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# 015



*Frontcover by Jeroen Ottens  
Backcover by Siercon and Coral*

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# Editorial

*By car\_mp*

A bit later than usual but here we are again. This number has had to wait for our annual event to end (you can see pictures of the event inside) but I assure you it has not affected the work we've put into this issue 015.

You can say many things about HispaBrick Magazine®, and after this issue you can say that it is in the clouds. In the previous issue we were visiting the stars, in this issue we get closer to the ground, but not on it. By chance we found ourselves surrounded by articles on flying machines.

In addition, our U.S. correspondent brings us two fantastic articles, opening new horizons in the magazine.

Another novelty is that we have changed our web service provider and now we can host our magazine files, without having to rely on other sites for storage. We hope all the download problems that have arisen in the past are solved.

As always, a big thanks to all who have collaborated with us, without them we would have closed fourteen numbers ago. And thanks to all who echo our launch issue after issue. Here we are, waiting for your opinions, suggestions and proposals.

#

## HISPA BRICK MAGAZINE EVENT 2012



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**CONSTRUCTION**  
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# The Sukhoi SU-37

## *Departed greatness Russian style*

By Jeroen Ottens

### The tragic history

Aviation has always stirred the imagination of the people. The freedom of flight. The elevation above the ordinary. It had a ring of romance to it as well. Not only the Casablanca-like romance, but also the engineering romance of pushing the boundaries further than ever thought possible. The development of airplanes is one of the most advanced developments in the human history. Almost all our technological fields have been stretched immensely by the airplane: electronics, mechanics, (aero-)dynamics, material science, etc.

As is typical for our species most developments were driven through our perpetual wish to fight. During the cold war era fighters on both sides of the iron curtain were constantly evolving to counter the perceived threats posed by the other side. And then the Berlin wall fell.

In the years following the fall the Russians opened up and started to show off what was previously shrouded in layers of mist and secrecy. They attended airshows with their latest fighters and stunned the world with their impossible aerobatic manoeuvres.

Where the Americans had chosen to go stealth, the Russians had chosen to go super-maneuverable. Planes that could fly with their nose pointing backwards or that could make a looping around their own axis. Planes with engine nozzles that could swivel to enhance the steering capabilities. Planes with engines that had more power than the weight of the plane itself so that it could fly straight up like a rocket. If ever a war was fought in dog-fights like World War I these planes would win hands-down.

And to top it all they looked stunningly beautiful.

But in the battlefield missiles are king nowadays. Planes fight against each other out of sight. By the time a dog-fight would ensue most planes will have been shot out of sky. And the grand Russian industry is falling apart. Knowledge drains away faster than gas from the leaking pipes in the tundras. Only two SU-37's were ever built. The Russian fighters are departed greatness.

### The building process

To be honest it was the looks that prompted me to build this plane in the first place. It was only during the research phase that I found out about its bittersweet history. I decided to build it studless, which was sort of a first for me (I was never a big fan of the studless technique because of the inherent weakness of the structures you could make, but with the advent of the 5x7 and 5x11 frames this issue is more manageable). I must say that I am almost convinced now. Especially for airplanes where smooth curves mean everything studless building gives a much better finishing (the smooth curved panels help a lot as well :). Furthermore the function density can be higher than with the old studded techniques. In figure 1 a good example of the high function density is given.

In total the whole building process took just over seven weeks. The first week I used to gather information from the internet. At [www.the-blueprints.com](http://www.the-blueprints.com) I got hold of a decent set of drawings which I plotted at the scale I wanted to build the plane in. In

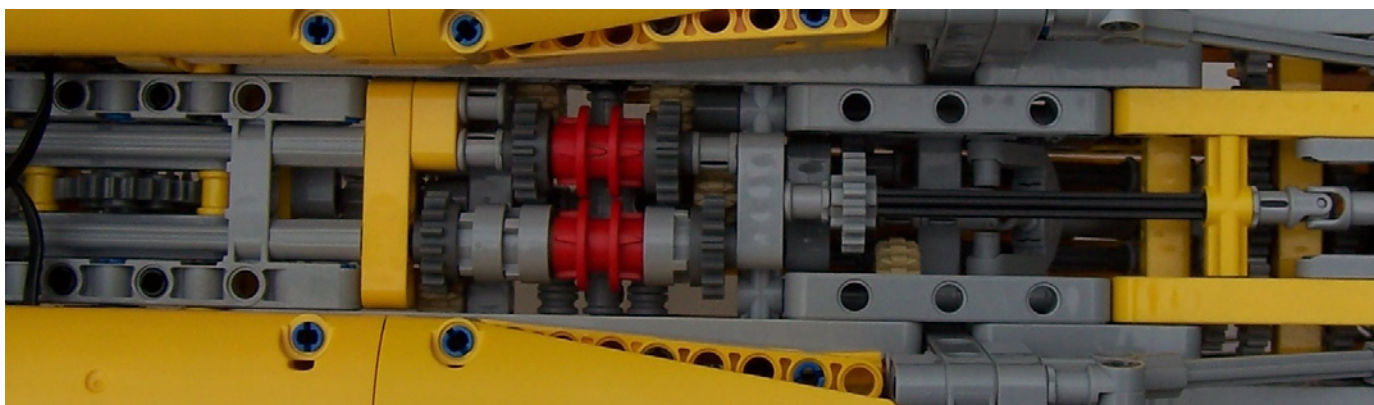


Figure 1: A look from the bottom: the function switch mechanics controlling the landing gears, the landing gear bay doors, airbrake and canopy. From left to right the following functions are visible: main landing gear (24 tooth gear), the switching mechanism, the mini-LA controlling the air brake and the mini-LA for the front landing gear.



figure 2 and 4 you can see this printout lying below the model. In the first stage I just built the outline of the plane. Almost no functions were incorporated, only the basic pivot points of the landing gears, canopy, etc were present. With studless building about one third of the structure is needed for stiffness, one-third is needed for the finishing and the last third is needed to guide the axles and gears. Once I had about half a plane (the other half is mirrored) I put that aside and started anew. This time I started with the functions in mind. Obviously the model should be motorized, so the first question was were to

put the motor(s). In my F14A I had filled the engine nacelles with removable jet-engine replicas and at first I wanted to do the same thing with this plane, but despite its size (almost 90 cm long) it has very little internal volume. In fact there are only three areas with some substantial volume: the two engine nacelles and the mid part of the fuselage. This plane really is just a wing with motors attached to it. So I skipped the removable jet-engines from the list of wanted features and put two PF-M motors in. In figure 3 you can see one of the motors sitting snugly inside the nacelle.

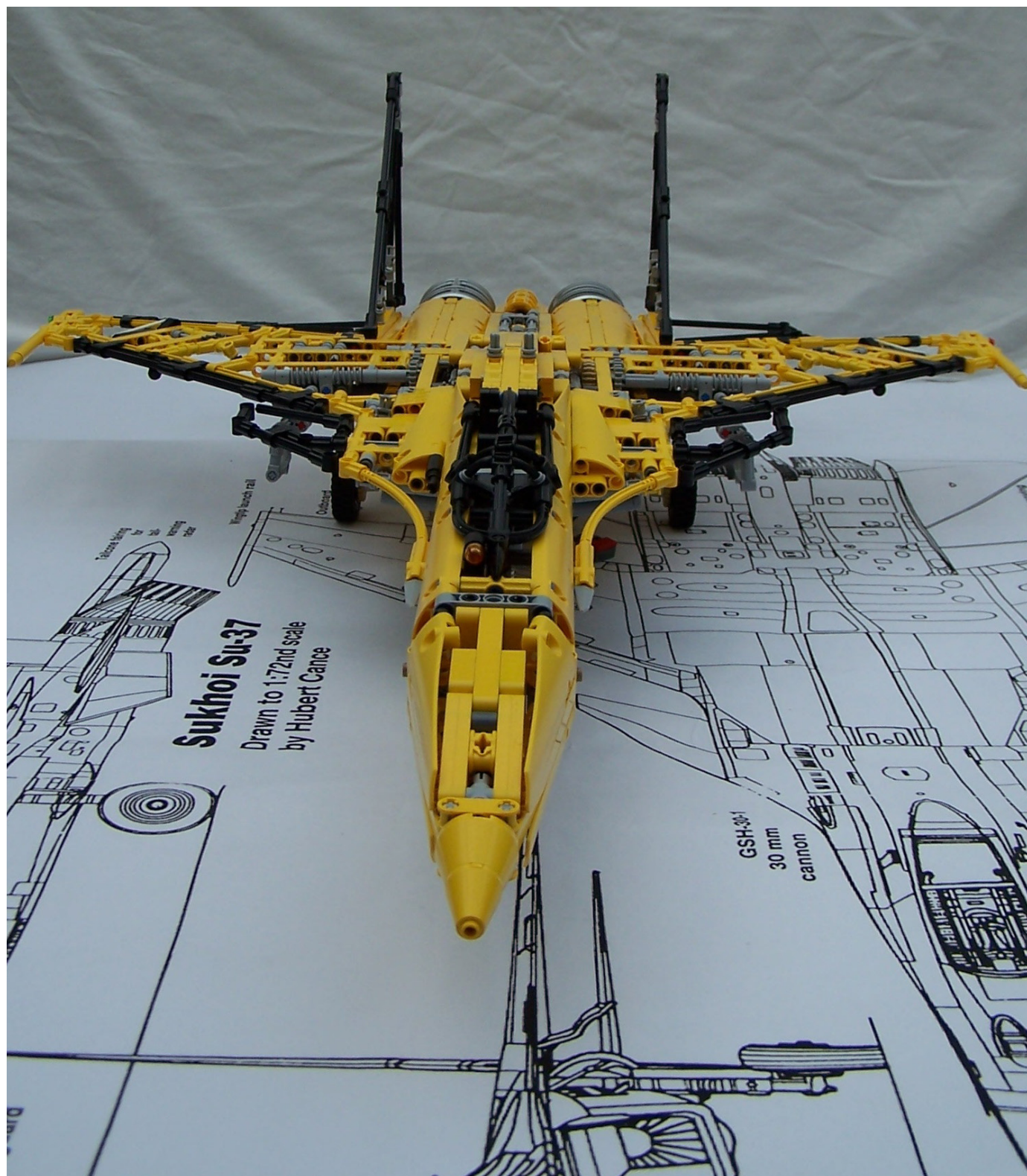


Figure 2: Front view of plane with the 1:1 scale drawing below it. The model rests on its own landing gear.



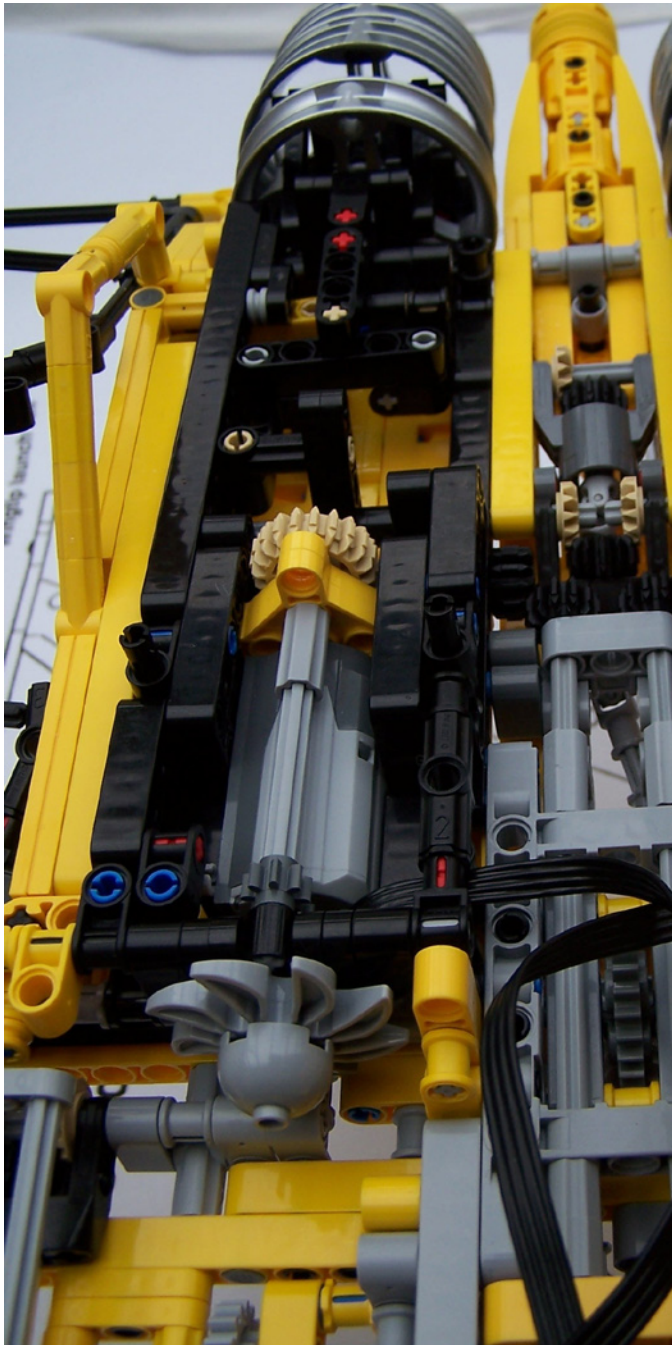
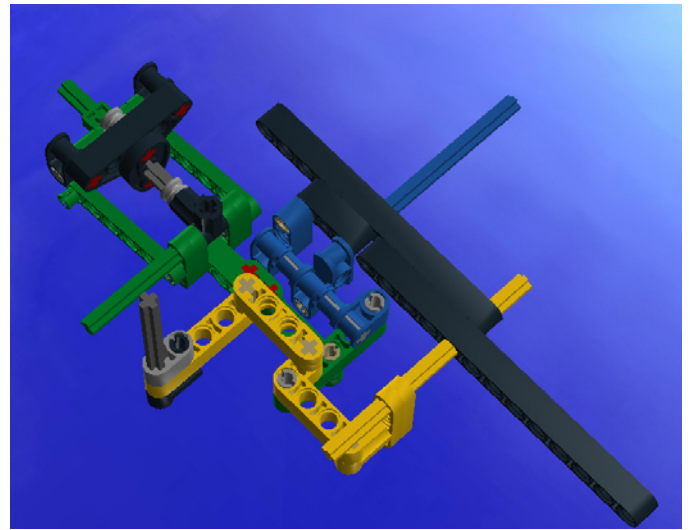


Figure 3: The inside of the right nacelle. The PF-M motors drives also the inlet fan. Behind it is the mechanical adder used to differentially control the tailplane and engine nozzle.

## The flight control surfaces

The second functional challenge were the flight control surfaces. The tail planes are controlled differentially. That means that they can move up and down together to steer the plane up or down (pitch control), but they can also move up and down against each other to put the plane on its side (roll control). The engine nozzles are steered in the same way. The vertical tail fins move left and right together to steer the plane left and right (yaw control). In practice most fighters fly

through a bend with a combination of yaw and roll, so I decided to combine these two controls. I devised a mechanical adder to combine the input of roll and pitch. In the next figure this mechanical adder is shown.



The black parts are part of the rigid structure. Blue is the pitch control, yellow is the roll control. The combined input of both determines the position of the green parts. The green axle is connected to the tail plane. The dark gray axle controls the vertical tail fin surface. On the other side of the plane the same mechanism is mirrored. The blue parts move in the same direction, but the yellow axle has the opposite direction at the other side (in figure 3 two tan 12-tooth bevel gears and one black 12-tooth double bevel gear are visible that do this). This configuration combines the roll and jaw control in such a way that if the plane turns left it also rolls on his left side. Before the main wings are two little canard wings. In the real plane these are controlled by fly-by-wire systems to keep the plane maneuverable at (extreme) high angles of attack. In this plane I have chosen to couple it to the roll control. In the figure 4 you can see that the canards are in their extreme position, while the tail planes are angled in opposite direction and the vertical fins are angled as well.

## Structural details

As I mentioned earlier I am not too fond of studless building because of the inherent weakness of the structure. Technic beam connections can easily be reinforced with plates on top and bottom, but studless beams can only connect to other beams through their holes. And that gives just that tiny little bit more play or less stiffness. Especially for a model this large it is not easy to prevent it from bending under its own weight. One of the tricks to keep a structure straight is by pre-stressing it in the other direction than the nominal load would do. The rear part of the fuselage is such a pre-stressed structure. In figure 6 you can see the framework that carries most of the weight. It is a triangle with a base of 34 studs and a height of 3 studs (see the drawn triangle in the figure). Pythagoras tells us that the sloped section should than be 34.13 studs. But it is only 34 studs. Consequently the backside is bended upwards slightly. The weight of the plane bends it downwards again so the net result is a relatively straight underside.

## The landing gear

The main landing gear has to rotate around its axis when it is raised to fit in the wing well. There are multiple ways of doing



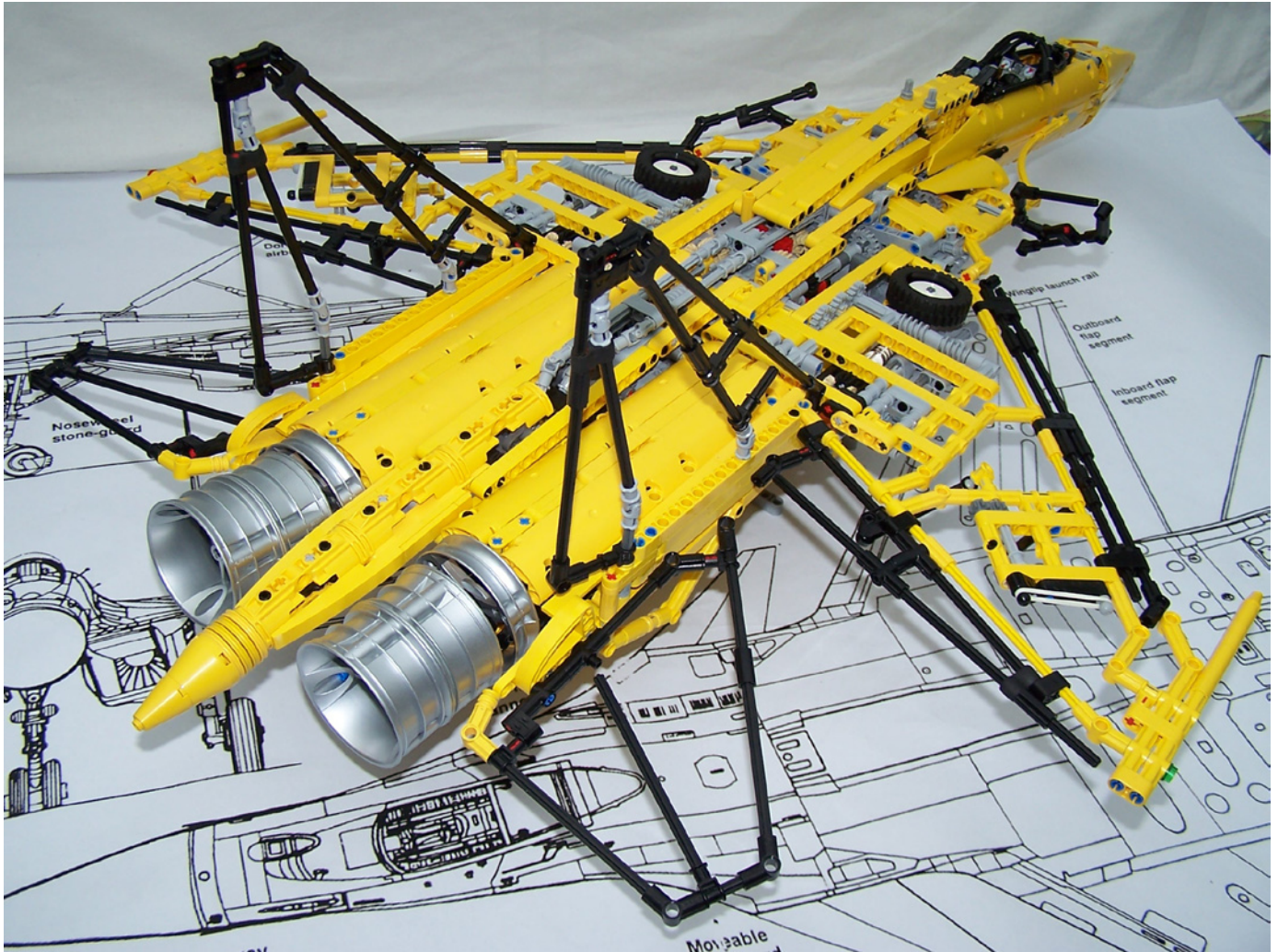


Figure 4: The plane has its control surfaces positioned for a left turn. The vertical fins turn left, the right tail plane pushes that side of the aircraft up, while the other one pushes it down. The engine nozzles enlarge that effect. The canards are also in quite extreme positions which normally would only be used when the plane is flying with his nose pointing upwards (or even slightly backwards).

this. For this model I have chosen to do it using a fixed gear. In figure 6 the mechanism is shown. The red gear is fixed with a long technic pin with stop bush, the yellow gears are used to drive the landing gear. The white gear will rotate along the red gear making it turn 90° around its axis while it is raised.

The front landing gear is much simpler. Because of the limited volume in the fuselage I had to compromise on the functionality. One of the compromises is that the nose gear has no steering functionality. It simply moves up and down. It is actuated with a mini linear actuator.

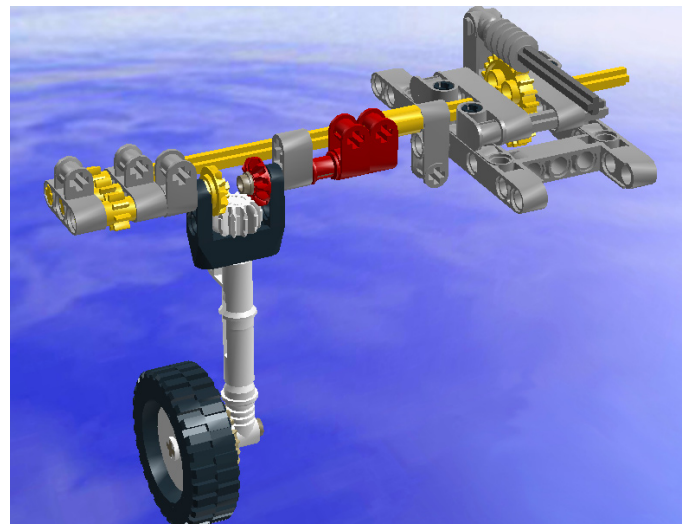


Figure 6 The main landing gear. The red part is fixed, the yellow part is the driving mechanism

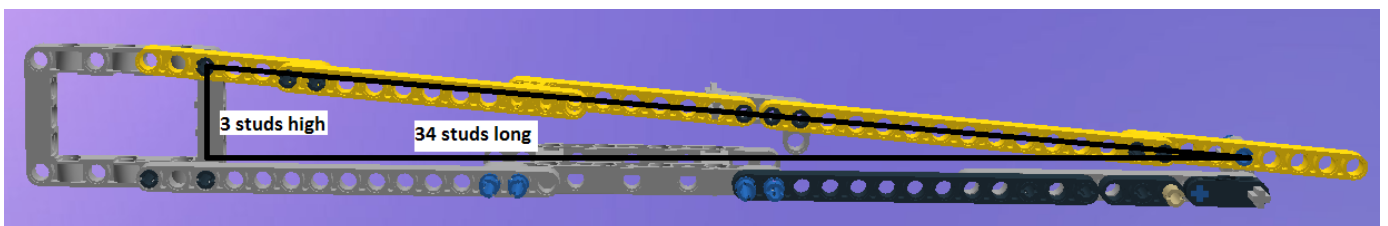


Figure 5: the pre-stressed frame in the rear of the fuselage to compensate the weight of the plane



## Building is compromising

Building with LEGO® is all about making compromises. Looks, structural integrity and functionality all have to fit in the same space. All in all I am pretty happy with this fighter as it turned out. It is quite strong and stiff. It is swooshable albeit the weight is significant.

It has the following functions:

Electrically controlled:

- Landing gear
- Landing gear bay doors
- Airbrake
- Canopy

Manually controlled

- Flight control surfaces
- Leading & trail edge flaps on the main wings

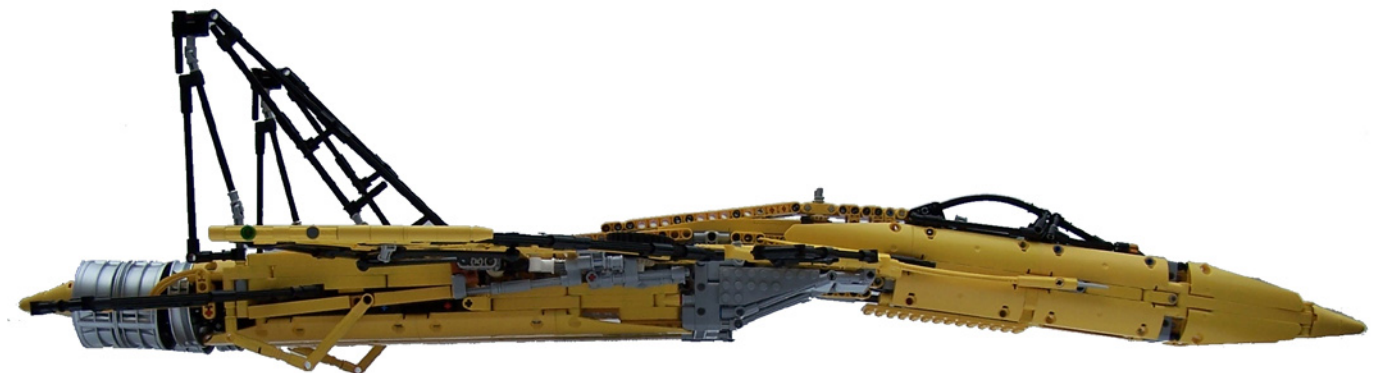
Functions that I wanted to incorporate but where I didn't find the space for:

- Ejection seat (including a mechanism to open the canopy a split second before the seat ejects)
- Nose gear that can steer
- Properly working bleed doors in the air intakes (they are actually there, but they move only a minimal amount)
- Functional control stick
- Nozzle outlets that can change diameter (afterburner mimicry)

As for the looks I'll leave that up to you to decide.

More pictures (and a video showing its functions) can be found on my Flickr page ([http://www.flickr.com/photos/jeroen\\_ottens/](http://www.flickr.com/photos/jeroen_ottens/)). Sadly the Sukhoi SU-37 will never fly the skies again to stun us with its agility. Only the romantic tales of its spectacular appearance will remain.

Leg godt,  
#





# Lockheed HC-130H Hercules

*United States Coast Guard No. 1711*

*By Beat Felber*

Probably still the most iconic transport plane, the Lockheed C-130 Hercules and its variants date back as early as 1954 when the first prototype had its maiden flight. The model I would like to present here, is quite a bit newer and belongs to the H-Series of the Hercules, with the A-Series being the first one to be produced. Nevertheless the plane I built my model after, is in service for the United States Coast Guard already since 1985.

The HC version of the Hercules is a series of special duty planes. They have been manufactured for the Coast Guard and the US Air Force only. The latter one uses the HC-130H for combat rescue duties, while the Coast Guard has more tasks for their Hercules' to fulfil. These include search and rescue, enforcement of laws and treaties, illegal drug interdiction, marine environmental protection, military readiness, International Ice Patrol missions and cargo and personnel transport.

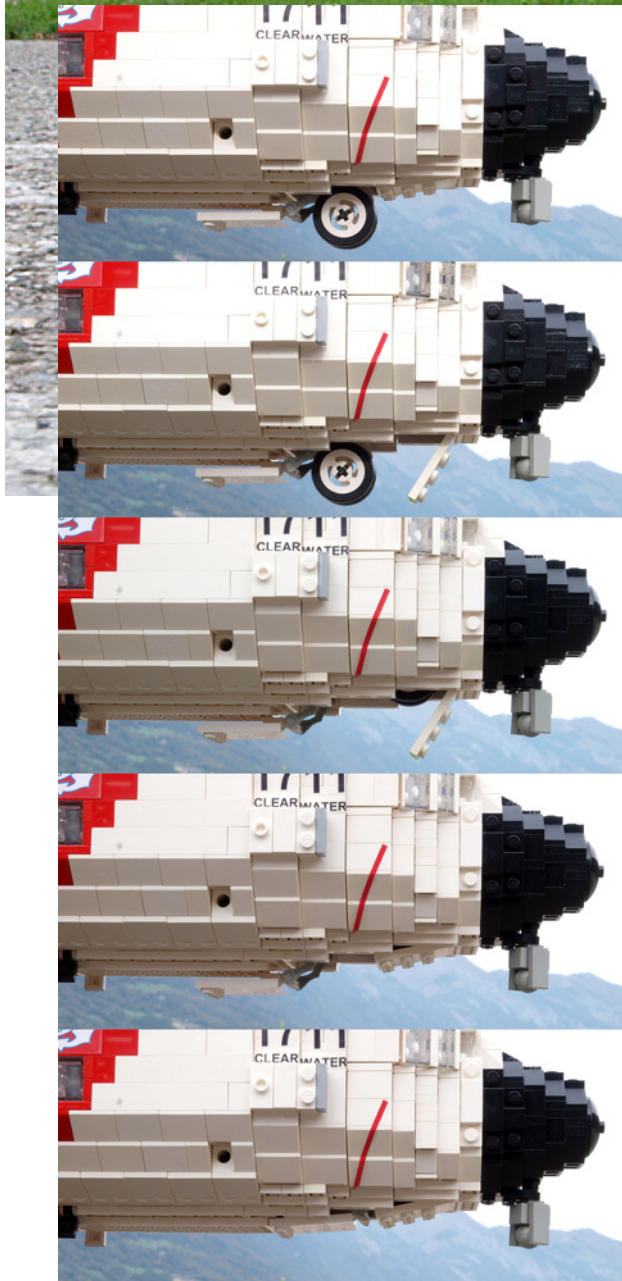
The Hercules is my first own creation of a plane for years. The idea to build it grew after I purchased a model kit of a Grumman F-14 Tomcat from [www.mechanizedbrick.com](http://www.mechanizedbrick.com) and customised it a bit. I decided that I would like to have more plane models in about the same scale. Since Ralph Savelsberg - better known as Mad Physicist on Flickr - already built a great collection of famous planes, I would never be able to even come close to, with my first creation, I was looking for

something I would be the first in by building it. So there was the Hercules. Thank you Mad Physicist for the inspiration I could draw from your creations!

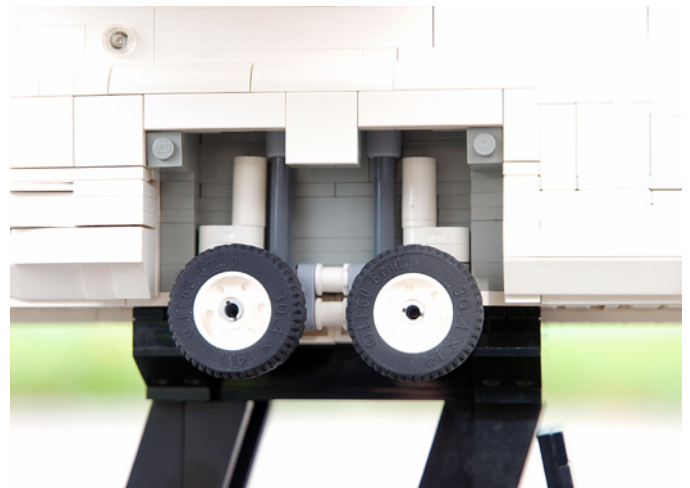
The decision to build a Coast Guard version and the exact scale of 1:33.75 are the result of the same initial idea for one of the main features of the model. The construction of the retractable main landing gear dictated the diameter of the fuselage and therefore the remaining dimensions. The part I chose for the wheel well cover, #2585, Hinge Panel 2 x 4 x 3 1/3, I only had in white. So the main colour of the model was given. It later proved to be quite a challenge to model the diagonal red and white stripes around the fuselage. Maintaining the stability and still be able to equip the interior with details, meant that I could not use complex SNOT techniques to realise this design feature.

The first thing to start with were the mechanics for the retractable landing gear. Having chosen the Hercules and set on a big scale, meant that I would have plenty of room to incorporate these working features into the model. So this should have been quite easy. But on the other hand, the big scale meant a heavy weight, which had to be supported by the main landing gear. On the real plane, hydraulically driven jackscrews move the four individual struts for the four main wheels up and down in a vertical movement. The most realistic and most compact way to copy this feature on my





model was to use a set of four mini linear actuators. Now there was a problem. LEGO® had these mini linear actuators designed with a clutch mechanism incorporated. This means that one actuator is able to bear a force along its axis of movement of about the equal of a weight of 900 g. I could never expect the model to perfectly sit on all four main wheels in a manner that the weight was equally distributed among the four linear actuators. And even then, a total mass of 3600 g would not have been sufficient for a model of this size.







Therefore I decided to modify the linear actuators so that they could bear more load.

I would recommend though that you only do so, if you do not plan to use the linear actuator in a motor driven configuration. It would then not be the actuator to prevent the drive train from stalling, but the weakest part anywhere else. The modification is done by opening the actuator and remove a small rubber part which is stuck in an eye of a needle like opening in the top end of the orange jackscrew. This is where the clutch action takes place. Replacing the rubber part by a thick piece of cardboard or some plastic sheet prevents the top part from contracting and therefore renders the clutch useless.

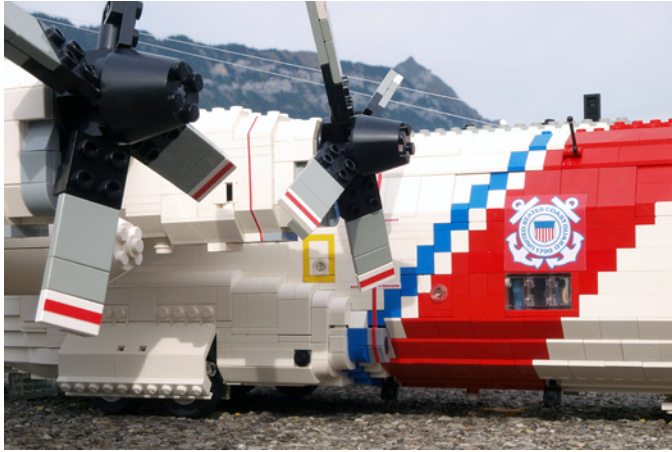
The four linear actuators are all driven in unison by a simple drive train. In order to not to disturb the appearance of the model, the "hand of god" actuating tool can be removed. On top of the fuselage in the wing's centre section is a Technic plate 2 x 4. Inserting a Technic axle with a knob on it in the centre hole, allows to wind the main landing gear up into the wheel well. The nose landing gear is driven by the same tool but independently from the main landing gear. A Technic brick 1 x 1 x 1 with hole on the right side of the fuselage is the only visible spot of the hidden mechanism. The nose landing gear is locked in both the extended and retracted positions by a bell-crank lever mechanism. The model is able to support its own

weight on the landing gear. Nevertheless it is a bit heavy on the tail so that the nose landing gear only barely touches the ground. All wheel well doors are manually operable.

The construction of the centre section of the fuselage was straightforward with a lot of slope bricks involved. A bit more complex were the nose and tail sections, with the latter one being a SNOT construction to achieve the correct angle. The most difficult part though to build was the cockpit section, which included quite some special building techniques. The real Hercules sports no less than 23 individual cockpit windows! I came up with a solution that still allowed to include a fully detailed interior. There are four seats in the cockpit for the pilot, co-pilot, engineer and radio operator as well as two crew berths. Two more seats are in the cargo compartment, one on each side behind a big side window, a speciality of the HC version C-130s. They are used while performing search duties.

To get a glimpse of the interior, the model features various operable doors. There is a crew entry hatch with included steps on the left side, right in between the cockpit and cargo sections and two paratroop doors on both sides at the rear end of the cargo hold. The latter ones swing open inwards to the ceiling, like on the real plane. Finally there is the two-part cargo door, with the upper part opening upwards and inwards, while the lower section serves as loading ramp and can be





details like antennae, position and landing lights and a set of self-made stickers. The latter ones were printed on either transparent or glossy white self-adhesive film using an inkjet printer. To display the model with the landing gear retracted, I built a display stand. It is also very useful when extending the landing gear since it is difficult to hold the plane in one hand and operate the mechanisms with the other. Despite its overall dimensions and weight, it is possible to “swoosh” the model. The corresponding picture - which furthermore shows the builder - shall give proof of it.

Some specs of the model:

Scale 1:33.75

Length 90 studs

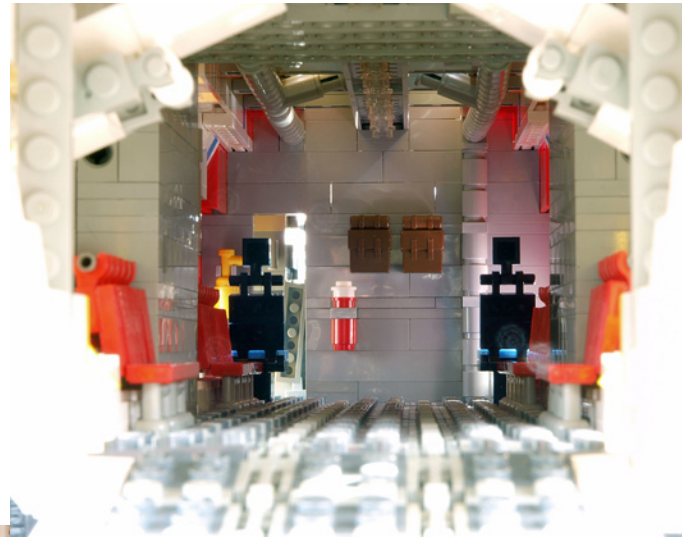
Wingspan 150 studs

About the author:

Beat Felber is a member of SwissLUG ([www.swisslug.ch](http://www.swisslug.ch)), the First Swiss LEGO® Club, and maintains a homepage called Engineering with ABS at [www.engineeringwithabs.ch](http://www.engineeringwithabs.ch)

lowered to the ground. Two optional small ramps close the gap between the runway and the main ramp and allow vehicles to drive into the cargo hold. The ramp can also be lowered to a horizontal position during flight, to airdrop parachute loads or to get a better view on the ocean surface while performing search duties.

The final sections to build were the wing, elevator and vertical fin. All of them feature operable control surfaces. On the wing there are ailerons and flaps. The Hercules has four turboprop engines of which two can be switched off to save fuel. This is a feature used during search and rescue operations when the plane circles over the ocean at low altitude and speed to spot castaways. My model features four variable-pitch propellers, manually operated. The outer sections of the wing slightly sweep, beginning after the inward engines. This is also the place where the outer sections separate from the centre section to ease transport of the model. The drawback of this solution is that the wing slightly flexes, whereas it would have been possible to build it stronger by skipping the sweep and build it one-piece. Hanging in between the inner and outer engine nacelles are two underwing fuel tanks to extend reach. The finishing touches to the model are realised by small











# The Hindenburg project

*The most famous zeppelin in the world recreated in LEGO®*

*By Jeroen Ottens*

## The inspiration

It was a sunny day in August 2011 when I saw my first flying zeppelin. I was on holiday with my family and we had decided to camp near the Bodensee. We drove through the city of Friedrichshafen when I spotted a white oval shape in the sky above me. I still remember the surprise and excitement that sight gave me. For all I knew the zeppelin was extinct. It had died in the flames of the Hindenburg crash before the war. My excitement grew even more when I found out that Friedrichshafen was home to the official zeppelin museum. I dragged my family with me to visit it. During that visit I began to truly appreciate the engineering achievement of the German engineers during the interwar. Within half an hour I had decided that I wanted to make a replica from LEGO so I spent the rest of the visit photographing details and soaking up as much information as I could. In the museum shop I was able to buy a book full of photos and data of the Hindenburg. That gave me enough information to start designing my LEGO® replica.

## Sketching the outlines

The most important thing to decide upon was the scale. One of the first things you see when you enter the zeppelin museum is a curved ceiling above you. It took some time before I realized that that ceiling was actually a 'small' part of the Hindenburg on a 1:1 scale.

The Hindenburg was big with a capital B. It's total length: 245 m. At his widest point: 40 m. For a comparison, the A380, the world's largest passenger aircraft, measures only 73 m. The Hindenburg was three times longer than the biggest aircraft today! And made without any of the materials that modern engineers can use to construct light and stiff structures.

But let's get back to the question of scale. At first I wanted to build it at minifig scale. That is roughly 1:50. It would mean I would get a model of 5 m long and 80 cm wide. I am not afraid to make big models, but this would be too much. It wouldn't even fit in my attic. So I decided to build it on a 1:100 scale. That would still lead to a 2.5 m long model, but at least it would fit in my attic :).

### Facts & figures:

Length: 291 studs  
Width: 53 studs  
Pieces: ~7000  
Weight: ~4.8 kg  
(of which 460 g is of the passenger decks)  
True building time: A few weeks  
Build duration: 1½ year



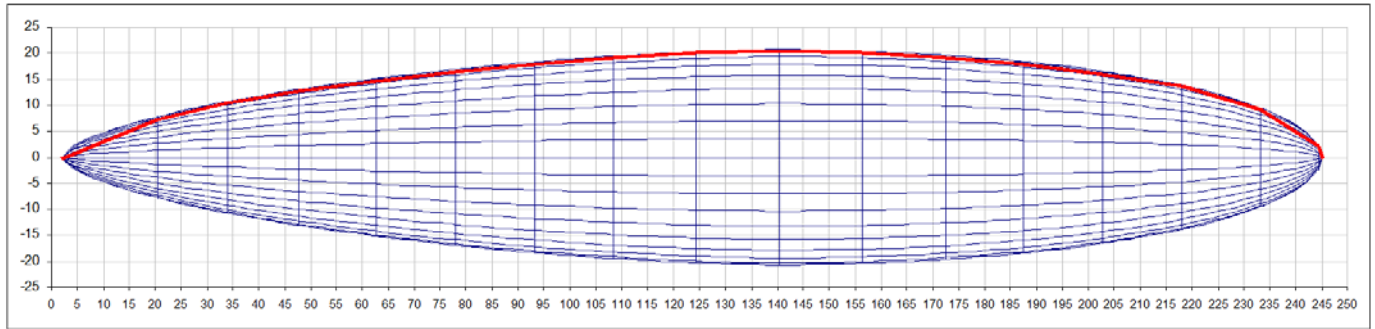


Figure 1: The Hindenburg outline (blue) and the LEGO version (red)

With that decision taken I could work on the next big question. How to create the shape? This turned out to be the most difficult puzzle to solve. The Hindenburg was built as a series of exterior rings that were connected with horizontal girders in between them. Every third ring was strengthened with steel cables that were connected to the central axis of the zeppelin, much like the spokes in a bicycle wheel. In between the main rings the large hydrogen filled balloons were placed. In total there were 15 main rings. Unfortunately each ring had a different diameter. And to complicate matters more some ancient Greek guy had invented the ratio between a ring's circumference and it's diameter. Since I wanted to replace the steel cables with LEGO® axles I needed both an integer length

for the radius and an integer length for the circumference. An impossible task so it seemed.

But fortunately the rings weren't round. They are 18 sided polygons. That means that the center of a polygon edge is ever so slightly closer to the center than the endpoint of the polygon edge. So I could choose to end my spokes at the center of an edge or at the endpoint. That gave enough freedom to minimize the error within acceptable tolerances. After a lot of Excel wizardry I came up with a nice set of measures. In figure 1 the real outline and the LEGO version are drawn. (Or at least so I thought at the time. It turned out that the real shape tapers less quickly than I thought. In hindsight I should have searched the web a bit more thorough before I started the project.)

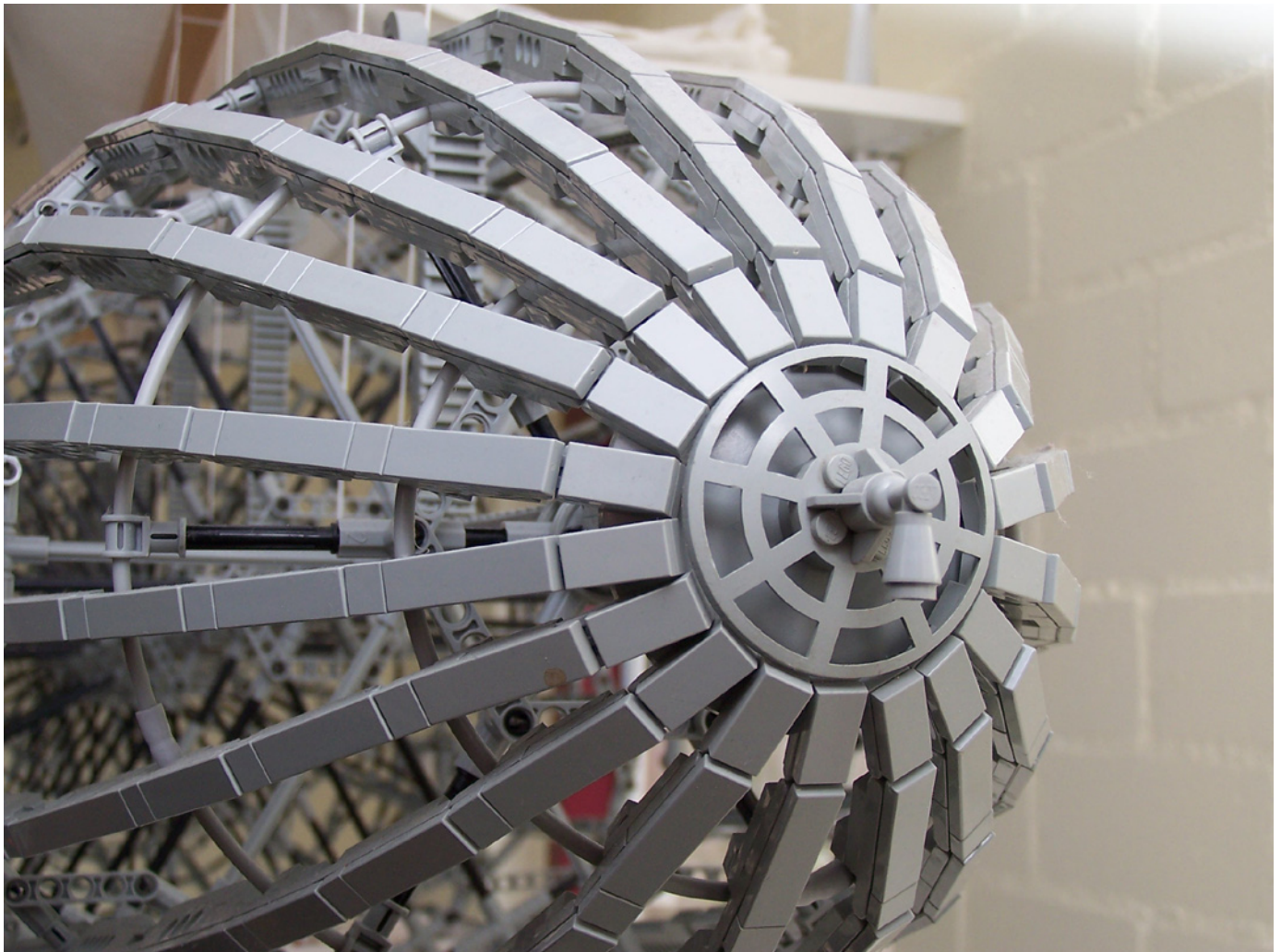


Figure 2: A close up of the front of the zeppelin, including the nose hook for the mooring mast



## Working out the construction

And now finally the build could begin. I started with the front. Since the curvature was so big between the first rings I had to use a different technique than simply placing beams between the rings like I did at the rest of the model. Instead I used the old hinge plates. Also the rings couldn't be made as polygons (the edges were smaller than 3 studs), so I used flextubes instead. In order to minimize the stress on the structure I pre-shaped them and then used a little piece of pneumatic hose to connect the ends. I used tiles as outer layer to suggest the smooth look of the fabric covering.

For the rings I could use only 6 spokes to connect the 18 sided polygons to the central shaft. I had to invent a way to keep the other corners at the right distance as well. For that I reverted to a technique that was also used by the original builders. I added shallow triangles to the spokes to connect at least 3 points to one spoke. To my surprise this arrangement was much stiffer than I had anticipated. The rings were so stiff that they could bear the weight of the structure when lying on a table. In figure 6 you can see the zeppelin resting on its rings somewhere midway through the build.

In figure 9 a dark gray flexcable end is just visible. All the beams on the top lengthwise rib are connected to each other with flexcables. Once the zeppelin is hanging this top rib will have the tendency to be pulled apart, the flexcables are holding it together.

### How to pre-shape flextubes

- 1) Make a holding structure to fix your flextube in the desired shape
- 2) Heat the flextube using a hairdryer for a few minutes
- 3) Cool the tube down in running cold water
- 4) Remove the structure and you will see that the flextube is now keeping its shape by itself.
- 5) If the tube is bending back once it is released you can repeat the procedure, but heat it a little longer, or over stressing the shape a little bit to accommodate for the relaxation afterward

## It's all about the details

When building such a big model as the Hindenburg it is easy to lose its attractiveness due to the inherent repetition. By incorporating as many details as possible the attention of the viewer is kept alive when he or she looks at the model. Fortunately the Hindenburg was filled with interesting details. First of all the outer objects; the steering gondola, the four



Figure 3: The nose seen from the inside. The ring with the gray spokes is the last segmented ring. The ones after that are made from pre-shaped flextubes.





Figure 4 A view from the inside, looking towards the rear. You can see several different techniques used to make the triangles at the end of the spokes. The first 3 rings in this picture are the biggest rings and are the only ones to have 12 spokes instead of 6.

motor gondolas and the four tail fins. But inside the zeppelin a whole zoo of objects was present:

A two story passenger area, with on the upper floor:

- The passenger cabins
- The lounge area (with the yellow piano made from titanium)
- The dining room

And on the lower floor:

- The smoking (!) room
- A Michelin star kitchen
- A bathroom with bubble bath
- The officer's mess

At the bottom of the hull a one foot wide passage ran from the nose to the rear. Alongside of it countless drums for water

and other fluids were hung. There was a radio chamber and a post office aboard the ship as well. At every second main ring a ladder was mounted that went all the way from the bottom to the top of the ship. At the top of these ladders venting holes were located that were used to vent excess hydrogen when needed. Next to the motor gondolas drums were present that contained diesel, oil and water to operate the motors. In the next figures some of these details can be seen.

A view of the upper passenger deck. The passenger cabins were located at the center of the ship. In the lower left the lounge area with the yellow piano is visible

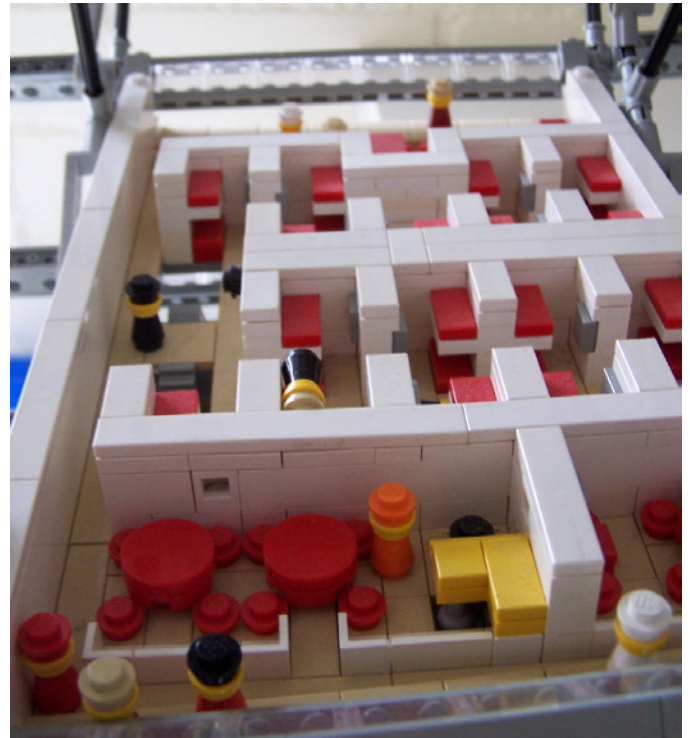
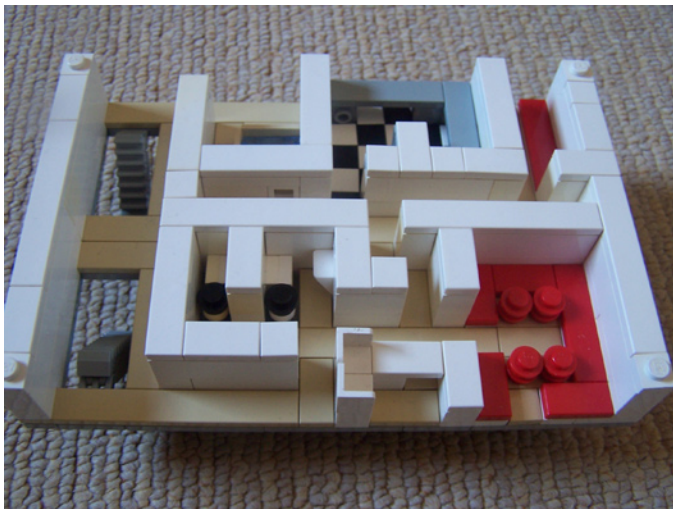


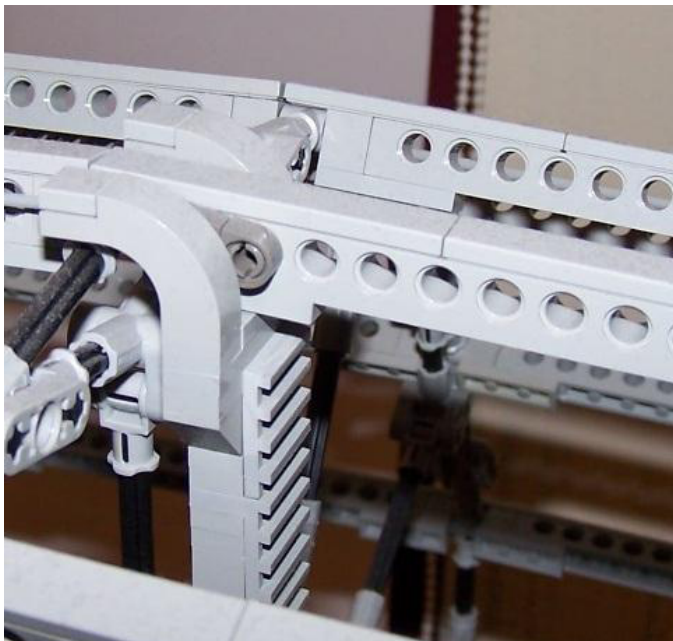
Figure 5: The outline is done, the model is resting with its belly on the black supporting structure. The stiffening triangles are visible at the edges of the rings (especially in front of the window).



The lower deck, with clockwise starting upper left: the bathroom, the kitchen, the officer's mess, the smoking room with bar and the toilets. The boarding stairs are extended to the ground.



One of the venting outlets at the top of the hull. The ladder is visible as well.



## The finishing touch

The last detail that needed to be added was the black limousine that also stood in the entrance hall of the zeppelin museum. It was the first car ever to be flown over the Atlantic Ocean and embodied the luxurious, almost decadent, image of the zeppelins.

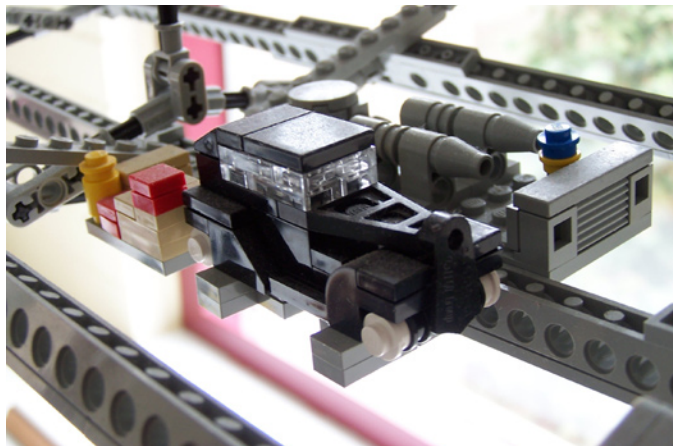
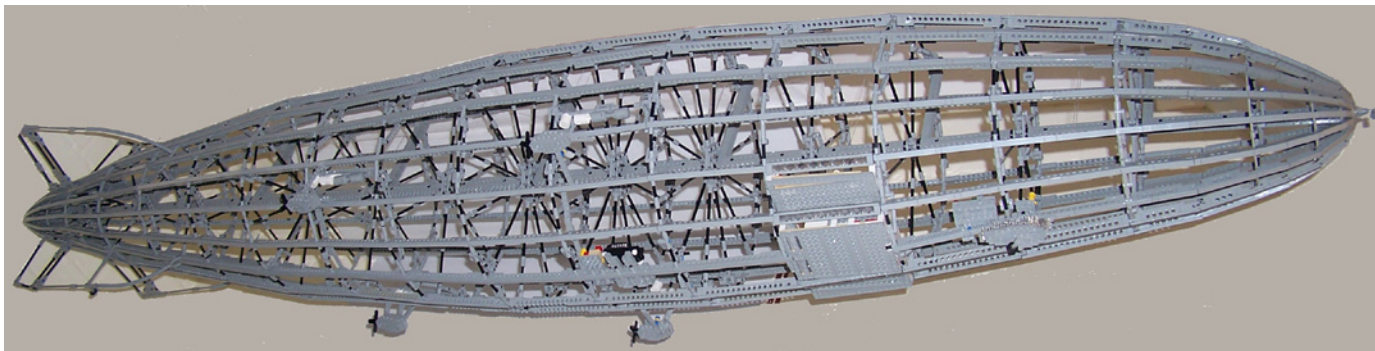


Figure 9: The Opel "Olympia" cabriolet

During the build of the zeppelin the LEGO® CUUSOO site went public. So once I had the model in decent enough state I published it there as well. If you want LEGO to consider producing this replica you can vote for it here. I am quite curious what the official LEGO comments will be, so I'll be very happy to reach the 1000 vote barrier :).

That leaves me with the hope that you enjoyed this article as much as I did building the Hindenburg. If you liked this zeppelin, you might also want to take a look around my Flickr page for other (big) flying machines. In figure 11 you can see the finished model in all its glory as it is hanging in my attic. Sailing above my head like the white zeppelin I saw on my holiday two summers ago.

Leg godt,  
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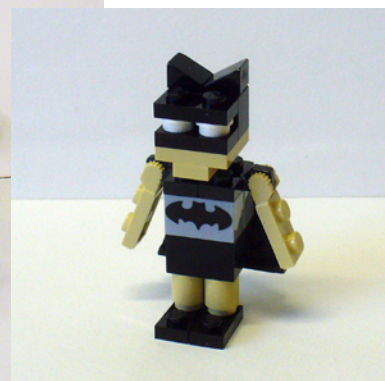
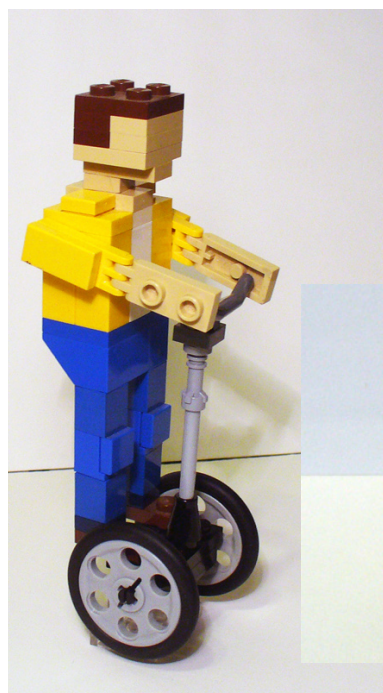
# The long and short of Miniland

*By Mariann Asanuma*

If you've been to any of the LEGOLAND parks around the world, you've seen the heart of the parks that is Miniland. It's always been my favorite section of the park and for at least the past decade, my favorite scale of building.

Sadly, for most adult LEGO® fans, Miniland is still an often misunderstood and confusing scale. As we have all grown up with Minifigs, most of us naturally build in that scale. But for me, once I began building in Miniland scale I never looked back.

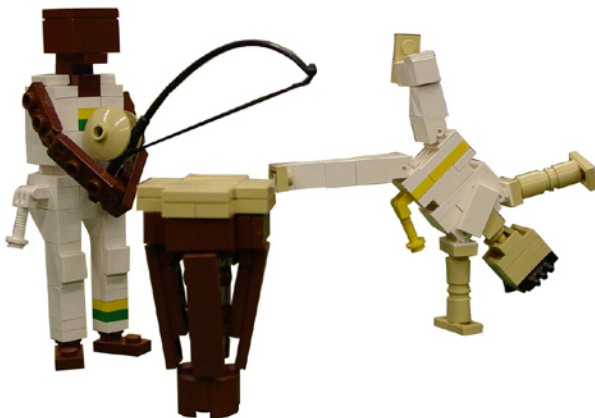
So, what is Miniland scale? Miniland scale is roughly 1/20 scale. Meaning that the 10 brick (4 inches) high built Miniland is 20 times smaller than an average man. The math doesn't completely work out as that would mean the person would be 6 feet 8 inches tall, but needless to say the figure represents roughly a 6 foot tall person. You can vary the height by a plate or two if you want to make an adult. Children usually range in height from 5-9 bricks high depending on the age you want to make the child.





And that is just one of the reasons that I like Miniland scale. You can represent all manner of different people – height, weight, skin tone, hair color, etc. – the variations are endless. The skin tone is usually made with tan or brown bricks and hair color and style is whatever you want it to be.

Miniland people can be built to do all manner of cool things. My Superman, Batman, and Capoeira Girl are all good examples of this. Not only are they flying, gazing over the city and cartwheeling, but because their outfits are brick built as well, they are infinitely customizable too.



Although the figures are for the most part faceless, their lack of expression does not lack personality. The slight turn of the head or the way the body is positioned can make all the difference. The Groom being dragged to the alter by his Bride is clearly not happy, but is resigned to the fact that he will be getting married today. The father and son fishing shows the dad's pride in his son even as he catches only a boot.



But of course Miniland isn't only about the figures, they are only the beginning. It's the buildings, vehicles, and all the little details like trash cans and park benches that makes Miniland what it is. Yes, it takes a lot more bricks to make a Miniland building or car, but you can also get a lot more detail on this larger scale.



Miniland even made an appearance at this year's BrickCon. Steve Oakes and I created a Mini BrickCon with Miniland people checking out a micro display of LEGO® models. It was a lot of fun and a big hit with the public. I'm already thinking about a larger and even more detailed version next year.

So give Miniland scale a try and see what you can build.  
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## Interview with Steph and Sean Mayo

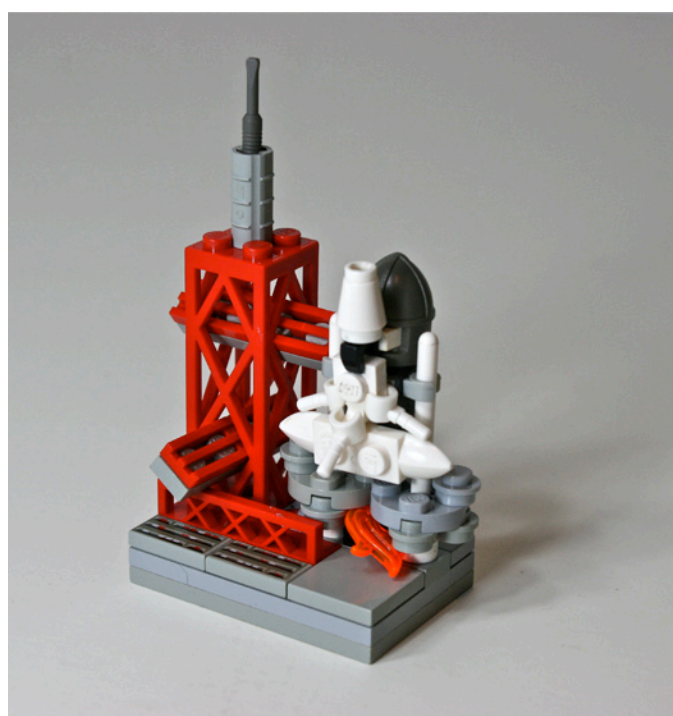
*By Katie Walker*

*Images by Steph and Sean Mayo*

Sean and Steph Mayo (Siercon and Coral) burst onto the LEGO® scene two years ago with a series of incredibly detailed and inventive fantasy models. Since then, they worked together to create an enchanting Faerie Forest, filled with charming details, creative use of parts and a sense of magic, both in the subject matter as well as in the ability to create an organic world out of LEGO. Sean and Steph are not limited to fantasy creations, but seem to master any theme they tackle, creating micro NASA shuttles, sailing ships, anime characters, and missile-shooting Big Macs with equal dexterity. Nor are they afraid to set a Mega Bloks castle on fire.

**Katie:** Tell me a little about yourselves.

**Sean and Steph:** Sure! We're a LEGO couple that loves to build together. But before and beyond LEGOs, we have tons of fun in all kinds of medieval fantasy or sci-fi environments. You can easily find us playing computer games, listening to books on tape, making arts and crafts, or dressing up and attending various cons. Also, we're aspiring authors. One of our long term projects and true goals is to finish a book that has been in the making for several years. Many of our builds are built in the same genre, and even our LEGO online names are from two of the main characters in our story. Do all of our builds







have a place somewhere in the story? No, not particularly, the storyline is much more cohesive than our often random whims of inspiration, but many of our fantasy MOCs at least have the same kind of "feel."

When we aren't busy having fun in imaginary worlds, Sean works as an environmental scientist. You can find Sean trouncing through the woods, delineating wetlands, streams and forests, then going back to the office to write reports about what was found. He secretly takes mental LEGO® notes informed by a closer study of nature. Sean also loves playing sports and practicing Jujitsu.

On a more personal note, Steph is currently staying at home, due to suffering with extreme chronic pain in her back and most of her body 24 hours a day, 7 days a week. She is an amazing person who is not defined by her pain, but we want to mention it if only to highlight the consistent joy in which she lives her life when every day is a battle to be strong, and when most of us would just curl up in bed and want to die. She is always creative and exploring imaginary worlds, while working on writing the book, and is still down to earth enough to keep finances together and particularly LEGO expenses from taking over our lives!



**Katie:** How did you get started with building LEGO?

**Sean and Steph:** Both of us have been building at different points in our lives to some extent, Steph when she was a kid and Sean up until college. But it wasn't until we got married and brought out Sean's LEGO collection from storage that we thought it might be fun to post some of those small builds online and perhaps slowly make houses and environments for

the many men Sean had collected throughout high school. Up to that point about 2 years ago, the Internet as an avenue for LEGOs hadn't crossed our minds, and we had much to learn. We learned about new concepts like SNOT (Studs Not On Top) or brick building baseplates. But what got us started building the most in the last 2 years was wanting to jumpstart the medieval fantasy aspect of the LEGO community. We could find a fair amount of MOC dragons, but many of the classic fantasy beasts had little, poor, or no representation. So we set out to construct a fantasy realm.

**Katie:** You work together as a team, sharing a single flickr account and publicly stating that you don't want anyone to know who built what. How does that work?"

**Sean and Steph:** I think we picture it this way, if either of us is going somewhere in life it's completely indebted to the





# FAERIE FOREST

By SIERCON AND CORAL



other. How this plays out in LEGO® is not just simply adding two people's building skill or building 'twice as fast', but the encouragement and hard work in all the other areas. Beyond building the actual MOC is the encouraged patience, edits, and sometimes even prods to redo the entire thing. It's sort of an accountability system. We don't post anything until the other looks at it, and often we'll get to simply build together. I think the main result of this is that rather than things taking half the time, we still take the same amount; the end result is just more refined than it would have been. Too often, I (Sean) get on a 'building high' and become completely satisfied, excited, and happy with the result of a few short hours of late night building. Steph often stands as the voice of reason in saying "Maybe you should go to sleep on it, it doesn't have to be posted tonight, and I think it could use some work." Only when I wake up the next morning do I think, "Wow... that doesn't look good at all." Typically what follows is a massive edit of the project and a solid post the night after. Two of the difficulties are entering contests and events. In contests, opponents can mull

over the idea that “I’m going up against two builders” and while that could be true, we honestly do keep it separate to honor the spirit of the rules. And in events, you are often forced to just put one name on the project, when in fact we both worked on it. We do our best to see that there really isn’t a “Sean” build vs. a “Steph” build. I think the basic truth is that all of our LEGO® would still be in boxes if it weren’t for both of us doing and enjoying this together!

## The Faerie Forest

**Katie:** Could you tell us a bit about the Faerie Forest? How did you come up with the original idea? How did the Forest develop over time? Was the final model what you expected when you started, or did it change significantly as you went along?

**Sean and Steph:** Well, one of the large armies Sean had collected in high school was Forestmen. In fact, they were his favorite, and as the most domestic and cheery of the lot they just seemed easiest to start with. So we set out to build them a home. The initial thought was, “If I were a Forestman, my dream home would be high up in the redwood forest.” And the idea developed from there. This build has been passively and incrementally built over the last year and a half. It did evolve over time, but not as drastically as one might expect. I think a good rule of thumb is that we build many things twice. Once a rough draft is built, we usually tear it down to fix some problem that was missed in the flurry of inspiration. Building late at night when you’re on a roll is awesome, and many times we go to bed happy with what we’ve done, but then we wake up. Only then once a build has incubated are we able to more accurately see aspects of it that we want to change, improve on, or scrap altogether. Fortunately this build was slightly different. Because it took so long much of the inspiration had time to sit, develop, and simply be added slowly. It is such a life-heavy build it was able to grow organically; trees, houses, or a river could be added after the fact without much adjustment. Some of the major additions that weren’t there for the first year of its existence were the lodge, the river, the spiral staircases, pinecones, and giant ferns. Our typical thought is that good things get better the more patient one is and the more refined you are able to make it. As a result, we have many creations that have been evolving over periods of time. We couldn’t tell you what creation we’re coming out with next, simply because we are typically working on about 10 MOCs at a time.

It seems people always want to know how many bricks are in it and how long it took. The “how many bricks” question always baffles us. We don’t understand how people keep track of how

many pieces are in their creations, and we definitely couldn’t tell you with really any of our builds. One thought is that it seems like it could be easier to calculate parts used in less organic builds. Regardless, our hats go off to people who know how many pieces are in their creations, and also those who can build digitally.

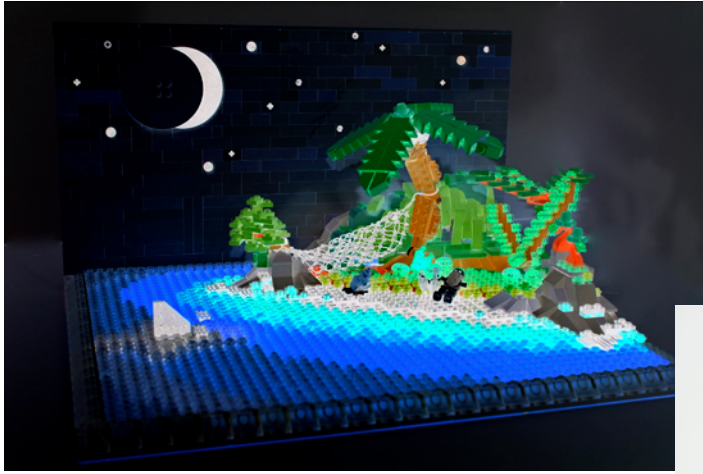
## Thinking Outside of the Box

**Katie:** You recently came up with some very interesting ideas for a “Thinking Outside of the Box” model-building contest. You set a Mega Bloks castle on fire; created another castle entirely by stacking bricks without connecting any of them together; and created an island with wild colors, meant to be seen through the “invert colors” filter on a computer. Can you tell more about the inception and execution of these ideas?”

**Sean and Steph:** Thanks! We were encouraged to think “outside the box” in a contest Nannan Zhang was running through the Builders Lounge on Flickr. “Thinking outside the box” was one of the categories. At the same time as that was happening we were moving to a new home. All of our LEGOs were (and still are to some degree) in shambles. Because of this finding specific pieces or creating refined or more elaborate displays would have been very difficult. It’s very hard to build when you can’t find pieces you know you have. So as a result we gravitated towards thinking about what could be done with LEGOs in general without using seed parts, or shuffling through bins for ideas or NPU (“nice piece usage”). The first thing we thought of was “Hey, we have all these rogue Mega Bloks! Lets make something really pretty out of it and post it online and see if all of the super LEGO/anti-Mega Bloks fans even notice.” When it became apparent that we didn’t have the pieces to make anything better than a average moc the idea to poorly film it and light it on fire kept the idea alive of getting a shock factor. So instead of announcing after a couple of days that the build was completely Mega Bloks, we rather tried to stun people into thinking we were burning LEGOs... only to hopefully relieve some fears by announcing that they were Mega Bloks. After that, we decided it probably wouldn’t be the best idea to enter a creation into a LEGO contest that did not contain LEGOs. So the idea of building something without locking the pieces together sparked. What was more anti-LEGO than to not have the pieces connected at all? Thus “Avalon” came into being. It was several fun nights of carefully stacking pieces like a card house or playing Jenga. A little known fact about LEGOs is that the vertical sides aren’t parallel! Try stacking 20 1x2 bricks on their sides without compensating for the slant of the sides. This made the build very difficult as all the pieces wanted to fall outward. Lastly, the inverted MOC. I saw a photo online of two different piles of colored bricks inverted, and it simply struck a chord. I wonder what makes green, and if someone could make an entire ugly MOC and have it invert to be something beautiful. And from having a good amount of pink pieces left over from various ‘Friends’ builds “Invert Island” was born. It was mind numbing trying to think in inverted colors. We frequently had to go back to a key photo that we used of various colors and combination of colors inverted on our computer to maintain that we were building with the right colors. Are the outside of the box MOCs done? Is there more outside of the box... Sure! I don’t know if we’ll be able to get to any of the ideas soon, but there are lots of outside of the box builds people can still build. One idea that has yet to be done is a refraction moc. If you’ve ever held a trans LEGO up to the light it can often make pretty patterns on the wall. Imagine cataloging the projection from lots of different pieces and making a mural triggered by a beautiful laser show... The door is open.







**Katie:** One of the things that I find the most impressive about your building is your ability to take a piece and use it in a completely novel way. Hair pieces become flowers and blackberries, a castle helmet turns into a micro-rocket, wheels transform into bee hives. How do you come up with these ideas? I know it's not always easy to understand how inspiration happens, but is there anything that you do in order to promote this kind of creativity?

**Sean and Steph:** Two steps stand out to us. First is that we have all of our pieces organized by color. We find that this encourages matching and strong color themes that often remove business and give MOCs life. So many of our MOCs start by looking at a single color, or bin of specific trans pieces, and assembling a disjointed version of whatever those pieces as a whole look like they could create. If we were to construct a dragon, rather than build a basic underlying structure, we go through the bins pulling out all the pieces or combination of pieces that look like they make the best version of a hand, tail, eyes, head, or teeth, while trying to keep within our desired scale. This process is done with no consideration to how the legs will attach to the body, or the head to the neck. There is no assembly at this point, just pure thought on what piece objectively looks best for this body part, in spite of ease of use and very often biased towards difficult pieces that people avoid. During this process we also utilize a small bin we have titled "Rare or Unique Pieces." If we have a piece we have never seen before, disassemble one, or find a rare or exceedingly odd or useless one, it goes in this bin. This is our random treasure trove of wacky and rare pieces. So during this process this bin is always kept in mind.

Lastly, we work on assembling the finished modules. It's a passive conviction that some connection can put anything together, and often it takes days to figure out how to attach the head to the body, or waist to the upper torso. But we always tell ourselves "there has to be a way." Rarely do we have to scrap an entire idea simply because we cannot connect the components. I think working in this disjointed and connection-less fashion and ignoring a potentially impossible connection

leaves room for using pieces in ways others might not have done so before.

**Katie:** What advice would you have for other builders who are looking to improve their models?

**Sean and Steph:** Learn from others, and get involved online. There are so many amazing builders to learn from. Also, be patient. When you are involved online there often develops a drive to post MOCs the second you think they might be done. Instead, let your creations incubate. Sleep on it and add to them and they will become more refined. This also helps when you are stuck on a creation and can't finish. Just put it aside, work on something else, and come back to it when you have more inspiration and creativity for that project. Some of our MOCs sat for up to a year before we posted them. It can definitely be hard to let things wait, but eventually it's worth it.

**Katie:** I want to thank Sean and Steph for not only taking their time to answer my questions, but also for sharing their incredible passion and building skills with the LEGO® Community.

## Resources

Sean and Steph on flickr: <http://www.flickr.com/photos/legocy/>

Sean and Steph on MOCpages: <http://www.mocpages.com/home.php/68828>

The complete Faerie Forest set: <http://www.flickr.com/photos/legocy/sets/72157630846954680>

Sacrilege (burning Mega Bloks) video: <http://www.flickr.com/photos/legocy/7882966434>

Avalon destruction video: <http://www.flickr.com/photos/legocy/7977937143>

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# About LEGO®, Congenital Muscular Dystrophy and mosaics

*By Pedro Almeida*

My name is Pedro Almeida, I am 22 years old, I am from Portugal and I am currently an University Student taking a Computer Engineering Degree.

I was born with Congenital Muscular Dystrophy (CMD). To be short, it's a chronic condition of genetic cause. It is characterized by the lack of a common protein called Merosine around the muscle fibres. The disease has an array of multiple complications it can bring – most common are generalised muscle weakness, contractures of variable severity, delayed or inexistent motor milestones, respiratory insufficiency, among a lot of others.

No cure is known to this moment. There are only treatments and technologies to provide a more comfortable life for the disabled.

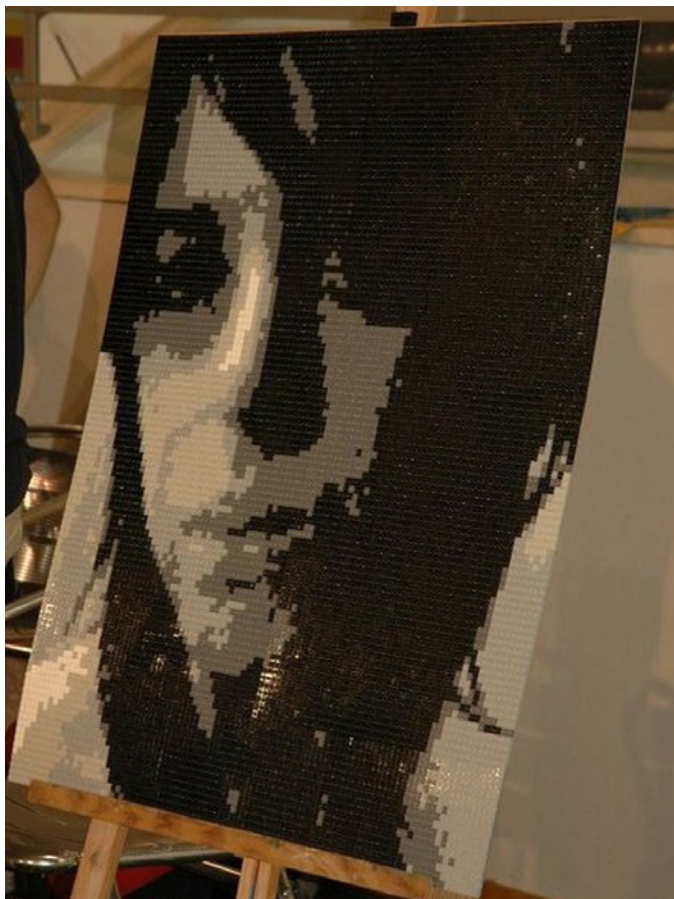
In my case the most significant thing you'll notice is that I move in a wheelchair as I do not have muscle strength to walk. Some disabled with the same condition as I are sometimes able to pass through the crawling stage, but I never did so.

Apart from that I have significant contractures. Both my legs and arms hardly open more than in a 90° degree angle and that is already pushing it a bit. I also have to use a BPAP non-invasive ventilation machine during sleep. This helps me improve my respiratory condition and breathe better overall during the day, when I breathe for myself without assistance (so far).

Last but not the least among my main difficulties is the fact I have developed a severe spinal scoliosis, meaning that I have to use a plaster jacket to support me so I can sit straight.







## Small beginnings

My first LEGO® experience was I believe in 1994 when I was 5 years old and I got my hands on what was left of a 1978 set of my older sister. It was just the baseplate, the minifigs, a few red bricks and some windows left, but it was enough to light the sparkle.

Since my mobility is limited and the most agile part of my body are my hands I started using a computer keyboard from a very young age. Combining small LEGO pieces was not always an easy task, but the fact that I have very thin fingers makes it easier for me to grab and place certain elements.

Things kept going slowly with those parts alone up until 1997 when by Christmas, I got my first decent sized set (and the first of my own) – 6915 Warp Wing Fighter of the UFO Collection. During the next two years I would get one or two more sets to keep the passion going.

Things got serious in the Christmas of 1999 (I was 10 by then) when my mother wrote to LEGO in Portugal talking about my passion for the toy and asking for a little help to consolidate that passion. That Christmas I was lucky to have LEGO send me 4 small sets – a Rock Raiders Figures Pack, a Space Vehicle, but best of all two Star Wars™ sets. I was already at this age a moderate fan of the Skywalker Saga, and LEGO helped me become a huge fan of SW while SW helped me become a better LEGO fan. By this time you may already have realized Star Wars is my favourite theme, taking a 55% share in my collection.

The next years would be spent playing with the few sets I had and making lots and lots of My Own Creations. I actually remember there was a time when I would make a different

fire-fighter truck every day (they were pretty much the same with a few different pieces here and there) and thus here I was discovering the full potential of LEGO and where it can take you at developing skills like creativity, imagination and the capacity to solve certain problems with building, which is a capacity that is helping me a lot now in my Engineer Degree.

Contrary to what you might think, I am not a big fan of LEGO Technic. The first ever really big set I got my hands on was a 1997 Technic set, the 8459 Pneumatic Front-End Loader. I started building it with enormous enthusiasm, only to realise that I didn't have the necessary strength to put the Technic pieces together. I tried for several days and finally had to completely give up on LEGO Technic.

However, building all by myself was quite boring as it was a lonely activity. By the time I went to middle school I had no friends who were really interested in LEGO, and my experience with the Internet was little at this time, even when it came to looking for LEGO related things. I eventually started doing so and roughly around 2004 I started hanging around in forums like FBTB and Eurobricks, mostly watching and learning and doing little if no active participation. All of this while obviously building up my collection over the years, with some big iconic sets like the Hogwarts Castle my sister bought me, and also the biggest batch of LEGO I ever bought at once, roughly 400€ at Christmas 2004, which included the UCS Sandcrawler which, if memory serves me well, is my biggest set to date.

## First contact

My pain would all come to an end in early 2007 when I found that there was something called a Portuguese LEGO Users Group. My first reaction was - "How did I not find this before?" and the next was - "Must get in, now!"

The fact you find there are more people interested in LEGO near you, becomes so overwhelming that it was impossible for me to not start buying much but much more LEGO than before, spending many many more hours looking for LEGO related news and other stuff.

This also helped me reach a whole new group of people, which is quite important for me as my disability limits my social life quite a lot. I am happy to say that not only in PLUG, but also in other LEGO Communities and even through LEGO Sales and Buys I have managed to gather a lot of friends that will help me in both LEGO and non-LEGO issues.

I am really proud to say that as I stand here today, 22 years old, LEGO is part of who I am. It is for me a kind of a presentation card. There's nowhere I go that I do not present my LEGO passion and works, and it usually generates a lot of interest which is great.

Now, as soon as I got into the whole LUG deal, I started seeing a lot of the work done by the local AFOLs (along all the work I saw on international forums) and I noticed there was this cool segment of LEGO art that was little explored by the time of 2007 – Mosaics.

It immediately caught my eye, especially because there was a lot of computer software made to assist in the project of LEGO Mosaics, and since everything related to computers interests me this was no different.

It was actually funny that by this time I was falling in love with this girl from my class, and my first thought was that I should





## LEGO Mosaic

Making a LEGO Mosaic usually starts with choosing a subject. I have limited myself to doing portraits of women with some meaning to me, either famous or not so famous, but you can choose to do just about anything.

The next step is choosing the right photo. This is the most difficult part and it only learn it by doing many tests on the software you choose to work with (I use Pic-To-Brick, but there's also Bricksaic and there may be more I don't know of). The fact I spend a lot of time trying things just for the sake of it and even if they are not going to become real Mosaics has helped me develop a few "filters" on what photos to use and not to use – for example it's impossible to make both very dark photos and photos with too much lighting. It even becomes more impossible to do photos where for example light only hits half a face or so. It is all really a matter of experience and a good eye.

do good and merge my passion for her and my passion for LEGO®, and so I started my first LEGO Mosaic: a portrait of her. I was quite inexperienced with things at this time, especially when it came to buying parts and it took me 3 years to complete this mosaic. First I investigated the different computer programs that were available, but I also needed help placing orders since I had no experience whatsoever of buying anything on the Internet, let alone LEGO pieces. Another factor that contributed to the delay was the fact that I moved to a location closer to the university and started studying for my engineering degree. By November 2010 the Mosaic was finished and I showed it to the girl who had inspired it- She really liked what I had done and encouraged me to continue making Mosaics.

### The future, and beyond

By now, 2012, I have already completed a second mosaic, using the American Singer/Songwriter Kelly Clarkson as a model and I am halfway through building a third one and am in the process of preparing a fourth.

Like many people who have a disability I sometimes feel different from the rest and I like to find ways of standing out in a positive way. One way of doing so is by showing my mosaics to anyone I can, for example on fan forums that are not LEGO related, and I feel really good about the amount of positive feedback I get about my mosaics.

For the first mosaics I built I used 48x48 baseplates, trying to make them in as few pieces as possible, but while building on the borders of these baseplates is easy, I often have difficulties working in the centre. For this reason the mosaics I am working on now are built on 32x32 baseplates.

My father was not very interested initially and didn't understand the time and money I spent on making mosaics, but over time he has come to appreciate my interest to the point where he has now started work on his own very first LEGO mosaic.

It is now my belief that doing LEGO Mosaics can be very challenging, especially if you want to become really good at it and not just do not so good work. I am proud to say that I have become better with every piece I do, and hope to keep progressing that way. Even with assistance from software things can be really tricky and it ultimately falls on your own experience and vision for art.

Next up is choosing the colour palette. While the software lets you use virtually every colour LEGO uses or has used in the past, things don't come as easily in practice. There's no pieces of some old colours, some others do not exist in the thousands I need (all my Mosaics are done solely with 1x1 plates) and some rare ones do exist in the necessary quantity but at prohibitive prices (I don't want to pay 0.40€ for a 1x1 plate and probably neither do you). Limiting the palette can do a lot of damage to the final work. I have come across two major issues – lack of "skin" colours (tan is ok but it's still not very close) and the lack of purple-like colours. Thanks to LEGO this last issue is gone as the Friends theme brought the Medium Lavender colour.

Once you're over the colour question it's time to go to the most important decision of all – size. Size matters a lot because it is what decides cost. You can do things as little as a 32x32 Baseplate to whatever size suits you (it's important to choose a size that fits the existing LEGO Baseplates, multiples of 16, 32 or 48 studs). It is my experience than when doing portraits like I do, you only get sufficient detail with a size of at least 96x96 studs, which is the smallest I have done. This takes around 9200 pieces and at an estimate of 0.04€ per piece, you can see how expensive this art can be (as a reference, my Kelly Clarkson mosaic, size 96x96 cost me 420€ in parts alone).

After all these steps it all becomes a matter of trying. Software like Pic-To-Brick has an array of different techniques. What I do is just generate a number of mosaics, with different sizes and techniques and ultimately pick the one that looks best.

When you have finally chosen what to do, the software makes it easy for you – it generates an image of what will be the Mosaic, but most of all it generates a list of the needed pieces. To this, I add my own little tweaks – I use image editing software to cut the image accordingly to the size of the baseplates I will use and second I usually cut the needed colours taking some that are used little in substitution for others to ease the shopping load.

With all this done it becomes easy – shop for the parts, receive them, place them and voilà – your Mosaic is done  
#

# Polybags

*Good things come in small packages...*

By Iluigib

Images by Brickset

Without realising it, they have become part of our lives. Since a couple of years, the small LEGO® sets that are offered (mainly) for promotional purposes have caused quite a stir in the world of LEGO fans and collectors. In the last couple of years the subworld of polybags has boomed and now we have a multitude, in different themes and with a strange distribution that is giving collectors some serious headaches.

My first encounter with the polybags was a number of years ago. A small promotional LEGO set came with Colgate toothpaste. There were three models, of which I managed to get two, a micro helicopter and a small excavator, both without a minifig. At the time I was in a semi-Dark Age, maybe my darkest period when, although I never completely disconnected from LEGO, I kept a certain distance, collecting only catalogues and some occasional sets. I remember I bought those two little polybags out of curiosity, as I was quite surprised to see they came with a tube of toothpaste.



Since then they disappeared from my life for quite some years, although for some time I think polybags were in fact little boxes containing sets with only a few pieces, like those offered by Shell at their petrol stations, for a low price. During my trips to Germany I would always stop at the petrol stations to see if I could find any of those sets and I loved the small sets that gave you an endearing model with just a couple of dozen pieces.



But in my opinion, although there were polybags in earlier times, like for example the 1195, a promo for Life on Mars, or certain local promotions like the Kabaya sets in Japan or those commemorating the World Championships Football and the LEGO Studios specials that were launched in collaboration with Coca-Cola™, they didn't become an important part of the LEGO world until the launch of the first Star Wars™ polybags in 2002. These were micro-scale reproductions of several ships that appeared in the catalogue for that same year.



We all know of the attraction generated by the Star Wars sets from their very beginning. The fact that the first polybag was a Tie Fighter, an iconic ship from the saga, resulted in a kick-start for collecting Star Wars polybags and, subsequently, of all kinds of themes.

Step by step the polybags became more widespread. I remember how at the beginning of the millennium, searching on eBay I found some of these little gems, and normally the asking price was way beyond what you would get in exchange. In France and Belgium, the fast-food chain Quick launched a promotion to obtain 4 City polybags in 2007. I was especially interested in one of the four sets, the 4937 - Life Guard, consisting of a life guard with an observation post and a



water scooter. Although I live relatively close to France (about 150km), It wasn't possible for me to make the trip 4 weeks in a row in order to get all 4 polybags. I therefore decided to get into contact with the French and Belgian Quick offices, soliciting the purchase of the 4 sets. Both offices were very kind and answered that they couldn't do anything until after the end of the promotion as they didn't know if there would be any bags left over. After several weeks I received two envelopes, one from each office, with a complete set of polybags and a letter offering me the sets free of charge. My passion for polybags started after building all 4 models and feeling fascinated at the beauty of models created with so few pieces.



In 2008 LEGO® “blew up” the polybag market with the massive launch of promotional sets. The promotions started with the British newspapers and the Brickmaster sets. Additionally, the fan clubs were gaining momentum and they all (or mostly) knew Bricklink and eBay. The polybag market had become a fact.

I'll go over the last 5 years to review the evolution of the polybag world and to show how, little by little, they have invaded all themes.

## 2008

This first year of the massive launch of polybags could be summed up as Brickmaster and Daily Mirror. Until 2008 the magazine Brickmaster (exclusive to the USA) had offered some Racers or Bionicle polybags, but it wasn't until 2008 that the first polybags labelled “Brickmaster” appeared. The simple fact of having an exclusive Brickmaster set was reason enough for collectors to try and get one. But additionally, that first year there was one set dedicated to Indiana Jones and another one to Star Wars™.



You can imagine the stir this caused among collectors of licensed polybags. And of course they could only be had in the USA, so the prices these sets reached were extortionate... and still are (the 20004 for example is at about 50€).

In October of that same year, the Daily Mirror offered a first promotion of polybags you could get buying the newspaper to get the coupon and collect the polybag in one of the affiliated shops. This first promotion resulted in my first “clash” with the tough reality of the polybags in set nr. 5626. It was the first appearance of a cross motor, and it was in a polybag that (like 99% of polybags) was not available in Spain. I fell in love with the motorbike and moved heaven and earth to get a couple of them. This anecdote is a good opportunity to mention that at this time LEGO made a “declaration of intent” with regards to polybags. Exclusive minifigs, pieces or elements were going to appear in these little promotional sets. It is a fact that later on more motorbikes of this type have appeared, and even in the same colour, but the polybags have offered, and continue to offer certain exclusives that cannot be found anywhere else.



There were other occasional promotions in some countries, with some sets that have not appeared again anywhere else, as was the case of the 4898, which (according to www.brickset.com) was available in Poland.





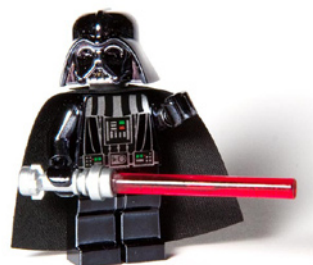
One of the sets that appeared in 2008 has been the longest-lasting and easiest to get in the history of LEGO®. It was 8028 - Tie Fighter, which even now in 2012 has been included in some promotions, albeit with a new packaging.



On the other side of the Atlantic, Brickmaster had no less than 3 Star Wars sets that year, micro-scale reproductions of ships of the saga, like the 20009 - AT-TE Walker and the 20010 - Republican Gunship.



But 2009 would be remembered as the year on the exclusive minifig. While it is true that in 2007, in the USA, there was a promotion with a golden C-3PO that appeared randomly in 10,000 Star Wars sets, and in 2009 the same was done with a chromed Darth Vader, it is no less true that this chromed Darth Vader could be obtained through other channels and there are rumours that the production was a lot higher than the theoretical 10,000 units.

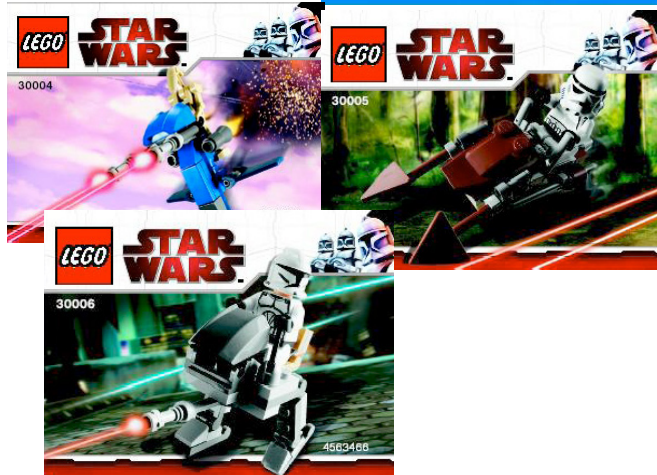


## 2009

The promotions in the UK increased. There were two waves in the Daily Mail which, in addition to the sets, provided a cardboard box and a mat to play with them. In this second year, RACERS and City were once again present and Star Wars™ sets were added regularly to the list. In the City theme there were some especially interesting sets like the 4899 - Tractor or the 30003- Road Roller.



In the Star Wars theme there were several sets with a minifig, a clone, a Stormtrooper or a droid.



The C-3PO was packaged in a somewhat special way, different from the typical polybag. But in the case of the Chrome Darth Vader the format was that of a typical polybag and all later promotions followed the same line. Therefore, although strictly speaking the C-3PO could be considered a polybag, in my opinion it is a separate case and I consider the Darth Vader to be the pioneer in this area.

## 2010

In 2010 the large increase of polybags continued. While in 2008 there were 22 and in 2009 there were 33, in 2010 the total of 50 models was reached. The themes are expanding as they do the options to get one of these little treasures. Evidently the City, Creator and Star Wars polybags continue to be the flagships of the promotions, but the temporary themes find their place and in 2010 there are sets from Atlantis, Prince of Persia, World Racers, Castle, Toy Story...

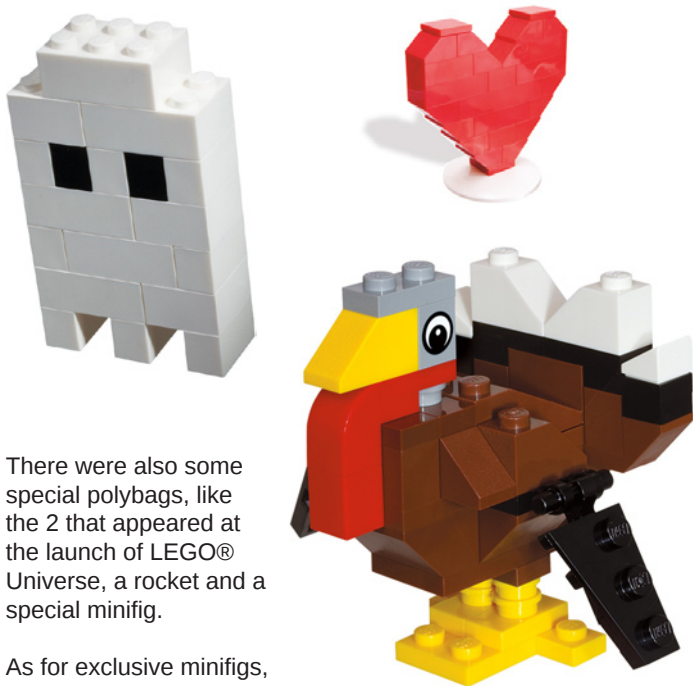






The distribution is also more global and exclusive, which means that polybags can be found in more countries, but many are exclusive to each particular country. For example, of the 4 Toy Story polybags, 2 were exclusive to the UK in another one of the Daily Mirror promotions and there were 4 magnets for the Bricktober promotion in Toys'R'Us in the USA.

On the other hand, in 2010 the Seasonal polybags are introduced, to commemorate Saint Valentine, Halloween, Thanksgiving, Christmas... Many of these were available through Shop at Home, although not always in all countries.



There were also some special polybags, like the 2 that appeared at the launch of LEGO® Universe, a rocket and a special minifig.

As for exclusive minifigs, there were several in 2010, like the Chrome Stormtrooper™, the white Bobba Fett or the exclusive minifig of the LEGO Club, named Max.

50 headaches in a prolific year. Unfortunately, in Spain we only had the opportunity to get the Chrome Stormtrooper™



2011

The increase in polybags continues, with a total of 59 and the number of themes is further increased. Brickmaster is a good source of slightly larger (and exclusive) models. Halfway through the year, the Brickmaster sets disappear, replaced by the Master Builder Academy (MBA) with more polybags containing more parts and even harder to get.



The promotions in the UK go from the Daily Mail to The Sun, but in the same quantity of sets, twice a year, and the same success. Another new distribution method for the polybags is at charity events. In 2011 there was one together with the BBC in the Children in Need campaign. It was a small yellow bear with a plastic tiara. Quite curious and beautiful.

Another curious fact in 2011 were the ghost polybag. A series of polybags were listed that (unfortunately) never appeared on





the market. For example there were supposed to have been an astronaut with a satellite in the City theme and a bee for Creator.



The licences become more prominent (if possible) and in this year there are polybags for Harry Potter™, Cars™, Pirates of the Carribean™...



together with many LEGO® owned themes like Alien Conquest, NinjaGO or Pharaoh's Quest. The Bricktober exclusives continue as well as the seasonal sets with new models for significant dates.



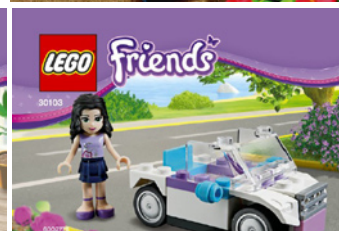
Evidently in this year there was also an exclusive minifig, a Shadow ARF Trooper that could be obtained through Shop at Home by buying Star Wars™ sets for a certain amount. At least in this way the "less favoured" countries had a shot at getting a polybag with an interesting minifig.



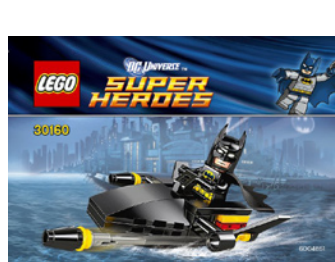
## 2012

And we arrive in 2012 We still do not have the final number, but I believe this year we will reach 50 without much of an effort. Two great novelties have appeared this year, coinciding with two new successful themes LEGO has launched: Friends and Super Heroes.

5 Friends polybags have appeared, each one with one of the girls doing their favourite activity. These polybags are a great way to get 5 Friends minifigs and pieces in new colours. The distribution has been quite massive, and they have been on sale in the USA and in newspaper promotions in Belgium and probably in the UK.



As for Super Heroes, there was a first series of polybags (DC) in a promotion of The Sun in May and they were on sale in the USA. Later on, when the Marvel Super Heroes appeared, there was a second wave with a more limited distribution, like for example Lex Luthor who could be obtained by pre-ordering the LEGO Batman 2 game.



The American LEGO division has also contributed, and this year they have offered an exclusive at the Rockefeller Center in New York: two cute models to commemorate the icons of the city: The Statue of Liberty and an amusing yellow cab.





The exclusive minifigs have also been present this year, with a Hulk, a TC-14 or a Darth Maul with a naked torso. The distribution of these minifigs has been quite generous and they have been available in many countries either through Shop at Home or in Tous'R'Us promotions.



Shell has brought out a set of 7 Ferrari polybags that are (supposedly) available worldwide at their petrol stations, in cooperation with Ferrari.



### What makes polybags so special?

We have seen a bit of the history and discussed the past 5 years, but... what turns polybags into objects of desire for collectors and fans?

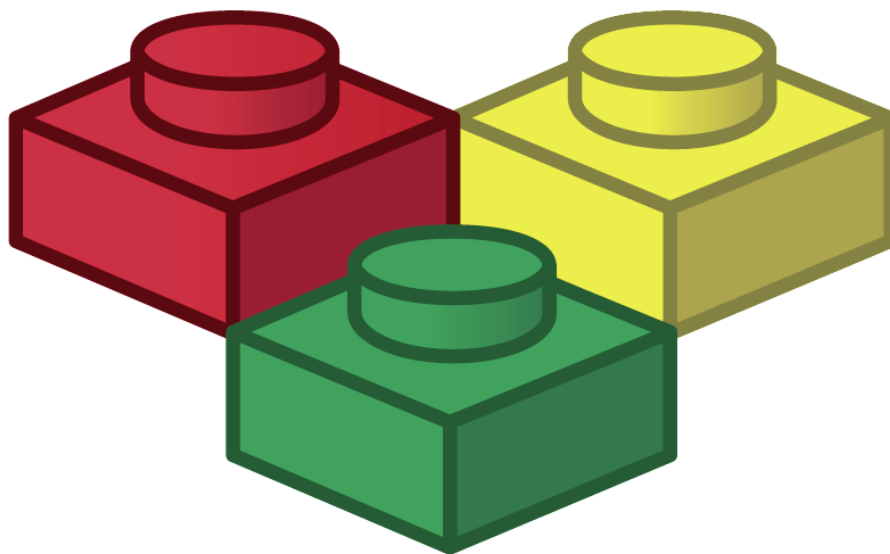
It is complicated to answer that question clearly and simply. In my case it was the fascination with the fact that with a relatively limited number of pieces some very well built models can be achieved. I love the miniature reproductions of sets like the mini-ships from Star Wars™ or the Creator sets. In the case of City, which is my favourite theme, these little sets are a complement to our displays, often with new and singular models.

Licensed polybags are a headache as often they include special minifigs or models, or exclusive or hard to get parts. The "erratic" distribution results in a lot of frustration, or in the worst case, an excessive inflation of the sales prices between private sellers.

Luckily, this year I have discovered the fascinating world of bartering through the Brickset forum, where you can meet AFOLs from all over the world and where solidarity with fellow fans who are having a hard time getting certain polybags because they are practically non-existent in our countries prevails over a tough business attitude. Thanks to many friends in the UK, Germany, the US or Poland, among others, I have been able to complete an important part of my collection by bartering. I would like to take this opportunity to thank Huw for allowing these transactions to take place and all the fans for their friendliness and willingness to help me in the difficult task of trying to complete my collection.

As I said in the title of this article, "Good things come in small packages". The essence of LEGO® is creativity. Building beautiful, stable and realistic models with less than 50 pieces is a challenge and the polybags meet it...let's hope for many more years to come.

Acknowledgements: Brickset for the images in this article.  
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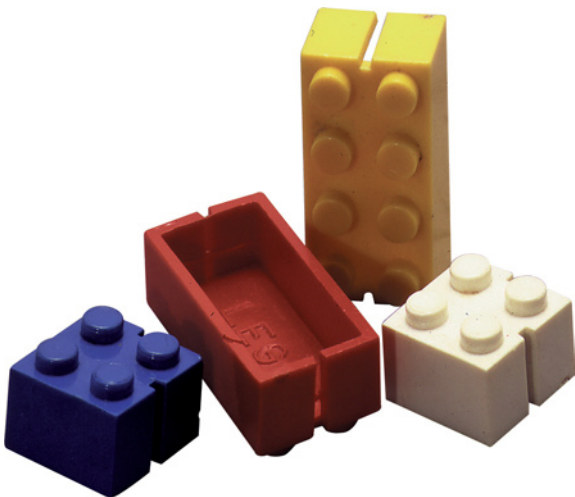
# Brickset.com



## 80 years LEGO® Group

*By Satanspoet*

*Images and facts by LEGO® Iberia S.A.*



On 10 August 2012 the LEGO® Group celebrated its 80th anniversary;

80 years since 1932 when Ole Kirk Christiansen founded the Danish wooden toys company in Billund, under the motto: "Only the best is good enough".

With that as a goal and the evolution of wooden toys to plastic bricks, today the LEGO company is the third largest producer of toys in the world in over 130 countries with approximately 10,000 employees.

The name LEGO comes from the two Danish words "leg" and "got", which translate to "play well".



## The success story of the LEGO® brick

The triumph of the LEGO Group started almost fifteen years after the foundation of the company, when Ole Kirk Christiansen discovered that plastic was the ideal material for the production of toys. It was in the late 40s when the first bricks hit the market, which resemble today's modern classic.

In 1958, Christiansen perfected the LEGO brick from being empty inside, a slot at each end, to having a fitting system that is used today in about 3120 LEGO pieces. This allows LEGO bricks to be combined in an infinite variety of combinations of continuously new ways. An example is that for six bricks of the same color with 2X4 studs, there are 915 million combination possibilities. Imagination therefore has no boundaries.

Since 1962, LEGO bricks are made of acrylonitrile-butadiene-styrene-copolymer – short: ABS. This matte-gloss plastic is very hard and has a scratch and bite proof surface. The material is completely safe for children, who like putting their toys in their mouth, so that makes it a perfectly suitable toy for children and especially LEGO DUPLO® bricks, which are twice as big as the normal LEGO bricks and therefore cannot be swallowed.



## 80 years of colorful bricks

- 80 years after the foundation of the LEGO Group on August 10th 1932 every person on earth owns an average of 80 LEGO bricks.

- Laid end to end, the number of LEGO bricks sold in 2011 would reach around the world more than 16 times.

- ABS granulates are melted at 232 °C and injected into the molds at a pressure of between 25 and 150 G according to the type of piece.

- In 2012, approximately 340 million minifigures will be produced. If you put them next to each other in a line, it would stretch approximately 7,900 km – equivalent to the distance from Billund, Denmark to Dallas in Texas, USA.

- There are 915 million different combination possibilities for six 2x4 LEGO bricks in the same color.

- About 80 famous movie characters have been produced as LEGO minifigures - from Luke Skywalker™, Harry Potter, Spider-Man, Indiana Jones and Jack Sparrow, to the characters of The Lord of the Rings™ released in July..

- 2.5 million LEGO DUPLO® elements are moulded daily at the LEGO factory in Hungary.

- With 5,195 LEGO elements, the LEGO Star Wars™ Millennium Falcon is the biggest LEGO model ever.



## 50 years of the LEGO wheel

- The LEGO group produces 381 million wheels every year, making it one of the largest tire makers in the world.

- The first LEGO wheel featured in LEGO set no. 400, which was released in 1962. In 1967 it was LEGO's best-selling set with an impressive 820,400 units sold.

- The smallest LEGO wheel has a diameter of 14.4 millimeter. It belongs to a small two-seater that was included in sets no. 345 and 346, which came on the market in 1969.

- The largest LEGO wheel has a diameter of 10.7 centimeter and was made for the Power Puller (set no. 8457), which came out in 2000.

- Before the LEGO wheel children had to play with finished miniature cars or they had to build wheels out of LEGO bricks.

- Since 1962 LEGO wheels have been made from LEGO's dependable base material ABS (acrylonitrile butadiene styrene).

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# Technic Cranes

*By Manticore*

In the world of LEGO® Technic, the most successful sets are probably those cranes and excavators. No matter how many mechanisms you introduce in a Technic vehicle, it's nothing compared to the possible functions of a crane or excavator. And of course the playability, a term that is sometimes frowned upon in this theme for experts, of a crane or excavator is much greater.

So in this magazine we will have a closer look at what, in my opinion, are the best LEGO Technic cranes, leaving the excavators for a future article. Don't expect excessively technical or complex reviews. I will simply describe the typical mechanisms of these impressive construction vehicles, looking at the most significant developments that have taken place during the Technic history.

Let's start with the obvious: what is a crane? Cranes are one of the main machines used in large constructions and industrial installations, allowing for the vertical transportation of materials or loads that need to be lifted and can be used for any task.

In addition to lifting heavy weights, cranes need to be well balanced; to this end they use stabilizers which allow changes in the centre of gravity of the machine and its load.

There are different kinds of cranes, and their classification is not easy as we can choose different criteria to differentiate them. For example, based on their functionality there are portal cranes (used in naval construction), industrial cranes, foresting cranes, etc. However, a more general classification is done based on the mobility of the crane and its type of installation. In this way, three types of cranes can be differentiated: fixed cranes, cranes on rails and mobile cranes.

LEGO in its Technic theme has marketed mainly mobile cranes. So we will concentrate on what in my opinion are the four most representative sets of mobile cranes. Don't confuse mobile cranes with crane trucks. A mobile crane is a combination of base (on wheels or occasionally on treads), with its own propulsion and steering mechanisms, on top of which a large crane is mounted. A crane truck is basically a truck, while in a mobile crane, despite using a truck-like base for driving, the important part of the vehicle is the crane, not the truck. For those who are still not clear on the difference, and since a picture is worth a thousand words, take a look the 8258 and 8421 to clearly see the difference. And talking of crane

trucks, I may have to write an article about those as well since they will not be referenced in this one. We'll see...

Mobile cranes are made up of two clearly different parts. The chassis or base vehicle, with stabilisers (hydraulic jacks fitted on outriggers) that prevent the crane from falling over, and a turning structure on which the boom of the crane and the control cabin are mounted.

Getting back to LEGO, what four sets are we talking about? Knowing the interest of the author of this article you can easily guess. The first crane, in order to keep even the old-time fans (like me) happy, is the 855, the first Technic crane in the history of LEGO.

The second set is the 8460. A crane that is similar to its older brother, but at a smaller scale.

In third place we'll look at "the set": 8421. The best Technic crane to date. It has become slightly outdated because it arrived just before the PF motor revolution, but even to it is the most complete and functional crane,... and the biggest.

And finally, the most recent Technic crane, the 8053, which incorporates the new linear actuators and has inherited the virtues of its predecessors, as well as some defects.

There are more, but they are mostly small sets and don't add significantly to this article.





## 855: NOSTALGIA

In 1978, together with other marvellous sets in the 85\* range, a small technical wonder appeared. I say small, because today, nearly 35 years later we have seen sets that are much bigger. But in its day it was a true revolution.

A salient detail is that the same set was brought out in the USA one year later with number 995 and, as usual, in the "Expert Builder" theme.

Along with its vintage look (too square for any young fan... younger than me anyway), this crane included all the functions of a real mobile crane: 360 degree rotation, stabilizers, elevation system and telescopic boom. If you have built a Technic set in the last lustrum it may seem too simple, but the features and functions that were built using just 512 bricks and plates (remember, it was back in 1978) are spectacular.

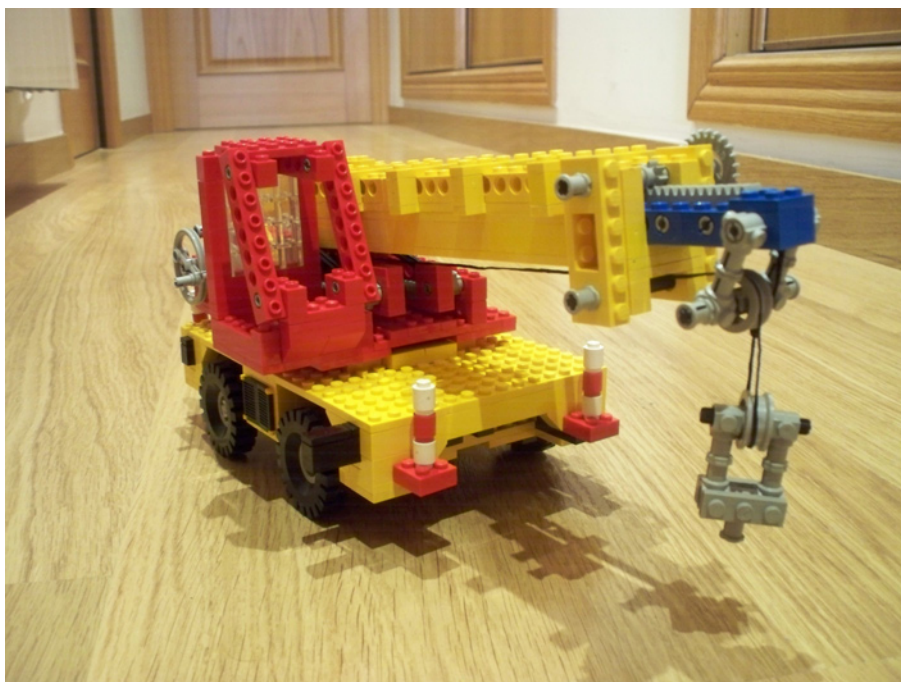
Also, in this set LEGO® introduced new elements which have later become a standard for any crane. The LEGO string/cord for example and the simple but efficient system for keeping the reel in position, using a rubber belt. And something that anyone building Technic has used hundreds of times: attaching wheels with Technic pins.

### The telescopic boom

The method for lifting the boom is quite simple. Using two types of gears (8 and 24 teeth) a reduction of 9:1 is achieved, which moves the mechanism until the boom is lifted. At the start of the movement the going is tough, but after achieving an angle of approximately 15 degrees things get easier.

As mentioned before, a simple mechanism prevents the boom from coming down by its own weight. A gear rack 1x4 is anchored to a 24 tooth gear that controls the elevation of the boom.

As for the boom itself, an extendible blue part moves inside the main boom, built in yellow. A handle on the left side controls the movement through a very long Technic axle, the result of combining three 8-stud long axles. OK, no big deal, but in its day it was quite imposing.



It also includes limiters to avoid the boom extending or contracting too much. At its maximum elongation, the telescopic boom extends to 180% its original length.

### Driving base:

The first thing that stands out is that the base doesn't appear to be a vehicle. There is no cabin, no steering, let alone suspension, a differential or other mechanisms that today might be considered inexcusable. The union of base and crane is as simple as effective: a 4x4 turntable allows 360° rotation. Manual rotation that is.

For this vehicle to roll effortlessly, four classical 17x43 wheels are used, so often included in so many sets until relatively recently.

The base of the crane is the least interesting part of the set, but at the time it was not so bad at all. One good thing is that it included stabilizers. Very simple ones; black bricks as outriggers, coming out of each of the four corners of the vehicle and by way of "jacks" three round bricks 1x1 and a couple of plates 2x2. Not that it was very effective (they are more aesthetic than functional), but I repeat that the available pieces at the time were not even 10% of what's available now.

There is little else to say about this set. For me personally it was one of those sets I've always wanted to have and only recently I've been able to satisfy the child every AFOL has inside of him.

## 8460: I'M STILL A CHILD

I bought this set at the early age of 24, when I thought that all the LEGO accumulated during my childhood was just a couple of boxes carefully kept and rarely used. As I said before, this is the first Technic crane I got my hands on until recently. I never had a Technic crane; that was an error that needed to be corrected, even if it meant that deep down inside every AFOL is just a big child. In 1995 the 8460 came onto the market and I was unable to repress my natural instincts and fell for it. And what an instinct, because I soon found it to be an extraordinary set that has only been superseded by the "monster": 8421.

Bigger than its predecessor (the telescopic boom has a total length of 69 studs) and a more realistic look of what a mobile crane looks like today. The improvements in the base are spectacular, starting with the three axles, (two with steering) and stabilizers that can be lowered and support the crane in a very realistic way.

Although I don't have the figures, I'm sure the crane sold well, as it was re-released in 2002 (set number 8431) and again in 2003 (set number 8438). In both cases the model was practically identical, with only a few pieces being substituted for newer version.

### Driving base:

A comparison with the 855 in this aspect should be prohibited; but since I'm not a pro I'll have a go. As mentioned before, the improvements are remarkable.

The steering mechanism uses a HOG (Hand of God), that is, from either of the two revolving lights on top of the cabin. As usual the front axle turns farther than the second steered axle. This is achieved using a reduction in the transmission of the movement from one axle to the other with two different gears (8 and 16 teeth respectively).

The set uses new 20x30 tires, which are much more realistic... but less vintage.

The rotation of the superstructure of the crane is also a step forward when compared to the 855. It is placed on a Technic Turntable which by means of a large reduction of 21:1 allows a complete 360° turn.

The crane includes two sets of stabilizers, controlled by two cranks, which really fix the crane to the floor. A 24 tooth gear on a worm wheel transmits the movement to each set.

It would have been more logical to control each set of stabilizers individually (front and back), but the result is so good one can hardly complain.

### The telescopic boom

This is where we find the main innovation in this set: the Pneumatic system. This system, which was first introduced in 1984, had been used in several sets, but the first large crane that used it to lift the crane boom was this set. To be precise, a combination of two opposed pneumatic cylinders lift the weight of the boom without the least problem.

There is a single valve to regulate the airflow to expand (lift the boom) or contract (lower the boom) the cylinders.

When both cylinders are completely expanded, the boom has a 60° inclination, which allows for hours play in any LEGO® building construction site... if you don't mind mixing Technic and minifigs... right?

As for the telescopic boom, the system is quite similar to the previous one. Some 20 years have passed, but if it works, there's no reason to change it. Completely extended it also reaches 180% of the initial length and the movement is transmitted by a long combination of axles that end in a worm gear that moves the inner part of the boom.

The hook is better than the one from the 855. One of the few metal LEGO pieces that, thanks to its weight, keeps the



necessary tension on the cable. However, sometimes the cable gets tangled on the reel which can have nasty consequences.

## 8421: THE DEFINITIVE CRANE

It may sound a little pretentious, but that's what I thought when I first saw this set. I grew up adoring the 855, maybe because I never got it as a child, but I always thought the telescopic boom was a little weak compared to what you see in real life. I'm not talking about the gigantic 6 or 7 element telescopic arms, but at least three segments would add a level of realism. It appears my prayers were heard in Billund, because in 2005 LEGO brought out the 8421, for many "the set until another monster with PF technology came onto the scene (the 8043 excavator).

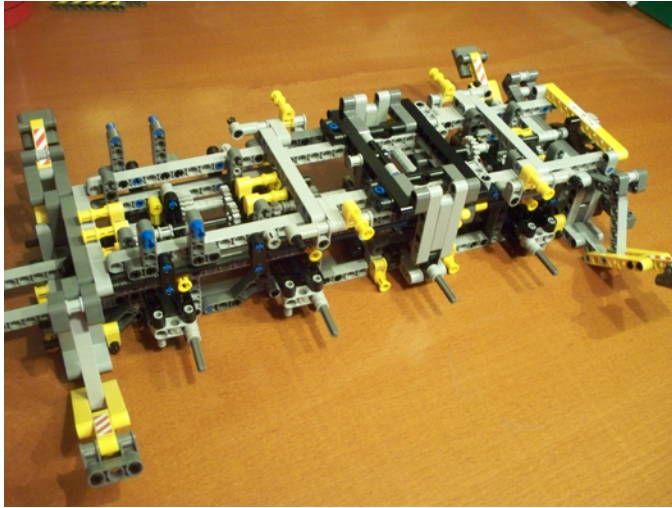
### Driving base:

If the 8460 broke the mould compared to its predecessor, the 855, in this case that didn't happen. It is much larger and detailed, but the structure is quite similar to the 8460. Instead of 3 axles it has four and three of them are steering axles. If this trend holds, the next crane should have 5 axles, four with steering...

The wheels are quite a lot bigger (62.4x20), and the steering is not accessible by HOG, but by a gear at the back of the vehicle. It is a curious way of controlling the movement of the vehicle, but you end up getting used to it.

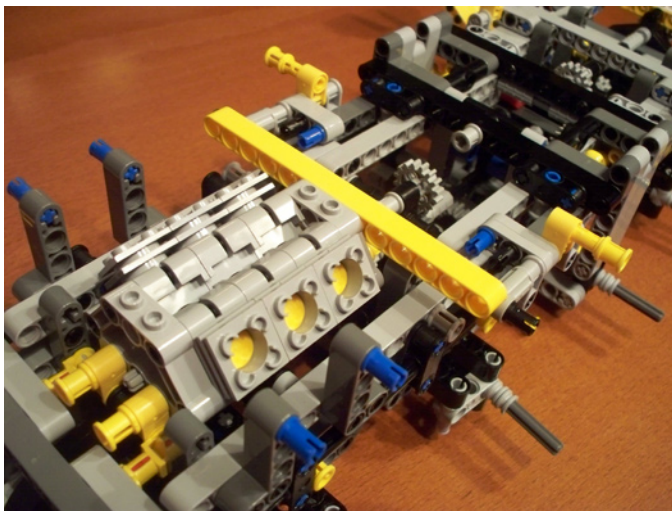






One thing that is an improvement is the v6 engine, located behind the cabin of the vehicle. The extra length of this case allows for the inclusion, but the 8460 is rather empty without a motor.

The stabilizers have the same structure as in the 8460. The boom is longer and the hydraulic system is better built, but the best part is that all four are controlled from the same gear wheel, located right above the one that controls the steering of the vehicle at the rear.

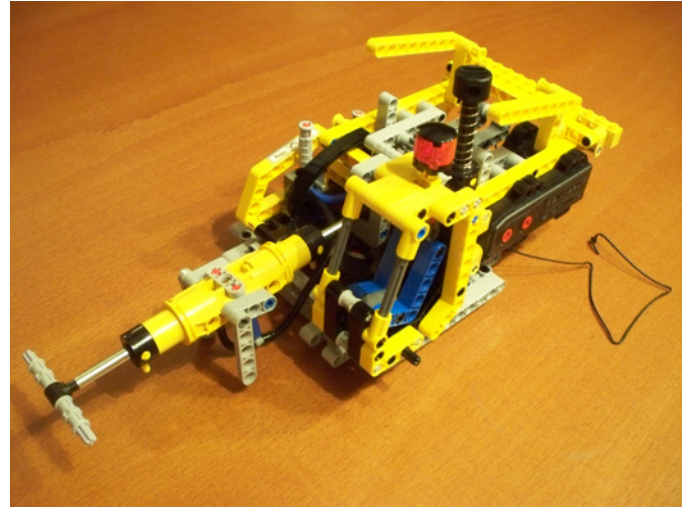


With these two gears you can place the vehicle where it need to work (LEGOLAND needs to be built), lower the stabilizers to fix the crane in place and... wait, how do we control the superstructure? This is the main failure of the set. The turning is done manually, as in the old 855; I'm no mechanical engineer, but given the size of the set I'm certain a solution could have been found.

#### **The telescopic boom:**

I'm tempted to do a copy&paste of the previous set as the elements are practically identical, though longer. As an example, there is a 32 stud long axle.

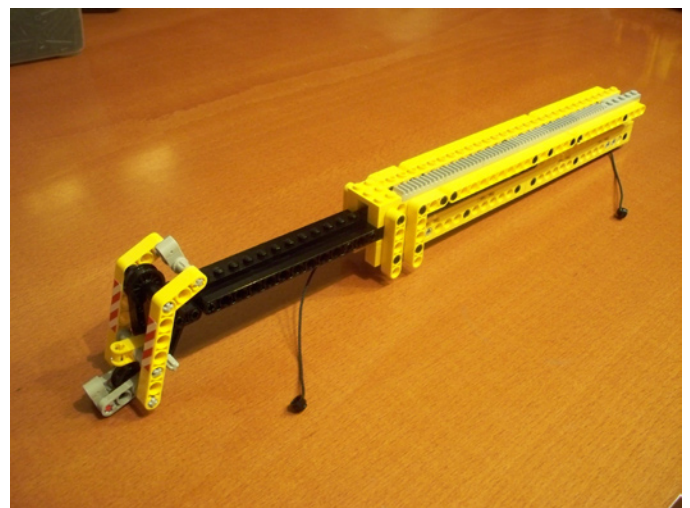
The Pneumatics system that controls the elevation of the boom also includes opposed cylinders. A new type of cylinder (with a round base) but really the same system. Again a single valve controls airflow to lift the boom or let it drop.



I say "let it drop" because this is another failure in this otherwise great set. The weight of the boom is so big that the pneumatic system can't hold it and the boom literally crashes down. I've also been able to check that when lifted, the boom will come down after a couple of hours. Even with the valve closed, the weight of the boom makes it come down to a horizontal position. This error can be corrected by a simple substitution of the pneumatic cylinders by Linear Actuators, as in the 8053 crane.

The superiority of this set is in the telescopic boom. The construction is similar to that of the 8460, but after building the secondary boom which is inserted in the main boom, you notice there is still space for a lighter, but completely operational third part. This third boom is not controlled independently, but move together with the secondary boom thanks to a LEGO® string with studs.

The result is spectacular. Especially since the movement of the boom is motorised. I've saved the best for last. An RC motor



(normally used for radio controlled racing cars) allows you to control the extension/contraction of the boom, and, of course, the movement of the hook.

## **8053: THE FUTURE**

Finally we'll have a look at the latest Technic crane, the 8053. I bought this one very recently, while working on this article. I hope the editors are listening and my next paycheck includes





extra expenses. What? How do you mean “non-profit”? That won’t convince my wife... there’s a serious risk of divorce when you get into these colourful Technic sets. Jokes aside, the best part of this set is that it combines the best from the best (the 8421) with improvements in the failures. Let’s take it one step at a time.

#### Driving base:

This is very similar to its bigger brother. A little narrower and shorter. And the wheels, logically, are also smaller (56x26 Balloon), although the use of the balloon type creates the visual impression of larger wheels.

All four axles have steering, which allows you to manoeuvre the vehicle very easily. However, I didn’t like the fact that it doesn’t include an engine. In the case of the 8460 it was obvious because it simply wouldn’t fit. But in this set there is more than enough space for one.

The stabilizers are completely different. After seeing cranes and crane trucks with stabilisers that come vertically out of the structure of the vehicle, in this case they extend to form a large X. The hydraulic jacks are operated individually with a worm gear that lowers the axle of each of the four supports. The effect is aesthetically overwhelming, but the system is rather weak, probably due to the length of the arms; or because we’ve forgotten that this is only a toy.



Steering and the movement of the stabilisers are controlled in exactly the same way as in the 8421. At the rear of the vehicle there are two gear wheels that control both functions.

Just like this crane inherits certain virtues from its predecessor, one of its main defects is also inherited: the upper structure turns manually. It is not controlled from an external knob like the steering function and the stabilisers. Again, I suppose something could have been done to fix this.

#### The telescopic boom:

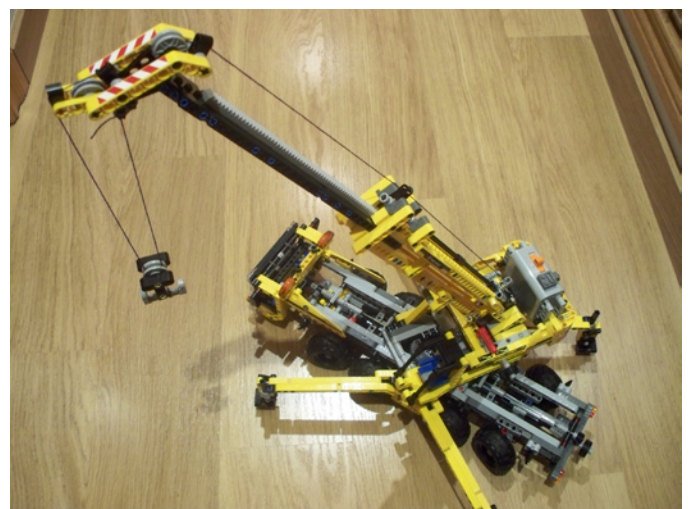
Very similar to the earlier cranes. It doesn’t reach the level of the 8421, which has a three part boom. The extension mechanism is basically the same as in the first crane, the 855. Obviously with higher efficiency due to the use of newer parts, like the worm gear or gears with different ratios.

The best part of this set is the substitution of the pneumatic cylinders by Linear Actuators. In this case one is sufficient to easily lift the arm, without it coming down at the slightest touch. The system is controlled from the sides of the superstructure, but I recommend the inclusion of a PF motor to improve the set. What’s more, I don’t see the point of a Technic crane without a motor. But that of course is a personal opinion. Once motorized, despite the fact that the battery box is rather large to include in the superstructure, three functions are controlled with it: raising and lowering the boom, Extending and contracting the boom and controlling the hook. Using a single motor, this is achieved with a gearbox, typical of the more advanced Technic vehicles, which allows you to select different combinations of gears.

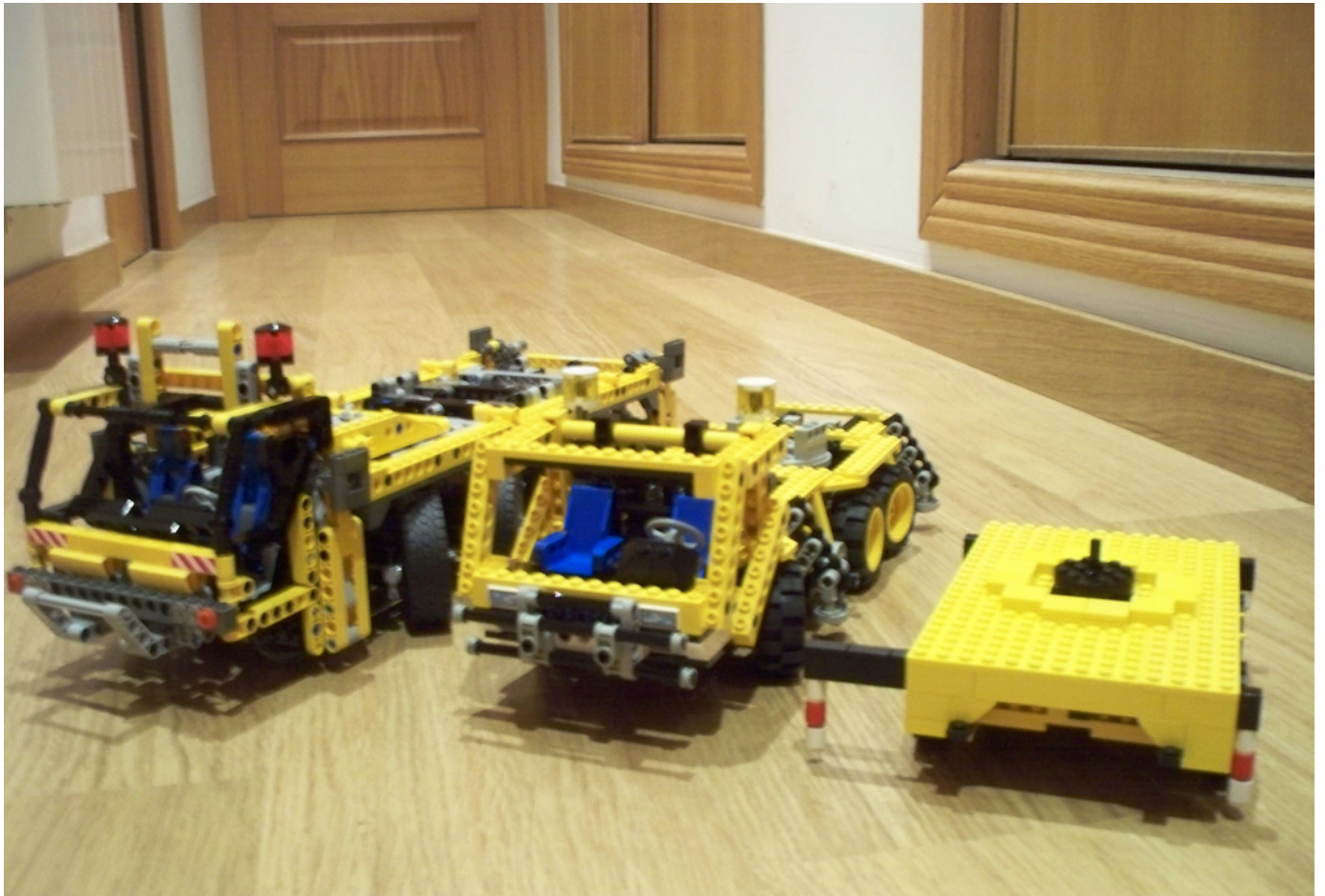
What’s left is a wish for LEGO® to make some kind of mega Technic set, (a UCS of sorts), that includes a powerful base, similar to the 8421, but with motorised stabilisers with LAs, controls for turning the superstructure, and a boom of at least 3 or 4 parts that is lifted by means of linear actuators. If we add lights and an invitation to the park in Billund that would be heaven. Of course the motors should be controlled by IR. Dreaming is free, right?

After this review of the best Technic cranes, there are no more excuses for not building our LEGO city. Oh yes, we’ll need excavators and crane trucks. We’ll have to wait for future editions of HBM.

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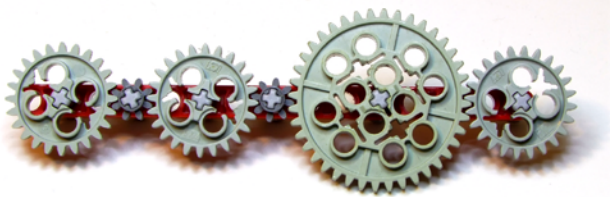




# Quest for Technic precision

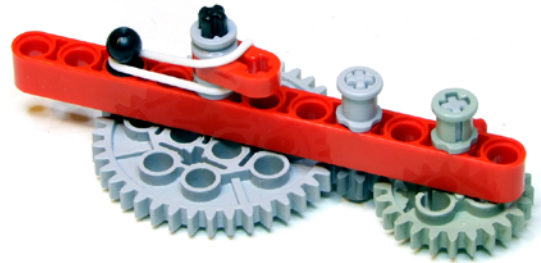
By Oton Ribic

Having analysed various structural limitations through the past three articles, in this fourth episode we will pay attention to another challenge most Technic constructors face often — accurate movements. It is a recurring problem for Mindstorms builders as well, whose models often rely on precision. Let's start right away with the effect from which most of troubles with inaccuracy arise: the often-discussed backlash. If you are not familiar with the term yet, backlash is a small angle any gear can freely rotate without moving its adjacent, meshing gears. It is present at all times with all sorts of gears (even beyond LEGO®), and since gears form a mainstay of movement transmission in virtually any Technic construction, it is difficult to avoid. Occasional models allow the motors to be connected to their target components directly, with just a single axle and no gears, but such cases are in minority. An additional problem lies in backlash aggregating through each successive gear pair. You may have experienced cases where a complex gearbox or a drivetrain system involving plenty of gears allows half a revolution or even more at the input axle without the output moving at all. Fortunately, backlash is rarely a problem in drivetrains, but systems such as GBC's, steerings, robots, Mindstorms plotters, etc. are much less forgiving.



This is a typical backlash-inducing scenario, involving many gears meshing together in sequence. Even in this small example, the rightmost gear can rotate as much as 45° without the leftmost moving at all.

Arguably the simplest and most commonly applicable solution against backlash is putting the final stage (or gear) of the system under a slight tension — usually with a rubber band, but any similar method works as well. It keeps all the gears in a constant contact, preventing them from moving as they please. Of course, the tensile force should be high enough to keep all the gears touching even while under load, but not as high to strain the supporting structure, or overpower the motor. Fortunately, in most models this is a relatively wide range, and usually works regardless of direction of the tension — that is, it can be employed to actually help the motor in the direction where it encounters more load (cranes, for example). This method, however, works well only for smaller constructions involving just a couple of transmission parts and with limited moving extents. Large systems imply too much friction that would, in turn, require unpractically high tensile force, whereas large moving extents are often impossible to cover using this technique.



Backlash can be avoided by putting the entire system under a slight tension, usually at the last gear, as shown here on the 40-tooth gear with a rubber band.

A large cascade of gears can sometimes be replaced with two pulleys and a rubber band — of course, with a well-judged band size to ensure its good contact with the pulleys, but not as much to strain it (or the supporting structure). This solution can span larger lengths, allows changing the rotation speed using pulleys of different radii, and is actually quite accurate as long as the involved forces are relatively low, i.e. low enough to prevent the rubber band flexing or slipping on the pulleys. In fact, veterans of the Technic scene will remember that the plotter from the 8094 “Control Center” set, released in 1990, successfully used this very approach to control the pen movement accurately in both axes.

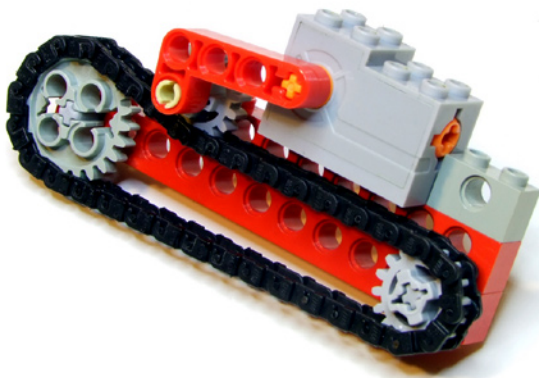


Belts are a simple and a relatively accurate alternative to gears if only small forces are involved.



For where compromises are unacceptable, the third option we will consider here is to employ gears (in this case, sprockets) connected by a chain. While this solution usually requires more space and is slightly more complex than the previous two, it can handle serious amounts of power, is not prone to slippage, and does not keep the system under tension while stationary. If you are lucky, or have freedom in choosing the gears that will be used as sprockets, you may find there is a length of a chain that matches the distances of your sprockets exactly, i.e. fitting them snugly without keeping them under tension. However, this case is not frequent, and you will usually find that the ideal chain length is not possible to build.

Another fixed sprocket can sometimes be painlessly included into the system, that changes the overall required chain length to one that is possible to build. Just as good solution is to build the just slightly longer chain than required, and keep it snug using an extra sprocket that pushes against the chain with slight force — using a rubber band, a spring, or anything similar. Varying this force you can actually finely adjust the behaviour of your chain: the more the tension sprocket pushes against the chain, the more precise will it remain under load, at the expense of increased stress on the supporting structure, especially the axles.



Chains are accurate and can transmit significant amount of force, but often need to be additionally tensioned, as shown in this example which uses a wind-up motor.

Chain has its force transmission limits too — it will break at the tension of approximately 15 N (close to lifting weight of 1.5 kg or 3.3 lbs), but there are two ways to work around them. If only a moderate improvement is needed, it can be done using larger sprockets: they will “convert” a bit of strain on the chain into the larger torque they will have to sustain, which normally is not a problem. If large forces are in question, chains can be easily doubled, tripled, multiplied even further, with sets of identical sprockets and chains working simultaneously. Just keep in mind that the 8-tooth gears are unreliable when employed as sprockets.

Having addressed the most common problem among rotating parts, let us proceed to linear movements, which are just as susceptible to slight inaccuracies; in Technic, they mostly take the form of various beam linkages.

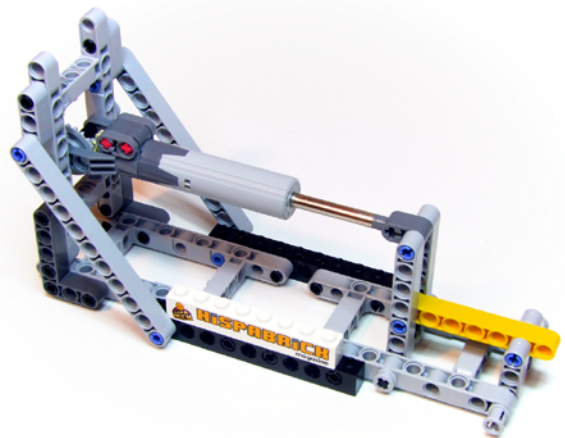
Namely, the frictionless pins that connect linkage beams themselves are slightly slack — which makes them frictionless in the first place. It allows the minute movements of the beams' pivot points, and just like backlash between gears, this amount

of slack increases with the number of beams involved in transmitting the movement.

Putting the entire system under slight tension using a rubber band works in this case as well, but is constrained by the same limits as when dealing with rotating parts. If only a small amount of beams is involved, sometimes it is viable to employ friction pins instead of frictionless — they allow no slack except under very heavy loads, but one must take into account the loss of power at the output, as well as more force at the input to get the system moving.

If possible, an effective alternative is to control the linear movement using a rotating motion. However, the usual rack & pinion systems are out of question as they suffer from backlash just like any other pair of gears does (after all, a rack may be considered as a particular type of gear).

Instead, controlling the movement using a thread wound on a controlled spool can be perfect for models where a controlled force is needed in one direction only, e.g. where the gravity takes care of pulling in the other direction. This method is reasonably accurate if the thread does not tend to stretch excessively, and also offers linear movement control, as long as the spool is large enough for the long spooling not to significantly change its effective radius.



Linear actuators are a good choice where very precise movements are required. They can be additionally improved using some kind of a lever or a pantograph as shown here, where the yellow beam moves laterally with very high accuracy. Note the usage of friction pins in the mechanical parts too — they significantly reduce slack.

A more complex solution involves linear actuators, such as 61927c01. Their internal backlash is negligible, they can handle more power, provide force in both directions, and are easily multiplied for additional power. True, their range of movement is not large, but within it they can provide excellent precision. Of course, it is possible to go further using some kind of a pantograph, but for the price of even smaller total range.

There are, of course, many other methods of increasing Technic precision — combining some of the aforementioned concepts or, better yet, developing new ones. In any case, it is important to stay aware that they can improve accuracy only up to a certain level due to the limitations of LEGO® parts themselves. When dealing with extremely fine movements, even the latent factors such as axle twisting, bending of beams

under the weight of construction, and uneven flexing of rubber bands become apparent. Hence, even if using the aforementioned methods, controlling movements finer than approximately half a millimeter will be extremely challenging, if at all possible. Well designed systems

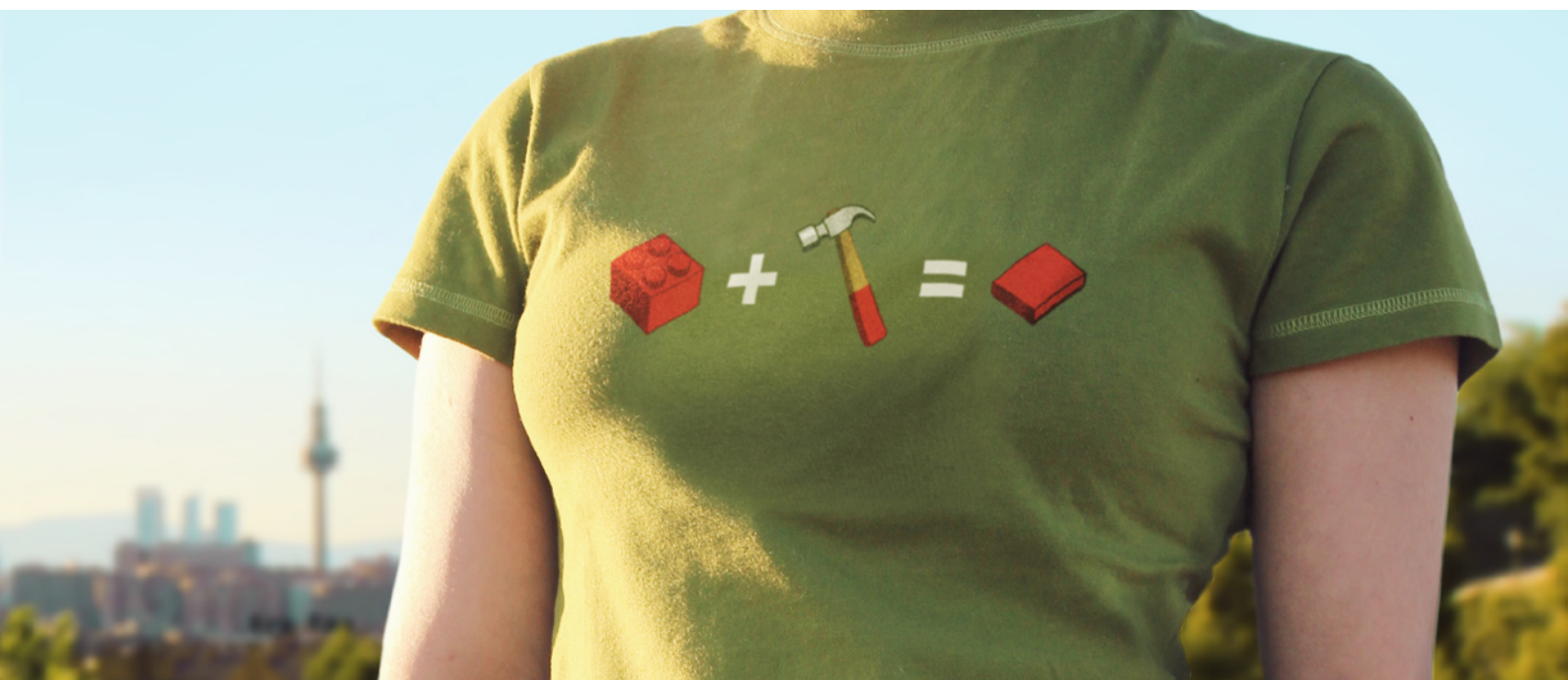
relying on linear actuators can further increase this resolution to a quarter of a millimeter or so, but aiming at anything finer is probably — too high.

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<http://legoism.blogspot.com/>

#### Conclusions: Increasing precision of Technic movements

- The simplest and the quickest way of reducing backlash is putting the entire system under a slight tension, e.g. with a rubber band.
- Rubber belts and pulleys are a simple and acceptable alternative to cascading gears if small forces and torques are involved.
- The best overall solution, capable of transmitting more power and not prone to slipping, are carefully tensioned chains and sprockets. However, they are more complex than the previous methods.
- Slack in beam linkages mostly arises from the frictionless pins — where there is plenty of force is available and not many pins are in use, they may be replaced with much more precise friction pins.
- Where the force needs to be applied in one direction only, threads and spools may be of great help, as long as they are not too stretchy.
- For the maximum precision, employ linear actuators, optionally connected to a pantograph or a system of levers if even more accuracy is needed, yet over a small moving range.
- Resist aiming for impossible precision: even the best slack-eliminating concepts can hardly compensate the inherent limits of LEGO® parts such as beam bending and axle twisting.



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# LDD to POV-Ray Converter



*By Martin Hronský y Johan Sahlström*

## What is real these days?

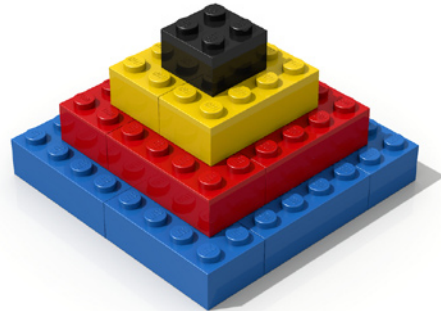
This was a headline announcing the release of the LDD to POV-Ray™ Converter at the beginning of August 2012 on the Eurobricks(EB)frontpage. LDD to POV-Ray Converter is the first tool that allows you to create photorealistic renderings of the LEGO® Digital Designer models using POV-Ray™.

## First steps

The whole story began about a year ago, in August 2011. LDD has been well known among LEGO®enthusiasts for many years. Also POV-Ray™ is not new to the fans of digital design using LDRAW based tools. However, LDD users have a little handicap – LDD is easy to use but it is not supported by any other software. Models can be exported only to LDRAW, and with mixed results since the mapping between the system is not always optimal. I have seen many requests for a conversion to other 3D formats. There are some tricks based on grabbing 3D data from a graphics card driver, but these are not for everybody and I wanted a solution suitable for everybody – legal and simple to use. Since I am a professional programmer and I like programming, it looked to me like an ideal task – joining two of my hobbies – LEGO® and programming.

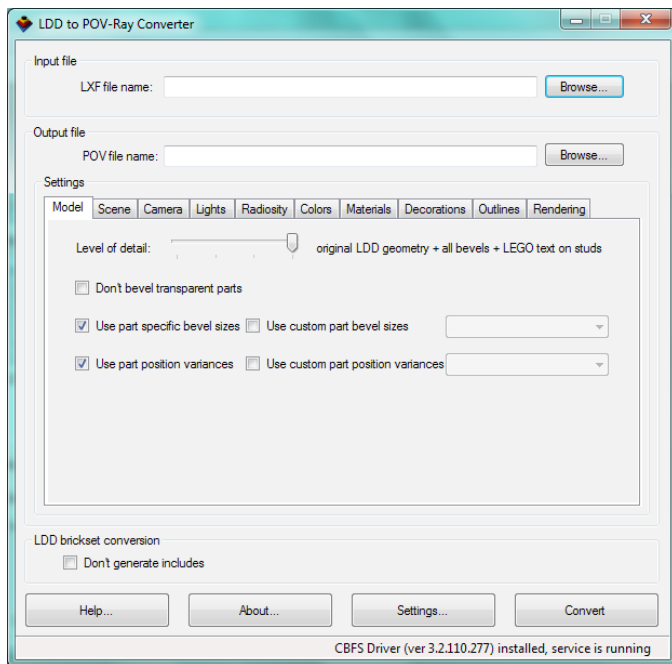
So I started discussions with long time LDD user Johan Sahlström(on EB known as Superkalle) – what legal possibilities we have, or what can be published. LDD EULA does not permit derivative works and we wanted a legal solution. Originally, I did not want to stick to POV-Ray™ - target format was not important to me. Taking into account that POV-Ray™ is free and has been already known to LDRAW users, I also tried it.

The very first version of LDD to POV-Ray™ was just a set of scripts, xslt transformations and small C++ program for reading the data from LDD. Applying a trial and error approach I finally got the first large render - one of the official LEGO® sets - 7744 Police Headquarters. I shared the pictures with Johan. It was a great pleasure to work with him. With all his experience and sense for a detail the tool got much further than I had expected at the beginning. I still remember how surprised I was when he asked me a question about brick bevels. I did not even notice before that bricks are not mathematically square and edges must be beveled to make it look realistic. After studying our possibilities of adding bevels to bricks without manually editing each of 2500+ bricks supported by the LDD, the small pyramid, which is currently LDD to POV-Ray™ Converter icon, was the first LDD model with the full level of details – bevels and LEGO® logo on studs. I had seen this pyramid rendered on Friedrich A. Lohmueller's website and I wanted to make a picture of a similar quality.



## A deal with the LDD Team

In the meantime, we asked the LDD team at LEGO® about possibility to publish a tool like LDD to POV-Ray™ Converter. We said that we would not publish brick geometry data or any other data which were not published by LDD. This seemed to be a completely unrealistic goal, since POV-Ray™ uses plain text files. How to store something in a plain text file and still keep it unpublished? A virtual file system looked like the right solution. A file system that can be read only by POV-Ray™ and only during rendering. A custom POV-Ray™ version wouldn't be a good solution. It is open source software, so it is possible to extend it with any functionality, but according to POV-Ray's license, even the custom versions have to be open source. That virtually means that LDD data will be accessible to anybody. And we wanted to keep the agreement with the LDD team. The second possibility was a true, operating system wide, virtual file system. Having done some internet research I quickly recognized that writing a file system driver for current versions of Windows was practically impossible for an individual person in some reasonable time. There were a few open source projects, but none of them was stable enough. Luckily, I found a professional solution from the EldoS Corporation. They offered a free license for non-profit projects, too. I did not expect to get one for such a small project, but I at least asked. Mr. Mayevski from the EldoS replied almost immediately and delighted me with his positive attitude. He was very nice and helpful, answered all my technical questions and gave me some useful advice for the implementation. After that we knew, that we had everything we would need to publish the application. I made the first installation package and shared it with Johan. That was in February 2012. We started testing and experiments with materials and lights. Johan invested a lot of time in tuning the colors and classification of bricks according to different material finishes. LDD natively supports only shiny plastic and steel brick finish, but real bricks have many more different finishes.



I then created a website for the project and started to write some basic help pages and reference information. After publishing the tool and making some fixes based on the experience of the forum members the announcement on the EB front page was made. With the exposure to a wider audience, the number of downloads really took off. LDD to POV-Ray™ Converter was designed with ease of use in mind. Installation is a fully automatic standard windows installer, which will install both the application and virtual file system driver. It is not possible to use it as a portable application. POV-Ray™ has to be downloaded and installed separately as it is not included in the converter installation package. Only official builds of POV-Ray™ 3.7 are supported. Version 3.7 is the first version which supports parallel processing and on multicore systems it can utilize full CPU power.

For a beginner, to do the first rendering requires only opening LDD model in the converter and then clicking the “Convert” button. The model is automatically converted with the default settings, which are working quite well for most typical models. After the conversion POV-Ray™ can be started automatically and rendering starts immediately.

For an advanced user all settings which affect the quality of the output can be adjusted by changing the settings in the converter user interface. Conversion parameters are divided into 10 tabs.

### Model

The first tab is named Model and settings on this tab control how the model will be converted, what level of detail should be used during the rendering and what other features affecting the model geometry should be active.

### Scene

On the Scene tab you can control the appearance of the POV-Ray™ scene containing the converted model, what background color should be used or whether you want the base plane to be placed below the model. The position of this plane is determined automatically based on dimensions of the model in the POV-Ray™.

### Camera

The third tab controls the behavior of the camera. The converter supports two most useful types of the camera - perspective and spherical. The perspective camera is the most

common camera we all know from real life. You can adjust view angle, which has also influence on the perspective of the camera. Focal blur can be activated and it will improve the rendered image by additional realism, yet it slows down the render significantly. The spherical camera is not so well known and not used very often. With this camera the output image will contain 360° view of the model. The best example of such a render is a castle yard. Imagine yourselves standing in the center of a castle yard and looking all-round you. What you can see, will be on the image. These images are useful for HDR lighting. You can render your castle yard and use it later as an image for a sky sphere – to make your other models look like standing in the center of a castle yard – all reflections and incoming lights will look like that.



### Lights

The Lights tab controls the color and number of lights used in the scene. Usually, the more lights you use, the better your output is, since in real life the light is also coming from many directions. However, each additional light source slows down the rendering process. Moreover, many users try to reproduce some studio lighting box conditions which usually means only two or three light sources. So the converter uses by default three light sources. On this tab you can specify also appearance of shadows in the scene. They can be completely disabled or adjusted from very hard, suitable for a space scene rendering, to very soft, suitable for some lighting box conditions.

### Radiosity

The fifth tab is named Radiosity, which is not a very common term. In POV-Ray™ this feature enables simulation of an ambient lighting present everywhere. In combination with a sky sphere and a good HDR image for lighting, radiosity can be used instead of traditional light sources and final rendered model will have very natural illumination. For some HDR images emissive properties of the sky sphere have to be adjusted, otherwise the output colors may be tinted according to a dominant color of the used image.

### Colors

On the Colors tab you can select color palette to be used during rendering process. The original LDD palette was optimized by the LDD team for use by LDD, but it is not very suitable for rendering. Black color is not black enough and also gray colors look strange. You can create your own palette or use custom palette supplied with the converter. Furthermore, there is also one special feature – color variance. Real bricks are produced in batches and different batches may have slightly different colors. Color variance randomly slightly modifies colors of used types of bricks and this way simulates the batches.



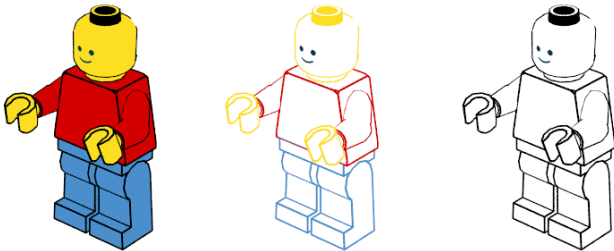


### Materials

Each brick is made of a particular material (usually a shiny or dull plastic) and for each material it is necessary to define certain characteristics for POV-Ray™. Converter contains definitions of all materials and these standard definitions are used by default during rendering. It is possible to use custom material definitions by selecting appropriate materials or finishes file on the Materials tab.

### Decorations

Converter allows specifying custom decoration images instead of the original decorations from the LDD. This feature can be activated on the Decorations tab. Decorations used in the model will be read by the converter and you can specify a new decoration file name for each used decoration. The new image replaces the original decoration completely for a given model, which means, all occurrences of that decoration on all bricks of the converted model will be replaced.



### Outlines

For a building guide generating purposes model can be outlined just like in original building guides. On the Outlining tab you can select the level of detail and also colors of the outlines. It is possible to generate images in a "coloring



pages" style. It is strange to use renderer to generate such images, but POV-Ray™ is currently the only alternative image generator from LDD models and some kids like to color the images of LEGO® models.

### Rendering

The last tab – Rendering – is related only to resolution and quality of the output image. You can specify the desired output image size, anti-aliasing parameters and rendering quality without manually modifying POV-Ray™ ini files. To let the converter create ini file is the fastest way to define the most common rendering parameters and start rendering immediately after the conversion.

For an experienced POV-Ray™ user output settings can be controlled also by specifying custom include files with definitions of colors, finishes, materials and other scene elements. You can create these files based on files included with the converter. It is not recommended to directly modify supplied files, since they will be overwritten during application or LDD brick set update. The modified files should be saved under different names and you can use them during conversion as custom files for colors, finishes, materials and lights.

### Next steps

Future enhancements of the LDD to POV-Ray™ Converter should cover mainly the quality of the brick geometry. Circle smoothing and improving rendering speed seem to be the most interesting features to be added. Materials and lights can be also improved. Since definitions of the materials are in included files and are directly editable, user experiments are possible and anybody can try to improve the definitions of the lights, colors or materials. Of course, feel free to request any other changes and features – just send your request through the converter website contact form.

#



# POV-Ray Tutorial

By Eric Albretch

If you have been reading Jetro's LDraw tutorials in HispaBrick Magazine® or on TechnicBRICKs, then you already know about the LDraw parts library and about LDraw editors like MLCAD. You know how to install unofficial parts (parts which are not officially released as part of the LDraw library yet), create virtual models, and how to look at them in viewers like LDView. Maybe you can even generate complex flexible parts with LSynth. Perhaps you have tried making your own instructions with LPub. Now that you have spent so much time making a virtual model, the logical next step is to make it beautiful. Editors like MLCAD are efficient and quick at displaying your models, but they do not use complex lighting or smoothing so you get something like looks like this



Standalone viewers like LDView use real-time rendering and, with the appropriate preferences selected, can produce a much more striking image. This image has smooth shading and anti-aliased edges. It looks good, but it still doesn't look real.



To really make your models shine, you need to use a ray tracing program. These are complex programs with very advanced capabilities, but the rewards for learning them can be stunningly realistic images. This image was produced by starting with the same LDraw file used for the first image, but converted, enhanced, and rendered using POV-Ray, a free (open source) ray tracer.



This tutorial will start by assuming that you have used the LDraw All-in-One Installer and therefore already have the following necessary software:

- LDraw library
- MLCAD (or another editor)
- LDView 4.1 or newer (PC or Mac)
- POV-Ray 3.6\* (PC or Mac)
- LGEO library\*

Items marked with an asterisk (\*) are not installed by default, so you may have to go back and install again and make sure to select them. If you are using a Mac, you can still do everything in this tutorial but you will have to install the needed software manually because there is no All-in-One installer. In addition to the above software, some advanced features in later tutorials will require Mega-POV, a POV-Ray patch, which you may choose to install now. (<http://megapov.inetart.net/>)

A knowledge of the different types of files and how they work will be invaluable in troubleshooting later. Let's start by reviewing what LDraw files really are, at their core. LDraw files consist of nothing but lines, triangles, and quadrilaterals. For purposes of rendering, we don't care about the edges because they will never be displayed in a photo real image, so let's forget about them. Triangles



and quads can only create surfaces, not solids, so LDraw parts are hollow. Triangles and quads can also never create curves, but can only approximate them with facets. This means that the LDraw language is not very good for making smooth, complex curvature.

LDraw parts are stored as text files in a library. Each part file usually calls out "primitives" which are smaller portions of parts which are used over and over (such as studs). An LDraw model file is also a text file which calls out many parts, assembles them in space, and assigns them colors. The position and rotation in space are controlled with a transformation matrix. You don't need to know how a transformation matrix works to use these tools, but it helps. Below is a line from an LDraw model file which positions a single red 2x4 brick in space. The first number, 1, just means that this line is calling a part from the library. The second number, 4, is the color red. The next 3 numbers, 0 0 0, are the position of the part in X Y Z space. The next 9 are a 3x3 matrix of the rotations in the X Y Z axes (this is the hard part). Finally, 3001.dat is the part number for a 2x4 brick.

```
1 4 0 0 0 1 0 0 0 1 0 0 0 1 3001.dat
```

A LDraw model will be made up of hundreds or thousands of these parts, possibly broken into submodels. In turn, each part will be broken up into primitives, and each primitive will be made of lines, triangles, and quads. All of this put together forms your model. However, this language is unique to LDraw and cannot be read by POV-Ray or any other ray tracer. This means we need to convert it.

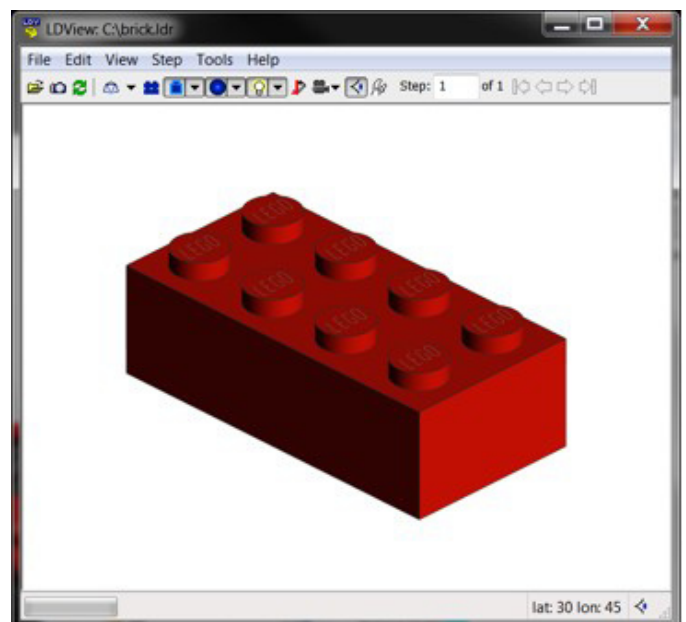
POV-Ray creates shapes using CSG (Constructive Solid Geometry). This method involves starting with simple solids such as cones, spheres, and boxes and then combining them with Boolean operations such as addition and intersection to create complex shapes. Obviously this is a lot different than LDraw so the process to convert from one to the other is not simple. Luckily for us, people have already solved this problem for us. Also luckily for us, POV-Ray places parts in space using the same sort of transformation matrix as LDraw and also consists of text files which call libraries of "include" files, so there are many things which will look familiar.

There have been a number of tools over the years which can perform the conversion from LDraw to POV-Ray, but my current favorite is LDView. It does an excellent job and will produce a good render without any further effort. With minimal additional editing of the POV-Ray file, the results can be improved even more. Finally, with advanced editing and changes to some of the core libraries, truly stunning results can be achieved.

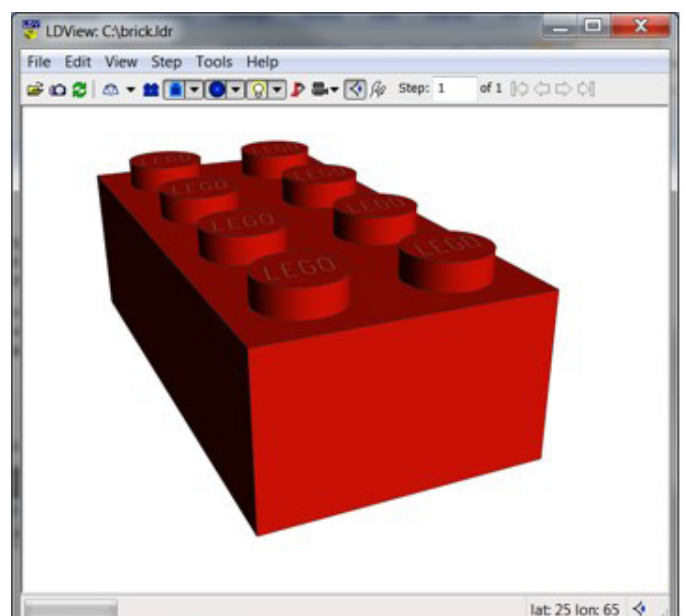
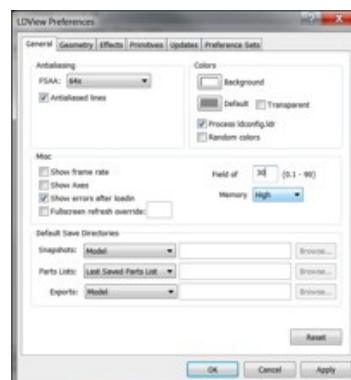
Let's work through an example from beginning to end using the simplest settings. We'll start with the model described above: a file containing a single red 2x4 brick. Create a file called brick.ldr that looks like this:

```
0 Brick Render
1 4 0 0 0 1 0 0 0 1 0 0 0 1 3001.dat
```

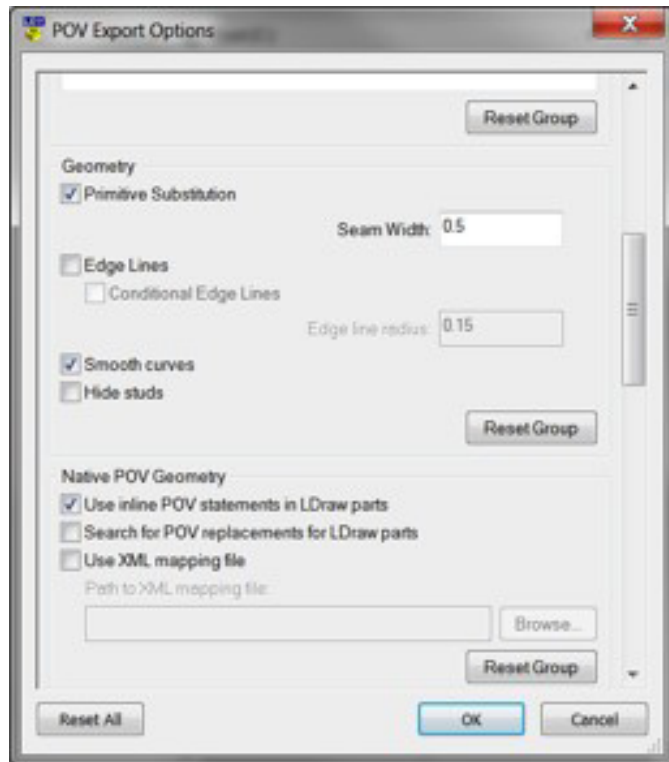
If you open this in LDView, you should see this:



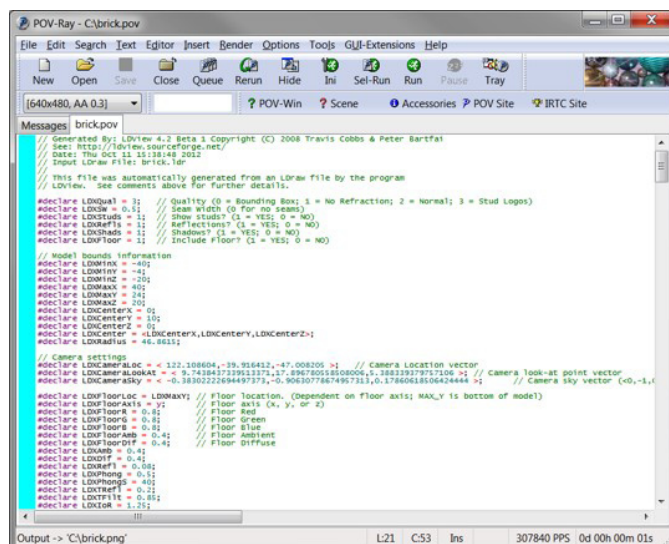
When you export from LDView, it will also export the view information including the position of the camera. Let's make this a little more interesting by changing the amount of perspective and rotating the part a bit. Open the preferences panel and change the field of view to 30 degrees. Now bring up the view window with CTRL-9 to enter a latitude and longitude of 25 and 65. After that, your model should look like this.



Now it is time to export to POV-Ray. You can either use CTRL-E or choose Export from the File menu. This will bring up a dialog box asking you to name the file. Let's just call it "brick". The extension ".pov" should be added automatically. The "Type" should be "POV-Ray Scene File". If you click the "Options" button, you will see a lot of things that can be configured about the POV conversion. We're going to start with all the defaults, except make sure you change "Quality" to "Include Stud Logos" and scroll down and deselect "Use XML Mapping File". Now you can select OK and save the file.



Now run POV-Ray 3.6. If you open "brick.pov", you should see this. It will look a little different on a Mac.

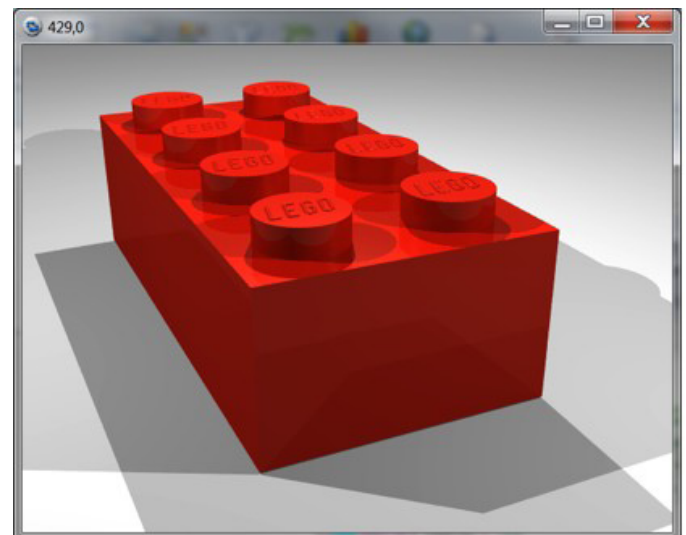


POV-Ray needs to know what size image you intend to make, and on Windows this is controlled in an ini file. Luckily, you only need to take care of this once and then POV-Ray will remember your settings. We want to try a render at 640x480 using anti-aliasing. To do this, select

"Edit resolution ini file" from the "Tools" menu. A text editor with a file called "QUICKRES" will come up, and you can add this to the file:

```
[640x480, AA 0.3]
Width=640
Height=480
Antialias=On
Antialias_Threshold=0.3
Output_File_Type=N
Output_Alpha=On
```

Save the file and quit the text editor. This will add an option called "640x480, AA 0.3" to a drop down menu that you can see at the top left of the previous image. (Note that you may have to quit and restart POV-Ray for the new option to appear.) It sets the height and width of the image, adjusts the anti-aliasing settings (which will smooth the edges), and outputs a PNG file. Don't worry about the details of the anti-aliasing settings; we'll just always leave them the same. Now all you have to do is hit the "Run" button, and a few seconds later you should have your first render.



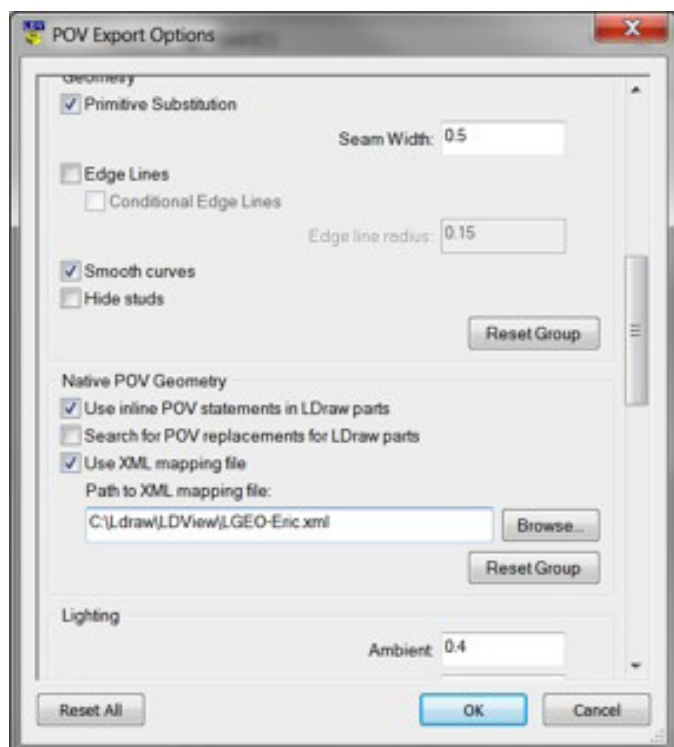
This is a big improvement! But it has a long way to go. You'll probably notice that there are a lot of overlapping shadows. You will also notice that, since this is a direct conversion from LDraw, the edges are completely sharp and square. LDView was smart enough to make the studs look round for you instead of faceted and it also added the stud logos, but this still doesn't look like a real part. The next big improvement we can make is to use the LGEO library. LGEO is a library of LEGO® parts made by Lutz Uhlmann using the native CSG language of POV-Ray. This means he wasn't limited to just triangles and quads, but could make almost any shape he wanted. He modeled the parts in much more detail including softly curved edges. The LGEO library of POV-Ray parts should also have been installed by the All-in-One installer. In order to use it, we need to make sure a couple of things are in place. Again, this is something you should only need to do once. POV-Ray needs to know where to find the LGEO library. Go to POV-Ray and select "Edit master POV-Ray.ini" from the "Tools" menu. You'll see a file which has some paths at the bottom. Make sure that the All-in-One installer has added the path to the LGEO library here. It should look something like this.



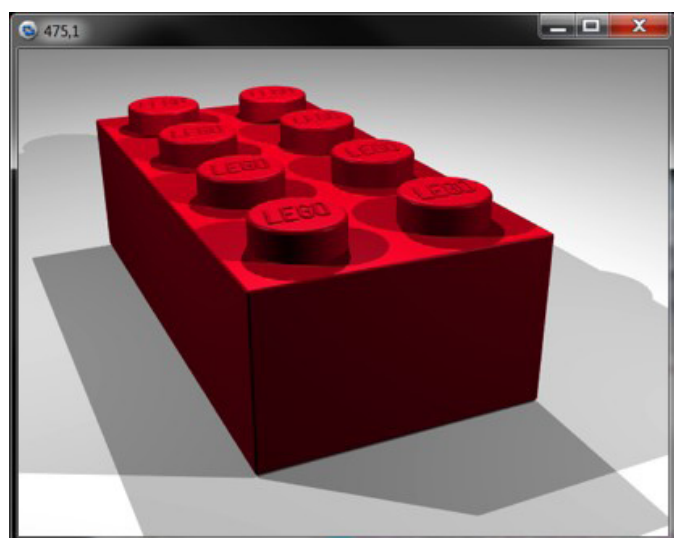
If it is not there, you may need to add it manually (the actual location of this file depends on where you installed it on your system).

Library\_Path="C:\Ldraw\LGeo\lg"

Remember when we exported from LDView and we deselected "Use XML mapping file"? Now we want to turn that back on. LDView comes with an XML file that maps each LDraw part to its matching LGeo part and performs scaling or rotations to make them line up. All you need to do is select the mapping file that came with LDView. It should be in your LDView directory. (Note that I have my own customized file which makes some changes and additions to the default file, but the default works fine.)

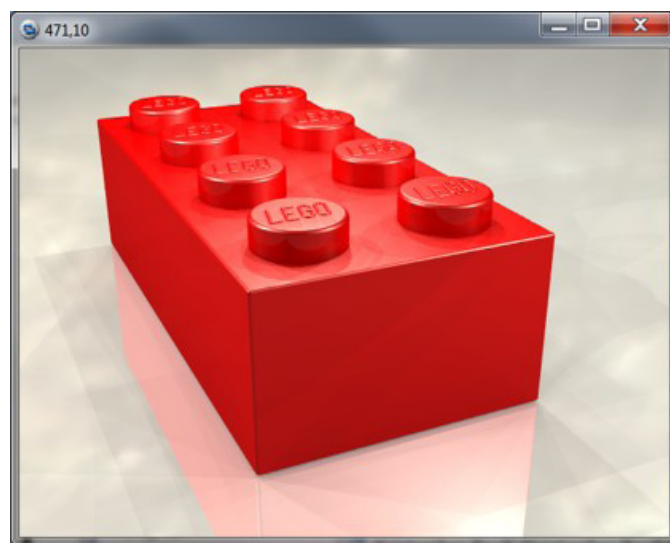


This time we'll call the file "brick-lgeo". If you have configured everything right, this file should work in POV-Ray without any further changes. Just open it and click "Run". Now you should get this.

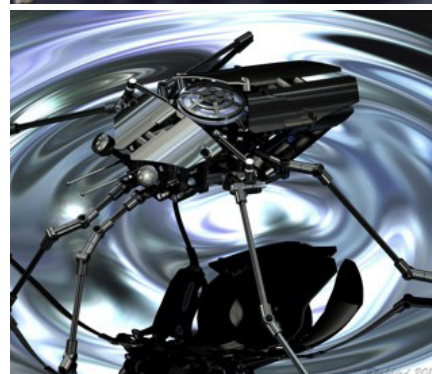


You can see the rounded edges, the different color, and the clearer logo. The LGeo library doesn't contain every single part that the LDraw library does, so in practice when you export a large model some of the parts will be replaced with LGeo equivalents and some of them will not. Usually this is not a problem.

With the skills you've learned here, you should be able to make basic renders. Although this tutorial may have seemed complicated, once you get everything set up the process is very quick. I can create the sample file containing the brick, open it in LDView, export it, and render the image above all in less than 30 seconds. In future tutorials we'll expand on what you've learned so that you can understand the content of the POV-Ray file and modify it to include more sophisticated light sources, use other features like radiosity and high dynamic range lighting, add backgrounds, and even create animations. After the next lesson, you should be able to replace the last image with this.



Eventually, you should be able to do this.



Happy rendering!  
#

# An introduction to Robotics with LEGO® MINDSTORMS (XII)

## *Social Use of LEGO® MINDSTORMS*

*By Koldo Olaskoaga*

In July I had the opportunity to participate in the course "Caring robots", organised by the universities of Windesheim Flevoland in Almere (The Netherlands) and La Salle - Universitat Ramon Llull in Barcelona. In this course, among other things, we discussed what activities with robots can be done to help in the rehabilitation of children with brain damage and in the improvement of social skills of children with Autism. La Salle - Universitat Ramon Llull is collaborating with Tufts University, Massachusetts (USA), Deusto and Comillas in the investigation that aims to determine if the use of robots in the rehabilitation of children with brain damage has advantages over more conventional methods.

One of the tasks that was proposed in the course, was the creation of an activity that would later be tested with brain damaged children in the Sant Joan de Déu hospital in Barcelona, principal collaborator in the project of La Salle. In this article I will present the activity, concentrating the explanations on the programming task it involved.

### **The activity**

One of the ideas that was proposed was the creation of a game to stimulate the memory. After considering and analysing the possibilities LEGO® MINDSTORMS Education offers, the material that was available, it was decided that we would create a game that involved remembering a sequence of sounds. The robot should reproduce a sequence of up to four tones (one for each entry port on the NXT) and the child should repeat the sequence using the keyboard we were for create to this end.

It was considered that remembering a sequence of tones could be complicated for some children - due to the fact that they are sounds - so it was decided to combine them with some other kind of stimulus, in this case colours. In the LEGO MINDSTORMS Education set there are three lamps that can be fitted with three different coloured transparent pieces, which allows for the inclusion of three lamps (red, green and yellow) that can light up while reproducing the tones. Since there were three lamps and also three entry ports it was decided to reduce the keyboard to three keys.

What would happen if the child enter the right sequence? In addition to the applause and a smiley face on the NXT display it was thought that it would be nice to include some kind of reward to add to the fun. To this end a mobile robot with a light sensor was built, which would advance or move back over a white surface with black transversal lines; with a right sequence it would advance, with a wrong one it would go back. The objective of the game was to make the robot reach the last line.

### **The game console**

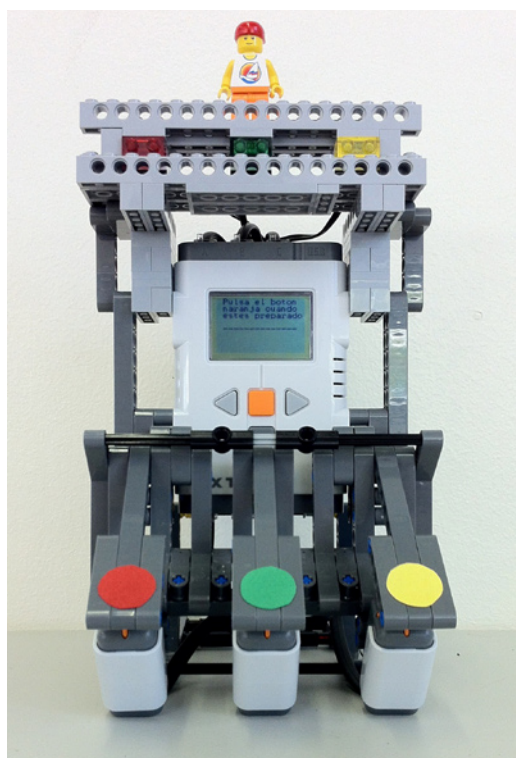
When building the game console the requirements were the following:

- Three touch sensors with sufficiently big and separated keys

to be used by kids.

- Three lamps with a coloured cap aligned with the keys.
- A structure that would allow for the console to be set on the table so as to allow easy access to the NXT screen and the NXT keys.

Since there were no additional LEGO parts in the three colours, stickers were used to identify each key.



### **The program**

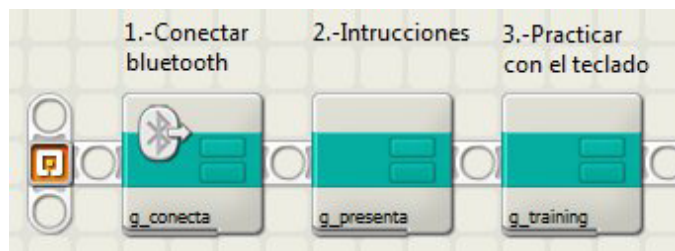
I will not go into every detail of the program, as this would make the article too long, but I will comment on some of the aspects I consider to be of interest.

The program of the console consisted of the following parts:

1. Establish a Bluetooth connection
2. Present the instructions
3. Practice with the keyboard: in order to get to know the keyboard. When pressing a key, a sound is reproduced and the corresponding lamp lights up. Upon pressing the orange button the program advances.
4. The game
  - a. Choose a level: Training (a sequence of 3 tones/ colours), Basic (4), Medium (5) y Advanced (6)[\[1\]](#)
  - b. The game itself: generate a random sequence; reproducing it; registering the key strokes; checking the result and giving feedback

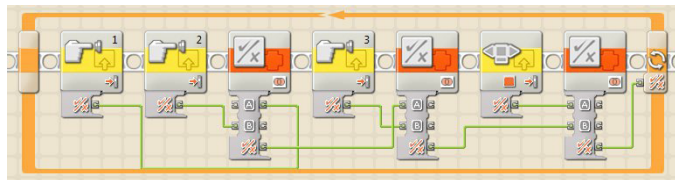


The program was built in a modular fashion, so each part could be tested separately before moving on to the next. New blocks were created whenever possible. The following image shows the first three steps of the program, each one converted into a new block.

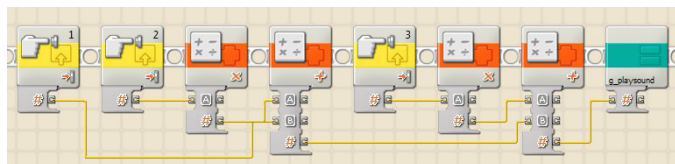


Let's leave the first two steps aside and concentrate on the third. In this step you can practice with the keyboard and check how it works for as long as you like. The program continues and starts the game when the orange button on the NXT is pressed.

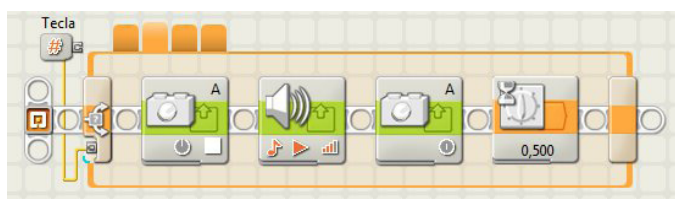
To this end, the NXT needs to read three touch sensors and the orange button sequentially until one of them is pressed. It uses a boolean OR to determine if one of the sensors has been touched. If so, it exits the loop and reproduced the sound or continues with the program.



Once one of the keys or the orange button on the NXT has been touched, the corresponding note is played and one of the lamps lights up, or the program exits the practice stage. This step can be done with a Conditional (If... Else...), but in order to avoid adding one inside another we converted the input into a number. 1, 2 or 3, depending on the key. This can be seen better in the following fragment of the program:



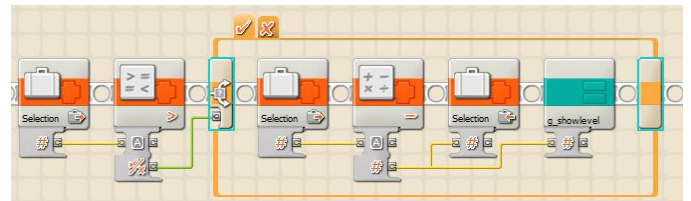
We take advantage of the fact that one of the outputs of the block is Read Touch Sensor, which gives a value of 1 if touched and 0 if not. Leaving the first value at 0 or 1, multiplying the second value by 2 and the third value by 3 and then adding these values we'll know which key has been pressed. In case if the orange button has been pressed the value will be 0. At the end you can see the block to make the sound and light the lamp which has been turned into a new block as it will be used several times in the program. The content is as follows:



After practice it is time to play. First the desired play level must be selected. To this end the grey arrow keys are used to select

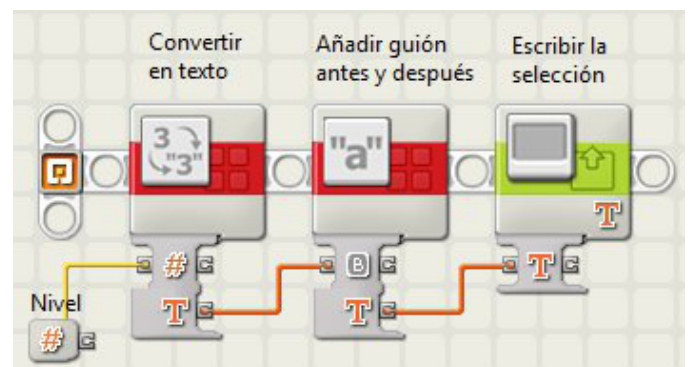
the level and the orange button to confirm the selection and start the game. The steps to follow are these:

1. Show options
2. Create a variable to store the level and set it to 0.
3. Show the level that corresponds to this value
4. Start a loop that will not end until the orange button is pressed:
  - a. Wait for one of the three buttons to be pressed (orange or grey arrows)
  - b. If it is one of the arrow, add or subtract 1 from the variable and show the new selection (there are four levels and the value must be between 1 and 4). Care must be taken not to fall out of the range when adding or subtracting and that the result is never 0 or 5.



In the image you can see the code that runs when the left arrow is pressed. If the contents of the variable Selection is bigger than 1, one is subtracted and shown on the screen, otherwise it is left as is.

When representing the options and the current selection some precautions must be taken. The View block has a verification box which erases everything if checked. For showing the level a conditional could be used, but it can be done more directly using the blocks that allow text operations. When an option is changed, the numeric value is converted into text and a dash is added before and after (simply for aesthetic reasons). The resulting text chain is written on line 8, overwriting the previous selection.

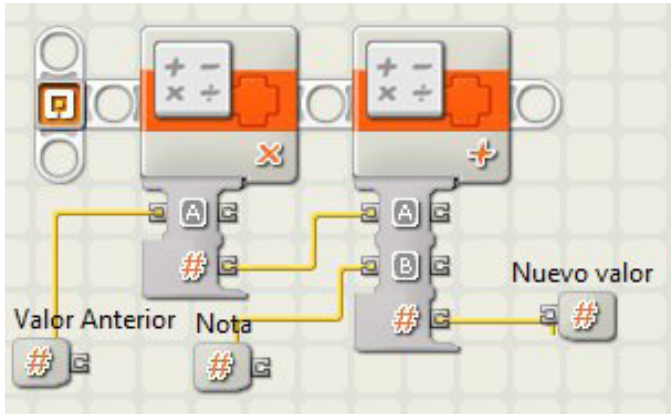


After selecting the level it is time to play, so the program picks a random tone, reproduces it (lighting up the corresponding lamp at the same time) and stores it. This is repeated as many times as the selected level requires.

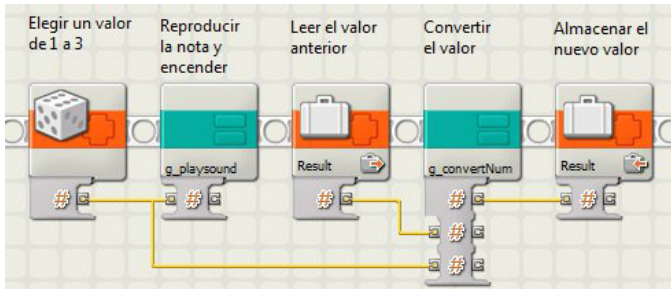
The most direct way of storing a sequence of notes would be in a matrix, but since NXT-G does not have standard support for matrices we chose a different method. We used a single numeric value in which the tone (a value from 1 to 3) is stored in the position of units, tens and hundreds. To do this, after generating the tone with the Random block (with a value of 1-3), the following calculation is carried out:

New value = Tone\*10 + previous value

[1] g\_GenerateSo: This block generates the sound sequence. The entry level is 1-4 and the exit level is a number that represents a sequence of between 3 and 6 sounds/colours.



So for each note the steps shown in the picture are carried out.

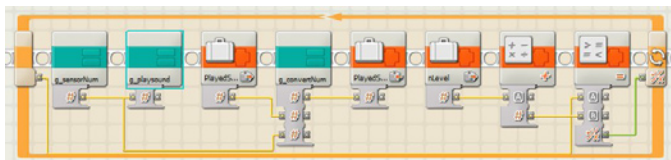


This is where the `g_playsound` block, which we saw earlier, is reused and a new one is created to convert the value as explained above.

When the user enters a sequence via the keyboard the same operation is carried out, so in the end the value that is generated can be compared to the stored value.

The loop that allows the user to introduce the sequence is as follows:

1. Wait for a key to be touched and convert the value into a number from 1 to 3 (`g_sensorNum`)
2. Reproduce the sound and light up the corresponding lamp (`g_playsound`)
3. Register the choice as seen before (bloque `g_convertNum`), in this case the variable is `PlayedSound`.
4. Add a unit to the variable `nLevel` (which stores the level with a value of 1 to 4) and compare it to the number of completed loops. If the result is `True` it means the sequence has ended.



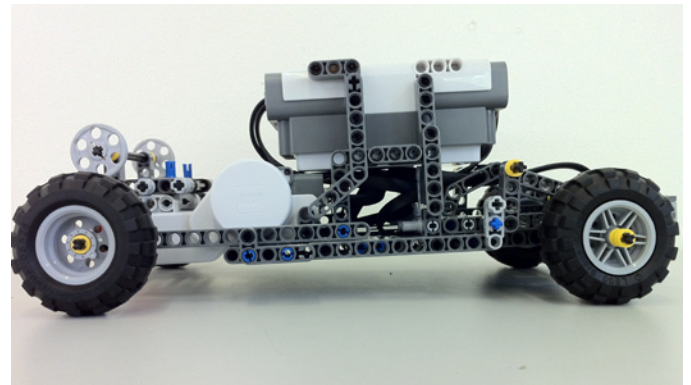
This loop needs to run more or less times depending on the level: the value that represents the level +2, that is to say, between 3 and 6 times. In order to keep count, instead of creating a variable that acts as a counter we used the counter of the loop. The connector of the counter is shown on the left of the loop (you need to check the box for the corresponding entry in the Loop configuration panel to see it). The value obtained from this connector is the number of completed loops. For this reason the value of the counter is compared to the value of `nLevel + 1`.

Now what remains is to compare the reproduced sequence to the one generated previously. If they match, a smiley face is shown on the screen and you hear applause, otherwise, a sad

face is shown and an error sound generated. Additionally a `True` or `False` signal is sent to the vehicle by Bluetooth. The original program allowed for 5 opportunities to get the vehicle to the finish line.

### The vehicle

The vehicle was very simple, as the only requirement was the possibility to advance or go back to the next line. We could even have used a single motor and a sensor looking down.



The program is waiting to receive a `True` or `False` message from the game console. After receiving it, if the value of the message is `True` it will advance till the next line, while if the signal is `False` it will go back (unless it is at the starting line). The program registers the number of tries and the position, so when 5 attempts are reached it goes back to the start position, whether it has reached the finish line or not (in the first case only after reproducing a triumphant sound).

It is important for the robot to control where it is regarding to the starting line, that is to say, whether it needs to cross it first or not. This was something that gave a lot of errors when programming the vehicle.

### Putting it into practice

The activity was tested at the Sant Joan de Déu hospital in Barcelona with several children with Brain Damage. While the test conditions were insufficient to draw conclusions, it was observed that little children focussed completely on the vehicle, forgetting the other part of the game. On the other hand, in some cases three tones/colours were too much to start; two tones and colours would have sufficed.

From a human point of view it was a very enriching experience, thanks to the collaboration of the hospital and the participating families.

### Possible improvements

- Use of the keys to control the menu with less able hands.
- While this was not considered originally, the mobile robot could pick something up and bring it to the user as a reward for finishing the exercise.

This activity was the result of teamwork in which the following people participated: Chang Long Zhu, Juan Pablo Forero, Louellen Palm and myself.

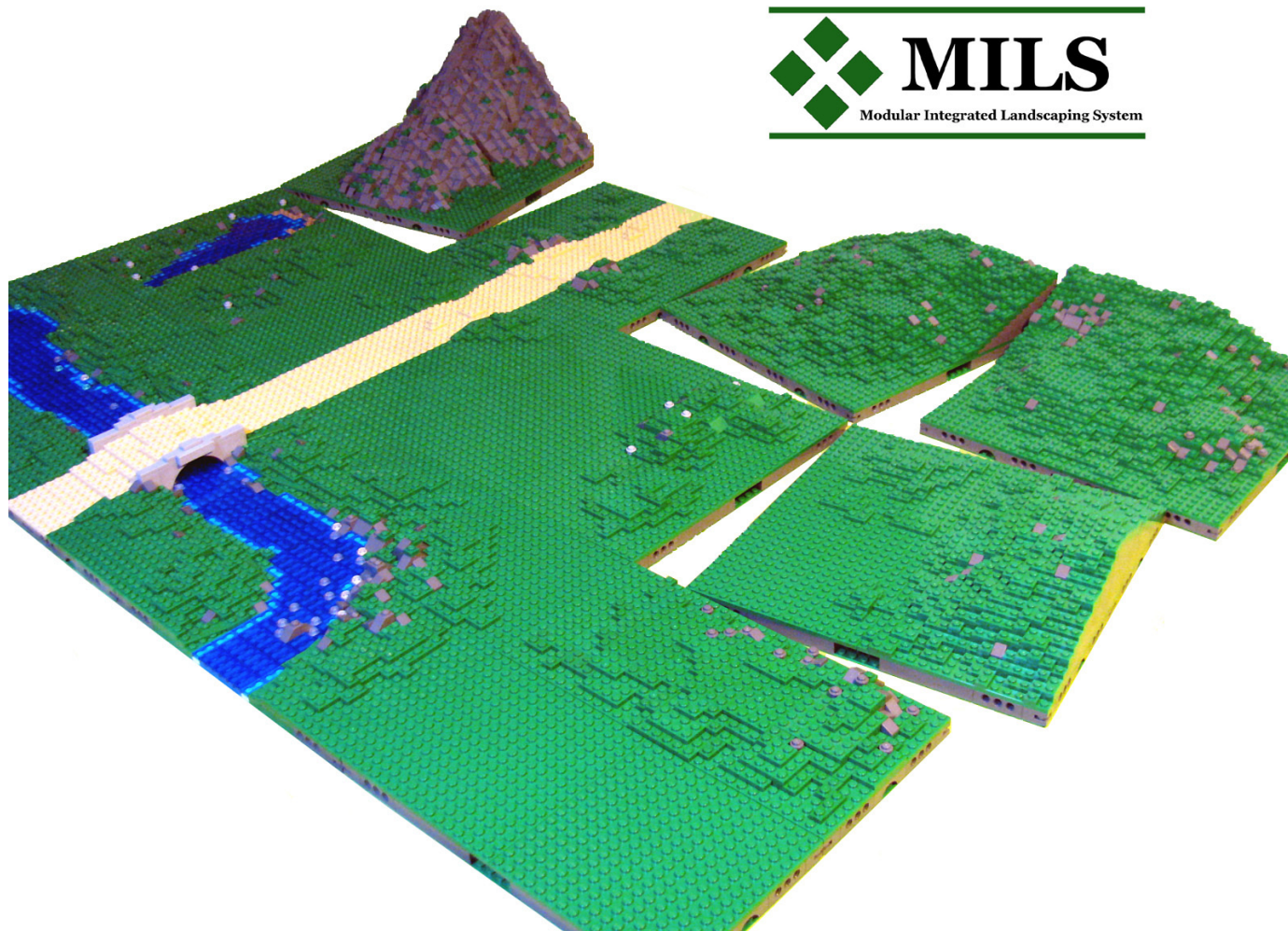
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## Modular Integrated Landscaping System (III)

*In this third article we will see new elements within the category of Compatible Terrain Modules (CTM). These new elements are hills and mountains.*

*By Legotron (A. Bellón)*

All modules seen so far were related to landscape with borders at surface level. But now, we are going to see a new type of construction with hills and mountains, as their respective modules need to be compatible in different height configurations.

### **CTM modules (Compatible terrain module).**

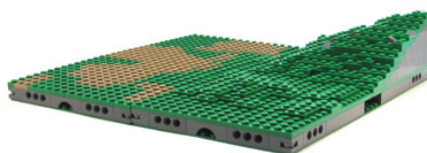
First of all, we are going to remember some of the things seen in past articles. The CTM modules have a measure of 32x32 studs, and they are intended to fulfil some conditions: they must have at least one side compatible with MILS rules but not all. And it is not compulsory that they can be oriented freely inside the diorama.

These modules are intended to be used to build rivers, roads, shores, hills or mountains. The first ones were reviewed in the last issue, so it is time to see the hill and mountain modules.

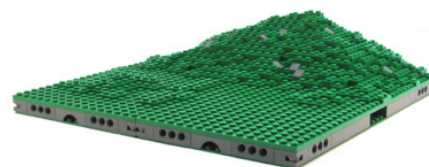
### **CTM: Hills**

These modules are intended to be part of hills or undulating landscape with soft slopes. When these types of terrain take up in a surface larger than 32x32 studs, it is time to use the hills modules. A hill can be constructed with an undetermined number of modules. These modules will contain in its 32x32 surface part of the hill, and they can have one, two three or the four sides as part of the hill. The number of different possibilities to build a hill is very large, because hills can have many different heights, different slopes and different shapes.

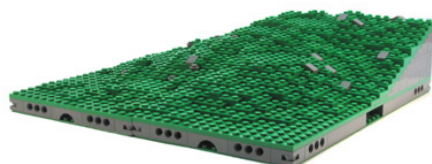
# Examples of hill modules



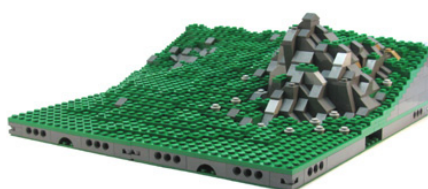
Hill null-null-short-short step



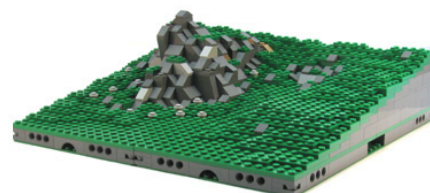
Hill null-null-double short-null step



Hill null-null-short & full-short step



Hill null-short-full-short step



Hill null-long-full-long step

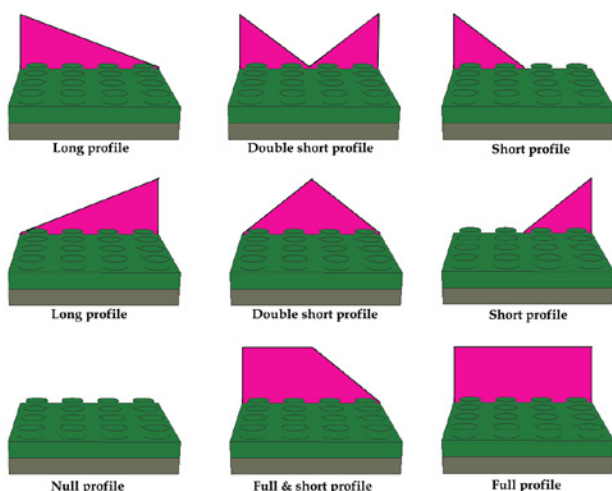
In order to have an easy compendium of rules, in the MILS system all the variants have been simplified to a few options. It is very important to remark that MILS rules are applied in the joining sides of the modules, so the rest of the module can have different sloping or height. This means that whenever a builder wants to build his own hill, with measures, height or slopes that are not compatible with MILS rules, he can do it. And if he wants to join that hill to constructions of other builders he only needs to change the sides intended to be the common joining part. The changes will consist on making those common sides compatible with MILS rules, but there is no need to change the rest of the hill. The same can be said for the rest of the elements shown in the articles of MILS system. As an explanation, the reason why all the modules of the HispaBrick Magazine® team shown in the pictures are MILS compatible, is because we are trying to develop the system of landscaping as a reference to show the efficiency of the MILS system, one of the main objectives of the MILS system is to be used with other landscaping elements which are not related with MILS rules.

We want to make the MILS rules as simple as possible. So we have defined a new concept: the profile. A profile is the shape that the side of a module must have. The MILS rules

reduce the available profiles to a few options, so it is very easy to know all the possibilities to make a hill module that is compatible with MILS system. These profiles will be the templates to mold all the sides of hill modules. When two different hill modules are going to be joined they must have the same profile in the common sides. This is a key factor to get a continuous landscape without gaps or inconsistent jumps.

These are the four profiles that have been defined:

- Null profile, this means that the module side has the same height as the surface of the module.
- Long profile, this means that there is a line climbing up 1 plate for every 2 studs. It starts at the level of the module surface in one corner and reaches a height of 5 bricks at the other corner of the side. This theoretical line will be the limit of the height the hill must have on that side. Under that line it is possible to build a solid construction or a gap, depending on the criteria of the builder.
- Short profile, this means that there is a line climbing up 1 plate for every stud. It starts at the level of the module surface in one corner and reaches a height of 5 bricks on the other corner of the side. This line covers only half of the side of the module, and will always have one extreme in one end of the side and the other extreme in the center of the side. It is possible to have two short profiles with one sloping line ascending and another sloping line descending.
- Full profile, this means that the whole side has a height of 5 bricks over the surface of the module.



As seen, the maximum height of the hill in the sides is 5 bricks over the standard height of a MILS module. This does not mean that all the hills have to be 5 bricks high, they may be higher or lower than this measure in the rest of the module, but in the sides that will be in contact with other modules they will have to fulfil the height of his type of profile. This height may have a variation of 1 plate above or below in the sides of the module.

Each hill module can have any combination of these profiles. The easiest modules will be constructed with some sides at surface level, and another two sides with a sloping profile, such as the corner of a hill. The most complex modules will have four sides with sloping profiles and full profiles. In order to get a common way to identify the different types of modules used to form a hill we have defined a nomenclature based on the type



of profiles of the module. To start the definition of the module we begin with the nearest side, usually the lowest side, and we choose the most appropriate term: short, long, null,... and then we continue with the rest of the sides clockwise, labelling the four sides. This is the way to ease the identification of the type of hill module we are talking about.

For example, if we want to build a hill null-short-long-null, this means we want to build a corner of a hill.

The process of building a hill consists of make some modules with sides that are compatible between them. The simplest hill is made up of only one module, a corner part of the hill. With many modules it is possible to construct complex hills, of a great variety of shapes.

For the hill we have chosen to use green parts in order to be very compatible with the modules we have explained in past issues. It is also recommended to add some parts in gray and tan to create a more varied landscape.

## CTM: Mountains

These modules will be used to build mountains that need more than one 32x32 studs module. The mountains are similar to the hills, but with more inclination and with a more rough and rocky look.

These modules will contain a part of the mountain in their 32x32 surface, with one, two, three or the four sides as part of that mountain. The number of possibilities to build a mountain is very high, so that MILS rules are simplified to a few options in order to be easier to apply. This does not imply that all the mountains have to be the shapes defined by the MILS rules. Any mountain with a geometrical design not related to MILS rules can be compatible with those ones that fulfil the rules just by making some of its sides compatible with the rules we are going to define.

In order to simplify the MILS rules, the system chosen to depict the way of building the mountain modules is very similar to that used in hill modules. This means everything stated in the hills section can be applied to the description of the rules for mountain modules. In the case of mountains these are the types of profiles we have:

- Null profile, this means that the module side has the same height of the surface of the module.
- Long profile, this means that there is a line climbing up 1

brick for every 2 studs. It starts with one brick above the level of the module surface in one corner and reaches a height of 16 bricks in the other corner of the side. This theoretical line will be the limit of the height that the mountain must be on that side. Under the line it is possible to build a solid construction or a gap, depending on the criteria of the builder.

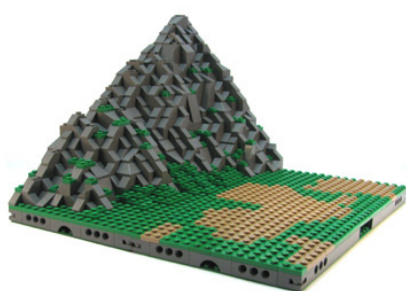
- Short profile, this means that there is a line climbing up 1 brick for every stud. It starts at one brick over the level the module surface in one corner and reaches a height of 16 bricks in the other corner of the side. This line covers only half of the side of the module, and will always have one extreme in one end of the side and the other extreme in the center of the side. It is possible to have two short profiles with one sloping line ascending and another sloping line descending.
- Full profile, this means that the whole side has a height of 16 bricks over the surface of the module.

As can be seen these are the same criteria applied to the hills modules. The main differences are the inclination, which is more sloped in the mountains, and the starting height, which is placed at 1 brick above the surface of the module in the case of mountains. All these things mean that the maximum height in the joining area will be 16 bricks. This by no means should be taken as a maximum height for the mountains. This is the height in the sides compatible with MILS rules, in the rest of the module the mountains could be higher. In the case of mountains, the deviation for this rule is 1 brick below or over the theoretical height line of the corresponding profile.

The same nomenclature system for the hills modules is valid for the mountains modules. The hill word is changed for mountain, and beginning with the lower side, which is oriented nearest, the profile of the sides is described clockwise. This is the same system explained with the hills. For example: Mountain null-short-long-null could be a module with a corner of a mountain.

We only need to construct the appropriate modules to create a mountain. Each mountain can be built in many different ways, some very simple and some others very complex. The simplest mountain can be made with a single module of null-short-short-null steps type to be located in a corner of a diorama, and the most intricate mountain full of ravines and canyons will need dozens of modules to be done. That's the builder choice to decide what he wants to do.

## Example of mountain modules



**Mountain  
null-long-short-null step**



**Mountain  
null-short-long-null step**



**Mountain  
null-null-double short-null step**

The main parts used to build and represent the rocky aspect the mountains are the dark bluish gray slopes and dark bluish gray bricks. In order to avoid a symmetric or artificial look the use of green and dark tan pieces is highly recommended. The green part could be used in the less sloped parts of the mountain. There is no need to make all the mountains in the same color, but to prevent strange color effects in the layouts in the mountains is highly recommended to use mainly dark bluish gray in the common sides. The addition of mottled elements in green and dark tan will result in more realistic mountains.

## Multilevel Hills and mountains

Although the rules described seem to limit the height of the MILS compatible hills and mountains, this is all but true. There is the possibility to build hills and mountains in several height levels. Enough modules with a "Full" profile on at least one of their sides are needed to delimit an area of the diorama. This area can be elevated to the level of its surrounded modules and be used to put new hill modules or mountain modules above it. This is the way to increase the height of the hills and mountains.

There are no rules for this type of constructions, for the moment, because these constructions involve many different possibilities, and it is something against the simplicity of the MILS rules. This could be a future development for an advanced set of MILS rules.

## Mixing different types of terrain

Until now all types of modules have been described to reflect a unique type of terrain. We have modules for rivers, modules for hills, modules for roads and so on. But MILS rules also allow

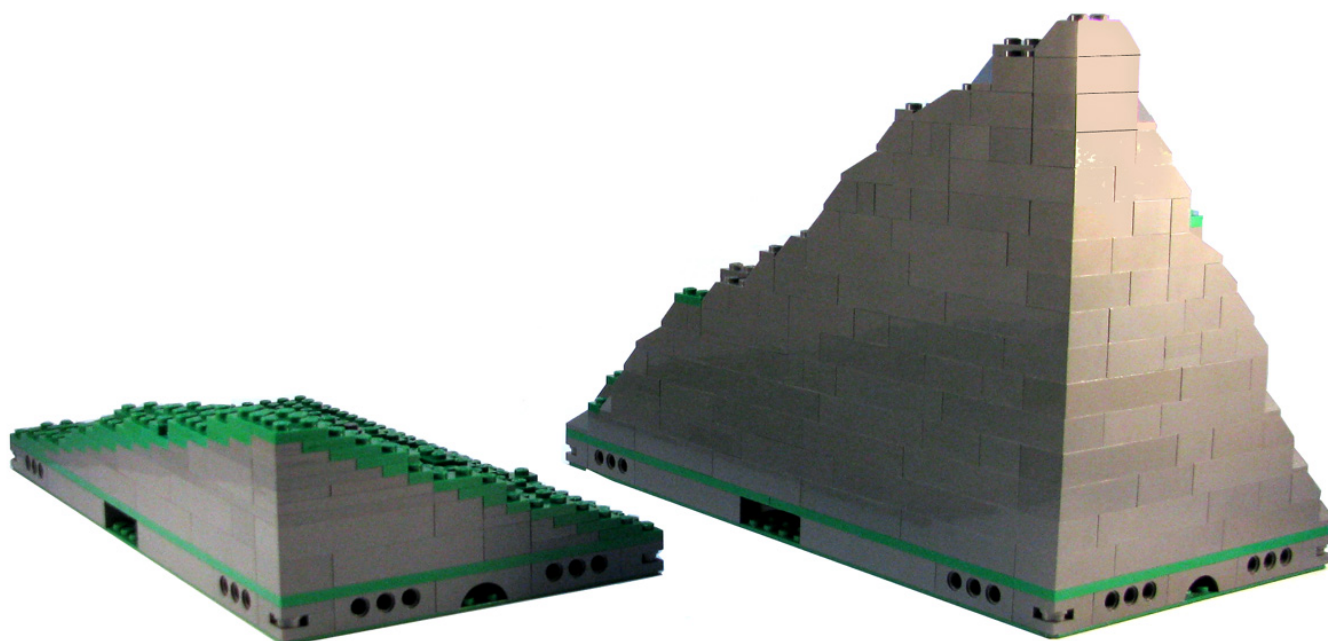
the combination of different types of terrain in one module. There is no problem to mix them, you just have to apply the sum of the rules for every type of terrain in that module. For example, a module with a hill can contain a path, and the path must have its ends in the middle of the module side, with the width designated for that kind of way, but the height is determined by the hill shape at the edges of the module. Of course, the union of different types of land will have to be done in a consistent manner, in order to avoid crazy land layouts.

The builder does not need to make a strict interpretation of the rules, he can use them when he needs. As an example, if one person wants to build two adjacent modules to create a hill, in order to use them in cooperative dioramas, he is only required to respect the MILS rules in the perimeter of his hill, but he is free to do whatever he wants inside those two modules. That is the reason why we are always emphasising the fact that the MILS rules are mainly intended to be used in the joining areas between modules of different builders.

We have prepared a web site in order to show a compendium of these rules, some examples of our modules and displays built to test the MILS system, and resolve any questions. You can it at: <http://www.abellon.net/MILS/index.html>.

In the next issue we will talk about the transition modules (TTM) and a little about mixed modules. Furthermore, we will show detailed pictures of our MILS dioramas that will be shown at the HispaBrick Magazine® Event 2012.

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Colina / Hill

Montaña / Mountain





## Muzeum LEGA

### *An oasis in the centre of Prague*

*By Iluigib*

This past summer, during our vacation in Prague, had an unexpected encounter. Walking through the streets of the capital of the Czech Republic we found the Muzeum LEGA, a private museum that reviews the history and different themes of LEGO® sets.

I have to admit I was a little baffled at the beginning. The poster of the Museum uses a very similar to the LEGO brand typeface, although it doesn't use the official name of the brand. In addition to the Museum there is a LEGO products store where you can find a lot of variety and some more or less exclusive sets. You may think that the LEGO Company is involved in this since the Kladno factory is only a few kilometres from Prague, but after a few inquiries (after my trip) I discovered that it is a completely private Museum and shop.

The entrance to the Museum is through the store, where you can buy the tickets. The Museum is divided into three floors with a tour of sets from CITY, Technic and Model Team, Classic Space, Star Wars™, Western, Pharaoh's Quest and a long etcetera...

I must say that all sets are documented with a card that displays the name, number of pieces, year and reference.

On the lower floor (basement) there is a very large CITY diorama with a mixture of Classic Town and CITY sets. Around the diorama there are many display cabinets with different







sets and dioramas, with, for example, one with (probably) all trains in the LEGO® world and another dedicated to the airport theme. Then there is a hallway that directs takes visitors to other smaller rooms with sets of themes which are more reduced in their number of sets. In each one of the rooms one or two themes are represented and always with a décor that helps to get into the atmosphere of the theme.

After completing the visit to the lower floor, you take the stairs to the first floor, which contains a large Star Wars™ diorama. There you can see most of the UCS ships and other smaller ones. The ones that do not fit in the diorama are in glass cases around it, as well as the entire Classic Space theme.

Finally you descend to the ground floor, where you find some

showcases displaying sets of lines that no longer fit on the other floors0, a play area for children (rather spacious) and the shop with LEGO and pieces.

Throughout the route we saw some “maxi-models” like the Rockefeller Center from Architecture with a height of about one meter.

Even though the museum is private, it is worth visiting it to remember our childhood, our youth and our “adulthood” sets. More than 2500 sets submerge you into a paradise for LEGO fans and will make you feel a little envious, because of some of the sets you may not have or the privileged space to exhibit them.

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# LEGO® Fan Weekend 2012

## *The LEGO experience*

*By Legotron*

A new edition of LEGO Fan Weekend event was held in Skaerbaek, Denmark, on 29 and 30 September 2012. This last edition brought nearly 350 AFOLs from 25 different countries to the convention, making it the most international of all events of fans of LEGO® constructions held to date.

As in the previous editions of last years, several members of the HispaBrick Magazine® staff went to the event. There we saw the great growth and the level reached this year. One of the main features of this event was the great involvement of members of The LEGO® Company in the organization. It was more than a spectacular exhibition of the MOCs made by attendees. Furthermore we were given several workshops, lectures and activities developed throughout the event.

The LEGO Fan Weekend is an AFOL oriented event, organized for the enjoyment of the fans, with large numbers of members of LUGs from many countries. This make it stand out as one of the most important events for fans of LEGO® constructions worldwide. Details like the housing system, shops, activities,

lectures, workshops and the exposition were a good starting point for the different LUGs to share their creations to the rest of the world, and to learn about the evolution of the LEGO hobby in many of the countries represented in the event. Furthermore, this event is a unique opportunity to meet some of the leading builders of the international community, especially at European level and also to meet some of the members of the LEGO® company design team.

The most striking part of the event was the exhibition of MOCs and dioramas made by AFOL attendees, which was gorgeous. Due to the large number of attendees it was possible to see a great variety of dioramas and constructions. From giant mosaics, dioramas of all kinds, even large buildings, to many types of incredible MOCs which were located in the two halls enabled for the exhibition. A lot of attention was given to the many dioramas on scales larger or smaller than minifig scale. Often, most of the dioramas which can be seen in local events are oriented to minifig scale. Also striking was the amount and variety of Technic and Mindstorm MOCs and the huge





GBC, which was another highlight of the exhibition. Hundreds of constructions were exhibited at the LEGO® Fan Weekend 2012, and it would take many articles to comment them, even if we only paid attention to the ones we liked most.

Some of the most important features of the event, and the ones I want to emphasize more, were the various talks that were offered throughout the event by different members of the LEGO® company. They were really interesting, with many details and comments about the activities, production problems, design, successes and failures of the company's products. Some of the questions related to these aspects, posed by AFOL attendees, were answered in these talks. Another activity to highlight was the common meal with all participants and members of the TLC staff. In addition to being

able to share the experience with other attendees, we could attend new talks and the presentation of new sets. There was also the possibility to participate in several workshops on various aspects of the activities of the LEGO® company, but these were restricted to a limited number of attendees.

From the point of view of HispaBrick Magazine® the large number of participants from many different countries allowed us to establish new friendships and contacts in order to collaborate in future articles for the magazine. Although we all share the same hobby, it's interesting to see the way people build with LEGO® pieces and organize their LUGs in different countries. A unique experience.

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# BrickCon Exhibition 2012

*By Katie Walker*

*Pictures by Katie Walker or their respective owners.*

BrickCon celebrated its tenth anniversary October 4-7 at the Seattle Center Exhibition Hall in Seattle, Washington. As the convention program says, "BrickCon is a convention for Adult LEGO® Hobbyists. Its focus is on building friendships and community through the sharing of time, ideas, building techniques and unique creations. The weekend features workshops, presentations, special events, and intriguing challenges. Every aspect of the LEGO® hobby is available for exploration."

This year BrickCon had 12,100 public visitors and 470 registered builders. The display space was 34,000 sq. ft. and there was 17,000 sq. ft. of convention space. Seven regional LUGs participated in the event: SEALUG, PSLTC, GPLR, VicLUG, VLC, PortLUG, and SMART.

BrickCon has two main parts: the private convention and the public display. Although this was my third time attending BrickCon, it was the first time that I was able to stay for more than a day. This gave me the chance to attend a lot more of the private convention, which included presentations, games, speakers, and other activities. I want to preface the following discussion by saying that what follows is only a tiny glimpse of all the geeky goodness that was on display at BrickCon. There were too many wonderful models, presentations, and people to fit them all into this small article; there were many events that I missed entirely. And of course, the only way to truly appreciate the convention is to attend for oneself. That being said, I'll do my best to share what BrickCon 2012 was like.



Seattle Space Needle, by BrickCon Director Wayne Hussey





## BrickCon Private Presentations

BrickCon's private convention had a lot of presentations to attend, many of which were done by highly skilled builders. The first one that I went to was called "Building a Bat Cave" by Carlyle Livingston. Carlyle discussed how he and Wayne Hussey went about building the giant Bat Cave that was on display in the Exhibition Hall (and which has also been featured all over the internet, including on the frontpage of msn.com). It was interesting to see how other people go about building projects, especially large and complicated ones. There was a lot of learning involved. For example, Carlyle talked about how he got better at making rocks as he went along, and he thinks that the rocks on one half of the cave are better than in the other.

Another interesting session that I went to was an AFFOL (Adult Female Fan of LEGO®) Roundtable, hosted by Anu Pehrson and Terri Landers. This was a chance for female LEGO® fans to talk about their experiences in a hobby dominated by males. Attendees talked about how they started to build with LEGO®; in a lot of cases, women started building because of the influence of a husband or boyfriend. We discussed ways to get girls involved in building, and about the effect that the new Friends sets have. There was a debate about whether the Friends sets should be put into the girls' toy aisle in stores (suggesting that non-Friends sets would not appeal to girls) or if they should stay next to the rest of the LEGO® (but where it might not reach the target audience of girls who aren't yet interested in building). It was also suggested that BrickCon should have an official Friends theme next year, just like it has Bionicle, Castle, or Space themes. Friends has been (wrongly) criticized by some people who think that it comes with large, pre-fabricated elements and therefore limits creativity. Perhaps next year's BrickCon attendees would be able to create an entirely original Heartlake City and show that the Friends sets lead to just as much creativity as other LEGO® themes that aren't specifically aimed at girls.

A few of the other presentations I went to included "Manipulating Mosaics" by Mariann Asanuma and "How to Build Rocks" by Alice Finch. A subject that I didn't know much about was discussed in "Play Well: Costuming with LEGO(R)," by Norbert Labuguen. Norbert talked about Cosplay (Costume



Norbert Labuguen

Play) with LEGO and showed some photos of neat costumes made out of LEGO®. He also demonstrated the Skulkin Skeleton Soldier mask and claws that he had made.

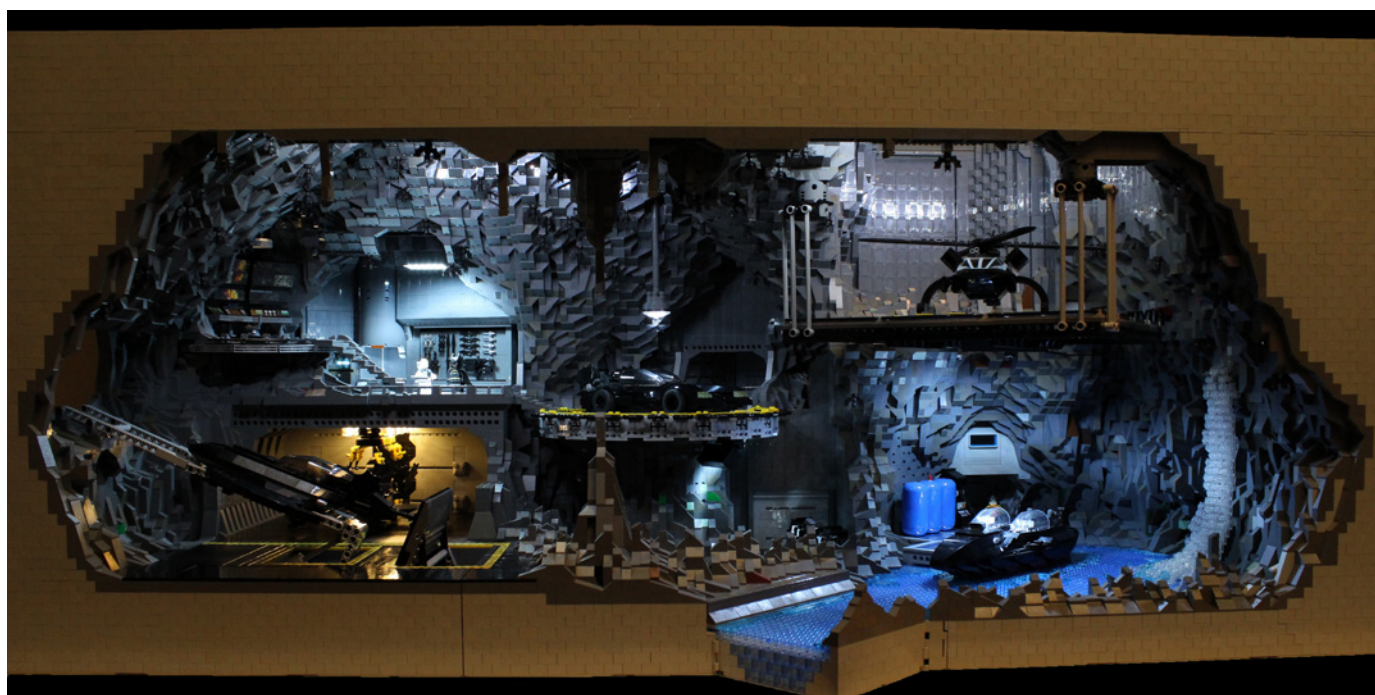
In another session, Brandon Griffith talked about his STUDS Builder Trading Cards. Brandon submitted a project to the crowd-funding website Kickstarter, which was successfully funded. As his

webpage, [www.brickstuds.com](http://www.brickstuds.com), says, "STUDS is a trading card set that profiles the people who use LEGO® to build incredible, original sculptures and brings you a close-up view of this fascinating world. Each card has the image of an amazing LEGO® creation on the front and info about the work and artist on the back." I found it especially interesting that Brandon said that he was trying to spread what AFOLs do to the wider world and give building with LEGO® a sense of artistic value.

One final presentation that I want to mention was the one I gave, which was called "Intro to Cheese Slope Patterns and Mosaics." Mostly I just want to say that it was lots of fun to be able to talk about something that I love to an audience of people who seemed to actually be interested. I think that is one of the best things about being able to attend a LEGO® convention: the chance to meet friendly people with similar interests, and to share with each other our creativity and passion.

## BrickCon Public Exhibition

The public exhibition at BrickCon was a crowded and chaotic affair. There are many different themes for builders to enter their models into. Some of the themes are pretty standard, such as Castle, Space, and Town/Train. Others are a bit more exotic, such as The Dark Side (which features glow-in-the-dark models under UV lighting), Numereji 2421 (a ship-wrecked space colony), and Bling and Race your AT-AT. There was also



Bat Cave, by Carlyle Livingston and Wayne Hussey (photo courtesy Carlyle Livingston)

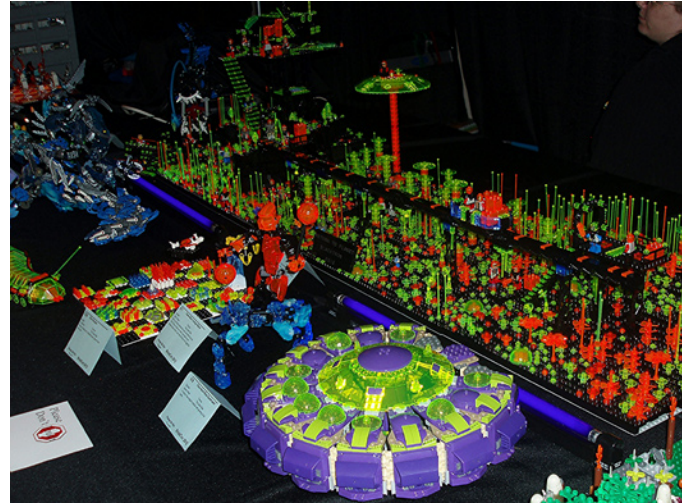




a BrickCon Film Festival, which included a winning entry by Paul Hollingsworth featuring harmonizing Wookiees.

As a Castle fan, some of my favorite exhibits were in the Castle theme. It was there that I met David Lines. His builds all had a geometric quality and intensity of detail which I found appealing. His King Leo's Summer Palace is featured in "LEGO® The Calendar 2013," and his Painted Castle is so lovely, I didn't even care that it was not purist.

Alice Finch's massive recreation of Harry Potter's Hogwarts Castle dominated a large portion of the castle section. Hogwarts won both the People's Choice Award (decided by the public) and the Best in Show Award (decided by registered attendees). I asked Alice for a bit of information about her



giant build. It took her about 12 months to build, with 90% of the work being done after her kids went to bed. Alice says that she worked on it "pretty much nonstop" from 9 p.m. to 2 a.m. every night. She was "seriously sleep deprived," but just had to get it done. Since the castle is so big, she isn't sure exactly how many bricks she used, but estimates it to be between 300,000-500,000. If you ask her how much it cost to make, she answers, "Don't know, don't want to know." I understand completely! One of the things that I found most impressive about this castle was how playable it was. There are about 150 minifigs in it, recreating scenes from the different Harry Potter movies. Walls swing open and roofs lift off to allow access to the interior rooms. Alice made special compensations to make it strong enough for her kids to play with, so that an especially vigorous battle would not damage the model. And yes, her kids really do get to play with it.

Paul Hetherington, winner of several previous BrickCon Best in Show awards, never fails to disappoint and this year was



David Lines and his King Leo's Summer Palace





Hogwarts Castle, by Alice Finch

Poseidon, Guardian of Atlantis, by Paul Hetherington  
(photo courtesy of Lino Martins)



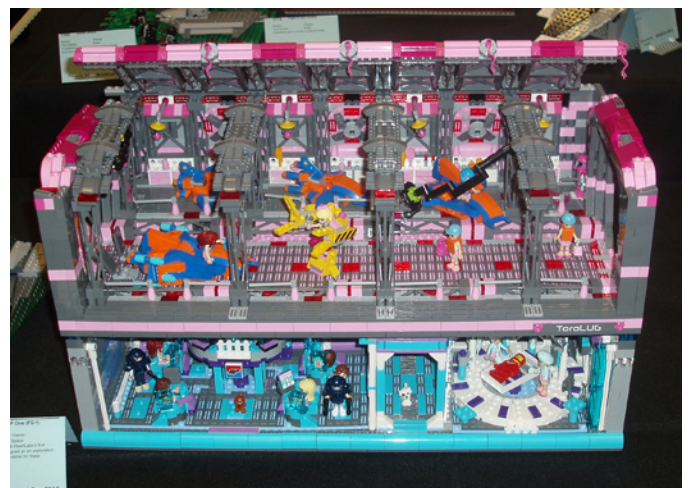
no exception. His Fun Haus, winner of Best in Town, depicted a spooky carnival ride. "A celebration of life... through death. Upon entering, the curtains to the afterlife will be parted. You will face your greatest fears and will come out more alive than ever!"

Paul also brought a giant model of Poseidon, standing guard over the city of Atlantis. The contrast between the giant sculpture and the meticulous details of the scene underneath made for an exciting exhibit. Even more fun is that the model has lots of moving parts. Poseidon moves his head back and forth and waggles his eyebrows; the mermaids swim and wave to and fro; Jack Sparrow makes an appearance, popping up from behind a treasure chest; and a giant clam opens to reveal Sponge Bob Square Pants.

Part of the challenge of bringing models to a LEGO® convention is the difficulty in packing and moving models without them suffering damage. I heard a story of someone who got rear-ended while driving to the convention, which caused lots of damage to his models. But even without car accidents, your creations won't always arrive in one piece. Simon Liu experienced this with Planet HeartLake's first interstellar starship, FriendSHIP One (FS-1). The story of FS-1 has a happy ending, though: Simon got it back together (with only a hundred or so pieces left over) and it won for Best Large Spaceship.

## The Heather Memorial Project

One of the most poignant parts of BrickCon was the creation of the Heather Memorial Mosaic. Heather Braaten was a talented AFOL who had been a staple of previous BrickCons, but



Simon's sad: Simon Liu rebuilding FriendSHIP One and FriendSHIP One (mostly) restored.





Robert Frost, Lino Martins, and the Heather Memorial Mosaic (photo courtesy of Lino Martins)

passed away last spring. Lino Martins and Robert Frost wanted a way to remember and honor her, and to give the BrickCon community a chance to say good-bye. They organized the creation of a large mosaic derived from Heather's sig-fig, funded by donations from around the world. BrickCon convention attendees were given the opportunity to put small sections of the mosaic together. At the end of the weekend, the mosaic was presented to Heather's family. Extra funds raised were also given to her family; however, Heather's mom asked for it to be donated to children who can't afford LEGO® sets of their own, because that's what Heather would have wanted. So Robert and Lino got to spend over \$400 on LEGO® which they gave to the Children's Hospital.



Photo courtesy of Robert Frost

One final tribute for Heather was an homage to the "Darlings" characters that she invented. Members of the AFOL community made their own Darlings, and either brought them or sent them to be displayed at BrickCon as part of the Bricks of Character Display.

I never really knew Heather; before this year I had never stayed at the convention long enough to get to know many people. It's a shame that I never will get the chance to know her. But every year that I go to BrickCon I slowly get familiar with more people. I learn more about them, and about what they like to build. I spend more time talking with them, laughing with them, sharing stories and techniques and ideas with them. BrickCon is about much more than just building models; it's about building friendships. I can tell by the tributes to Heather that she had made many great friends during her years at the convention, friends that came together in the tragedy of her passing. As previously mentioned, BrickCon's focus is on "building friendships and community through the sharing of time, ideas, building techniques and unique creations." And, without a doubt, that is exactly what it does.

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Photo courtesy of Lino Martins





# HispaBrick Magazine® Event 2012

*By HispaBrick Magazine*

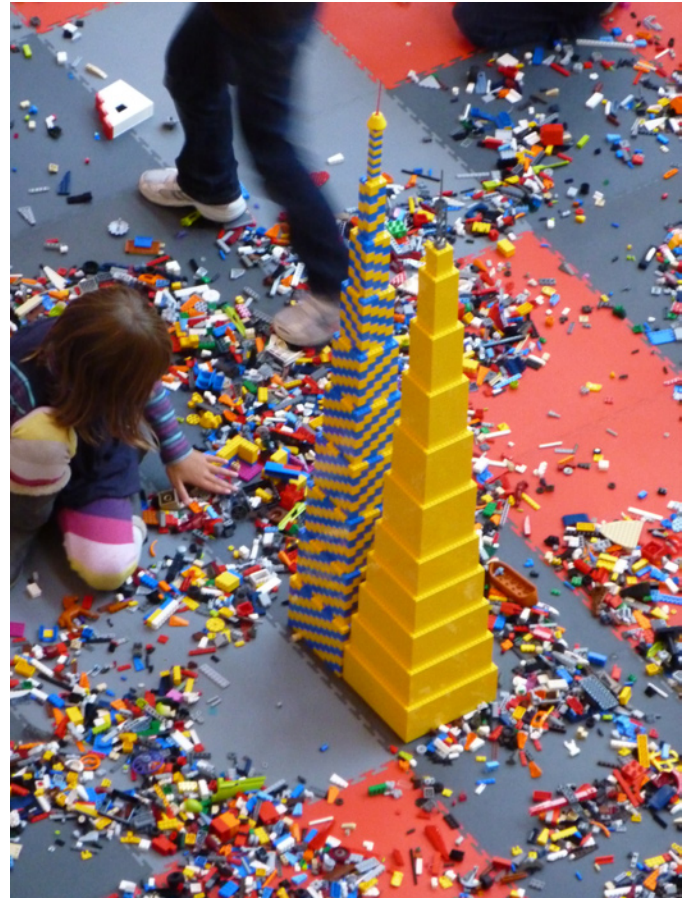
On December 7 and 8 last, the first HispaBrick Magazine® Event was held at the Museu de la Ciència i de la Tècnica de Catalunya in Terrassa. Its 100m2 of exhibition, games, contests, conferences and projections attracted over 5300 people during the two days of the event.

## Activities

The younger visitors could enjoy the play area with LEGO® pieces where they could let their imagination run wild.... and their parents' as well. They could also participate in a search for giant minifigs throughout the museum or the contests in the exhibition area. There were prizes to be won in each activity. At the auditorium, visitors could enjoy watching videos about the history of LEGO and about the manufacturing process of our beloved bricks. In the conference area there were presentations on building techniques or on robotics, presented by our MCP Jetro (in a packed room)











## The exhibition

Visitors could enjoy an exhibition of diverse LEGO® materials, among which the presence of several early design pieces from the for LEGO elements LEGO design department stood out, as it was the first time these were publicly exhibited. Once inside, in addition to visiting the installations of the museum, there was the exhibition of the material presented by the members of the LUG. Some outstanding pieces were the Hoth, medieval and Hobbiton displays which were built using the MILS system, or the Hornburg in Helm's Deep that drew attention due to its sheer size. A large City diorama with both vintage and new sets (together, but not mixed), Star Wars™ (including the Imperial Hangar), Panzerbricks (with more than 50 tanks and military vehicles), Space Classic, Halo and a football stadium made up the largest part of the exhibition for the little ones. For the older ones there were also the latest Technic and MINDSTORMS models. As a novelty, on Saturday the new Horizon Express from the LEGO Creator Expert theme was presented in the best possible way: integrating it in the City diorama.

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# Review: A Million Little Bricks

By car\_mp

Pictures by Skyhorse Publishing Inc

## A Million Little Bricks

The unofficial illustrated history of the LEGO® phenomenon

Author: Sarah Herman

Pages: 303, hardcover.

Publisher: Skyhorse Publishing Inc(R)

Since the first issues of the magazine we have not talked about the world of books about LEGO® bricks. But in this issue we have two books to talk about. The first, being the first to reach our hands, tells the story of the LEGO phenomenon from the point of view of Sarah Herman, a British writer and, of course, LEGO lover.

The book, bound in hardcover, has 303 pages, with color illustrations and is published by Skyhorse Publishing Inc (R).

The book is divided into six chapters. The first five feature the story of the company, in chronological order, while the sixth is a review of other products surrounding the LEGO brick.

Within each chapter there is a summary of each of the themes that appear in the period to which the chapter is devoted, surrounded by an overview of the situation of the company and the toy world in general at that time. A surprising number of themes and subthemes have appeared, some of them unknown due to my Dark Ages during these years. In each of them there is a review on the topic, highlighted sets and colors or distinctive emblems. It also gives an idea of the possible inspirations that led the designers to create it. You might miss the inclusion of more photos, but it is supposed to be a book, not a catalog, so including all the photos an AFOL would like to see would have meant more pages ..., many more pages.

Of note is the first and last of these chapters on the history of the company. The first is a detailed account of the beginnings of the company. And in the last the crisis that engulfed the company in the early years of the new millennium is described, as well as how it resurfaced. The early years of the company, although quite well known to any fan worth his salt, are well covered in the book. However, I wish the years of the crisis were treated more deeply, when the company plunged into losses and had to make tough decisions, but this may not fit in with the overall tone of the book and was more like a book on business economics.

It should be mentioned that the book covers until 2011 and therefore you should not expect the latest news or themes announced by the company. For new generations used to blogs, podcasts and forums, it may be a bit of a novelty to find something that is not updated every day.



Sarah Herman, british writer, editor and LEGO® fan

Throughout the book there are comments and quotes from designers and enthusiasts, with outstanding collaborations like Joe Meno or Nathan Sawaya.

## Conclusion:

A book that is out of the current trend of reference books, ideas and construction techniques, becoming a historical overview of the LEGO phenomenon. A good read for those who are not satisfied with the “now” and are looking to learn more about their favorite company than the catalog of this year.

A downside may be the need for a second part in a few years, as we all expect a long life for our favorite company. With a little luck, our magazine will be mentioned in the next volume ...#



## A Million Little Bricks

THE UNOFFICIAL  
ILLUSTRATED  
HISTORY OF  
THE **LEGO**  
PHENOMENON

Sarah Herman





# Review: The Unofficial LEGO® Technic Builder's Guide

By car\_mp

Pictures by No Starch Press

## Review The Unofficial LEGO® Technic Builder's Guide

Author: Paweł "Sariel" Kmiec

Pages: 333, paperback

Publisher: No Starch Press

For fans of this magazine, the author of this book will not be a stranger. In addition to being a genius building with LEGO®, he has always been willing to collaborate with the community. He did not hesitate to let us publish his tutorials in the pages of our magazine, and on his website you can find many of the innovations that are now collected in this book. Eric "Blackbird" Albrecht is not a stranger either. What's more you have already been able to read an article by him on Pov-Ray a few pages back and an interview we did in one of our previous issues. The introduction is signed by Fernando Correia, editor in chief of TechnicBRICKs. Against this background, we could only expect the best of this book... and it hasn't let us down.

It may seem that this theme is especially aimed at people with training in engineering or similar, but with some basic knowledge anyone can get started in this world. This book covers that purpose well. The first three parts take a practical look at the basic fundamentals of physics and engineering that are needed and the Technic pieces and elements that we have at our disposal. This part is intended to allay the fears of the uninitiated and arouse their interest in the rest of the book.

I don't consider myself uninitiated, but certainly a newbie. Up until now, my skills were limited to building official models and modding the mechanisms they included ever so slightly to adapt them to my needs, many times without knowing exactly what I was doing, and of course, without knowing if there were alternative solutions to my problem. Even so, I have learned a great deal from these first parts. It goes without saying that the last two parts have opened up a whole new world for me. Although in the first three parts there are already a lot of examples of mechanisms as an application of what is explained, in these last two chapters you will find everything you need to reproduce practically any real-life element - steering, transmissions, suspensions, etc. - and how to build

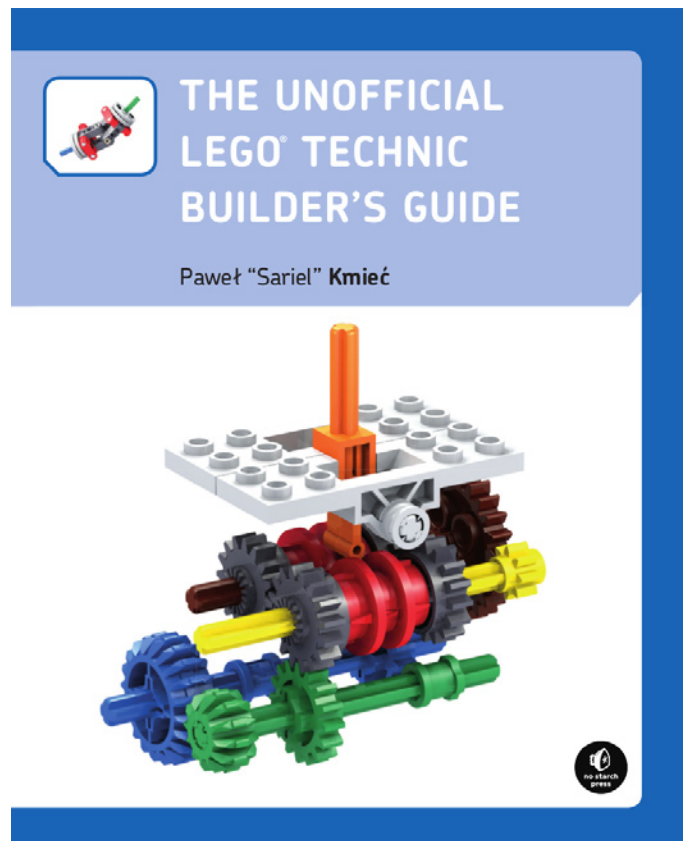
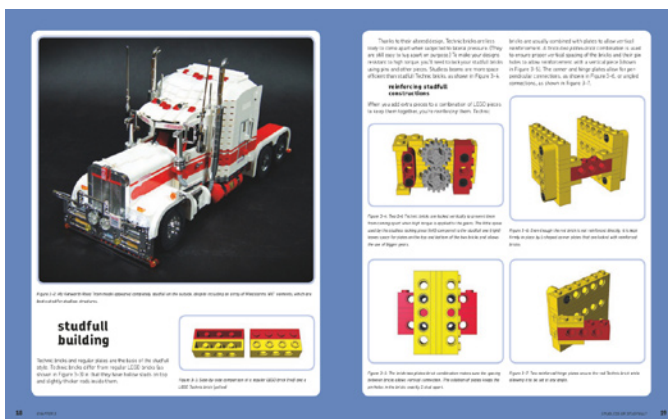


them into your scale models. Personally I don't think that there is any Technic builder who cannot learn something from this book, given its completeness.

The book is very well illustrated with both photos and renders and many pages dedicated to building instructions.

## Conclusions:

Probably the best Technic book for any builder, independent of their level. A must have for your collection.  
#



# LEGO® FRIENDS

## City for Girls

By Jetro

Images by Brickset

When LEGO® Friends was announced in 2011 there were mixed reactions. One of those that stood out most (with the exception of the various groups that tried to use the product to further their personal campaigns) was one made on twitter saying: "There already was LEGO for girls. It was called 'LEGO'".

That comment was not only over simplistic, but also grossly inaccurate. When Godtfred Kirk Christiansen set down the "10 characteristics for LEGO" in 1963, one of these was: "For girls and for boys and while it is true that theoretically a brick is a brick and it's only your imagination that makes the difference, from very early on LEGO has made determined efforts to specifically cater for the female segment. No less than 5 strategic initiatives were taken before Friends to make LEGO especially attractive for girls, in the same way as other initiatives were clearly more targeted towards boys. So let's have a quick look at those "girl" themes:

### Homemaker

The Homemaker theme was launched in 1971 and ran till 1974. A total of 30[1] sets were released that consisted mostly of furniture. The minifig had not been born yet and so the scale used was quite different from now, with built up figures made with a head, 2x2 bricks and hinges. This scale fell out of use when the minifig was introduced in 1978.



### Paradisa

This subtheme of Town ran from 1992-1997 and a total of 18 different sets were produced. This was "LEGO for girls" in the truest sense in that the sets were slightly more oriented to girls, but still stayed 100% within the LEGO system of bricks and

were fully compatible with any other "traditional" LEGO. The sets included a lot of pink and other pastel colours. They were certainly not the only Town sets to include female minifigs and the paradise island atmosphere of the sets made it ever so slightly more difficult to integrate them with the rest of the sets, but certainly not too much of a stretch either.



### Belville

Produced from 1994 to 2008 and with a subtheme called Fairy Tale between 1999 and 2001, these sets included minifigs that were about 10 studs tall and had more points of articulation than a standard LEGO minifig. They included many large, single purpose pieces, most of which did however combine with standard LEGO bricks. About 80 different sets were produced, that included many play elements, but required very little construction.





### Scala

This theme had a small start in 1979-1980 with a few sets introducing LEGO® jewellery (bracelets and pendants), but it wasn't until 1997 that it really kicked off as what might be called LEGO's answer to Barbie. Although loosely based on the LEGO brick system, the sets included dolls that ranged from 8 studs (a baby) to 20-22 studs in height ("father" and "mother" dolls with many articulations), with clothing and lots of little details. In total about 75 different sets were produced, but many of the elements were very specific to the theme and are hard to combine with anything but their intended counterparts.



### Clikits

This theme was produced from 2003-2006 and consisted exclusively of sets to build and decorate your own jewellery and accessories. However, the parts in these sets were exclusively designed for the Clikits theme and do not in any way fit in with the LEGO system of building. A startling 74 different sets were produced, including such things as bracelets, hairbands and picture frames.



### Friends

That brings us to LEGO's latest offering specifically directed at Girls: LEGO Friends. Launched in late 2011 (The earliest sets became available in France during the month of December), the theme is arguably closest to Paradisa in several respects. For starters the elements used in this theme are all perfectly compatible with the LEGO building system and there are no unnecessarily large or simplified parts. Also the sets require a fair amount of construction and there is some similarity in the pastel colours that have been introduced with this theme and those available in Paradisa.

The main difference from the aesthetic point of view is the creation of a new kind of minifig for Friends. Rather than creating a large, doll-like figure with actual clothes. Like in the Belville or Scala themes, the Friends minifig is only slightly taller than a standard minifig (about 5mm). This is not a very big difference as "standard" minifigs with dress (using the Slope 65 2x2x2) are roughly the same size. However, the mini-doll is a complete redesign from the standard minifig, making it a lot thinner, with curves, longer legs and a shorter torso, and using different connection sizes for hips and neck. The articulations also differ as the Friends doll can move head arms and hip, but not rotate the hands or move the legs independently. On the plus side the hair pieces come with several sockets to attach decorations like ribbons or bows. This does not mean that the Friends can't change clothes, because in each of the sets the main characters appear in they are dressed differently, and body parts (read clothing) can be changed between Friends



Picture by Huw Millington

According to David Lafrennie, LEGO®'s American PR director at the time of Paradisa, the line was very successful<sup>[2]</sup>, so why it had so few sets and was discontinued after only 5 years is quite a mystery. One way in which Friends is different from Paradisa is in the strong background story to the theme has. Not only do the 5 main Friends characters have extensive biographies and very clearly defined personalities, the world they live in, Heartlake City, is also a well-developed community, centred around a number of common interests of the Friends. In addition, LEGO has launched a promotional DVD telling the story of how the Friends meet each other in Heartlake City and so providing a complete background for girls to start playing with the sets, either re-enacting scenes from the film or creating their own scenes following the model.

From its release, Friends has become an immediate success. Twice as many sets were sold as initially forecast for the first half of 2012 this no doubt has had an important impact in the 24% increase in Net sales compared to the same period last year. Meanwhile, the second wave of Friends sets has arrived and images of the sets for the first half of 2013 have been shown as well. LEGO plans the Friends Theme to become an evergreen for girls, the way LEGO City is for boys, so LEGO Friends are here to stay.

## Adventure Camper – 3184

Let's have a closer look at one of the Friends sets to see how this theme differs from earlier offerings aimed at girls. Rather than creating sets with large, quickly assembled pieces, the Friends theme in general and the Adventure Camper in

particular have a very similar building experience from any other modern LEGO theme. This 309 piece set comes with a single instruction manual, but the pieces are prepacked in three numbered bags, indicating three separate building stages. This sets relatively easy targets while allowing (part of) the set to be played with before completing the entire build. Like most Friends sets one of the smaller bags inside the larger numbered bags contains a set of accessories, including knives and forks, cupcakes, a mixer, a frying pan and more. There is more detail to the set as it also includes such things as a turkey drumstick or a printed 1x1 brick that represents a juice carton.

Since the Friends dolls can't turn their wrists, they can't actually hold on to the handle bars of the bikes, but they can ride them reasonably well (although it looks like they are standing rather than sitting) and the yellow basket that can be attached to the luggage carrier makes for a cute detail. Friends dolls can't sit on studs either, so the design of the camping table and front of the camper requires the use of plates, but in the case of the camper these are enhanced with stickers to make them look like cushions. At times it can be hard to make these dolls sit without them toppling over, and in the front of the camper a special part has been used that fits right between the feet of the doll and keeps it in place. Also, since Friends dolls are slimmer, both dolls can sit next to each other in the compartment.

Small accessories tend to get lost easily and so the set includes a container that closes with a pink tile to store the cutlery and more storage space under the bed in the camper.







All areas of the camper are easily accessible, either by removing the roof over the front part of the camper (the only large piece in the set that could have been built up of other parts) or by opening the side wall of the living compartment or opening the roof that's built with hinges. The back door of the trailer can also be let down to easily load or unload the bikes and the surfboard, which, alternatively, can be fixed to the back of the camper.



## Conclusions

After going over the history of LEGO® sets specifically targeted at girls and taking a closer look at one of the Friends sets, it looks like all the off-hand dismissals of the theme are not only inaccurate, but completely dismissible after a closer inspection of the product. Whether or not you like the new LEGO Friends dolls, the sets are well presented, fit in with the LEGO building system and contain a good variety of parts. The new colours are a welcome addition to the colour palette and the sets have been carefully designed to have both a well-polished finish and contain interesting building techniques. Friends has made a strong start. A total of 22 sets have been released in the first year, not counting polybags and other promotional items, and more sets have been listed for 2013. As mentioned earlier, Paradisa only had 18 sets in its 5 year lifespan. From the sales results, it looks like the intended audience is happy with the theme and new strategies are being developed to keep the theme going strong. I Sincerely hope that Friends is here to stay!

[1] Two additional Homemaker sets were released in 1980-1982 but only for the USA market

[2] <http://www.fundinguniverse.com/company-histories/lego-a-s-history/>

Acknowledgements: LEGO SYSTEM A/S and Jan Beyer for the set.

# Review 9474: The Battle of Helm's Deep

*Defend the fortress at Helm's Deep from the assault of the Uruk-hai army.*

*By Legotron (A. Bellón)*

**Set: The Battle of Helm's Deep**

**Set number: 9474**

**Parts: 1368**

**Minifigs: 8**

This is the biggest set of the new LEGO® theme related to The Lord of The Rings (LOTR). It depicts the mighty fortress located at the Helm's Deep in the lands of Rohan, where the inhabitants of this reign take shelter to defend themselves from the attack of Saruman's army.

As a big fan of the LOTR trilogy by Peter Jackson, the fact of seeing that LEGO® had obtained the license to produce this new line of sets has been a great joy. Since I began to see the first photos of the sets, this set was on the first place on my list of favorites. When I had the opportunity to buy it I didn't wait a minute, although expensive I bought it, because this set contains everything you need to play one of the most important scenes of the movie of The Two Towers: the Battle of Helm's Deep.

Before I could buy the set I reviewed countless photos about it that were published on the Internet. I looked for all the

details, the gadgets and everything else. When I got it, I had the opportunity to build it with other fellows of HispaBrick Magazine®. We were attending the Fanvencion 2012 event, and we did a live construction of this set, my set! This first built was great fun, and I noticed that it was really interesting. After the event I dismantled the set and packed everything carefully, in order to avoid losing any piece on the way home. I wanted to build it again, but more slowly, little by little to have the great experience of building such a great set. This time I decided to go through the steps of the instructions, which are perfectly stored in a small bag with a cardboard backing, a much appreciated detail, since instructions usually take some damage in these big sets. It was very exciting, because I remembered all the movie scenes in every step of the building process. And that was like a story becoming a reality through the LEGO® pieces.

One of the things I noticed when I built the set was all the details on the walls and other parts of the building. Until now, most of the castles from LEGO® were designed with very simple walls, straight, and without any kind of detail in the foundations. But this castle was different, the walls of the fortress are placed over a rocky terrain, built with many slopes,







to remove a very big section of the wall. A perfect detail.

But it was not finished. After finishing the outer wall and the fortress there was another element, the inner part of the Hornburg fortress. I built this small section, that was designed with the same level of detail than the rest of the fortress. It was curved as well as the main gate section. This inner wall runs parallel to the other wall, but in the interior part it is built as a throne room, with many details, like weapons racks, the throne of Rohan and some furniture. This was the last part of the building process. When I put all the elements together the sight was amazing, the awesome Hornburg fortress.

There are more elements apart from the fortress: the minifigs. I waited till the end to build the minifigs. There are 4 minifigs to represent a small unit of the Uruk Hai army, that come with a large ladder to assault the wall. All

that give the impression of a very robust construction. The curved form of the main wall and the different types of bricks, like the brick 1x2 modified with masonry pattern and the sand green colour bricks, used to represent the stones of the wall, were very interesting. The first element I built was the main entrance with the ramp. This part had several gadgets from the movie, like the secret door that was used by Aragorn and Gimli to attack the Uruk Hai troops standing on the ramp. The LEGO® recreation was very well designed. There was also a shed to take cover and to throw stones against the enemy soldiers in the top of the wall.

Then I built the main tower, where the great horn of Helm Hammerhand was located. This was the least interesting part of the whole set, because it is very simple with very few details compared to the rest of the fortress. There is a nice touch with the buttresses, but the rest of the tower is very simple. After that I built the low wall, located near the tower, which includes another one of those details that make this set something special. The wall contains a small spillway where a little stream comes out, and where you can place an explosive device to blow up the wall. This explosion is recreated with a mechanism

the minifigs have both sides of their torsos printed, and also the legs come with printed details. 3 of them are regular Uruk Hai soldiers with their weapons, but the fourth was a berserker, equipped with an explosive device to blow up the wall. The defending force was represented by some main characters of the LOTR story: Aragorn and Gimli. Also the commander of the fortress and King of Rohan, Theoden, who is riding one of the new horses and comes with a masterfully detailed armour. The last minifig is the one of Haldir, an elf who went to help the defenders. It would have been great if it had come with a soldier, in order to have a vassal to defend the king. Anyway, the quality of the minifigs is great, and there are enough to recreate many of the scenes of the battle.

My conclusion: This is a great set, with a very entertaining construction and many interesting details. Furthermore, it contains a large selection of minifigs, so it is an indispensable reference in the LOTR theme. This is the most expensive set of those available in the first wave, but definitely it's worth it. The sheer number and versatility of the pieces, the design of the fortress, the minifigs, and the endless possibilities of this set make it very attractive. But that's not all, there is another set than can be combined with this to get a bigger fortress with more defenders and attacking minifigs. I'm talking about the set 9471 Uruk-hai army. This set is an extension of the Battle of Helm's Deep. The wall can be attached to the main fortress wall to get a bigger construction, a perfect addition to decide the fate of the Middle-earth in the decisive battle of Helm's Deep.

As a final comment, it would be nice to add the rest of the inner part of the fortress, with the arches carved in the rocky mountain, the Rohirrim riders charging against the Uruk hai line, uhm... I guess that this is something I have to think about in order to modify this wonderful set in a future.

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# Review 79003: An Unexpected Gathering

By car\_mp

Images by LEGO® Iberia S.A.



**Set: An Unexpected Gathering**

**Set number: 79003**

**Parts: 652**

**Minifigs: 6**

After the first wave of sets of the Lord of the rings, one of the most anticipated franchises since the trilogy by Peter Jackson, and before we get time to dream about what the second wave will bring us, the sets of the new trilogy, the Hobbit, begin to arrive. The set we review on this occasion represents Bag End, the home of Bilbo Baggins, the protagonist of this trilogy. The scene it refers to is the arrival of Gandalf and the dwarves to the house of a surprised Bilbo at the start of the adventure that

is narrated in the book.

The box is one of the first that comes to my hands after the reduction in size of the boxes and to be honest, I like it better this way. I suppose that for kids the bigger the better, but for me, as an adult, the fact that it is smaller makes me feel that what is inside is of higher quality. But that's just me.

It comes with two instruction manuals, a small sticker sheet, four numbered bags and three large plates outside the bags. Incidentally, the minifigs are built throughout the different building stages and not at the beginning as is usual in other sets.







The included minifigs are Gandalf, Bilbo and four dwarves. A highlight are the beards of these dwarves, especially that of Bombur, which includes a supplement to simulate his enormous paunch - quite a detail.

The construction is rather straight forward and there is a large variety of interesting pieces and colours. The final result is very striking, maybe too square to imagine it is a hill, but the number of pieces would have increased significantly if less abrupt slopes had been attempted.

The set is centred around the cave-house under the hill. The exterior is very detailed and very few large or "prefabricated" pieces have been used. A clear example is that the fence is made of bricks modified and tiles - no large fence pieces. The round window and door stand out and they resemble the film faithfully. The interior is even more detailed, with its fireplace, bookcases, and kitchen utensils... all around the large table in the dining room. The set is open at the back, following the most classic LEGO® tradition, but the roof can also be lifted off easily, giving the set even more playability. The set includes details that make it usable for the end scenes of the book as well, as they are not there at the beginning of the story... just in case I won't give any further details.



## Conclusion

I should point out I am a Lord of the Rings fan, but I must also say that I have tried to be as objective as a weathered journalist like me can be. Looking at the images, whether 'legal' or not, of the sets from the The Hobbit theme that will come out in this first series, this is for me the star of the line-up. There may not be any orcs, wargs, spiders or other assorted Middle Earth fauna, but it has everything else. I mean it has everything a LEGO builder could want. No large pieces, no repetitive construction, external beauty, playability, building techniques, curious pieces, varied colours... It is without a doubt a LEGO SET - in all capitals. Whether or not you are a fan of the franchise you and your family will enjoy it.

Acknowledgements: LEGO SYSTEM A/S and Jan Beyer for this set and LEGO Iberia S.A., Joachim Schwidtal for the official images.

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# Review 10228: Haunted House

By Iluisgib

Images by LEGO® Iberia S.A.

Set: Haunted House  
Set number: 10228  
Parts: 2064  
Minifigs: 6

The commotion that originated in the announcement of the 2012 Monster Fighter theme was amplified when the first images of the Haunted House, a large abandoned Victorian house became public. But not just the house was worth the attention of the fans. Additionally, the elements contained in it deserved attention on their own. But without further ado I will begin with the analysis of the haunted house.

The assembly is divided into 5 stages. The first of these contains the minifigs and the accessories. The set contains 6 minifigs:

- Lord Vampire
- The bride of the vampire
- A zombie butler
- A Frankenstein waiter
- 2 ghosts

The minifigs are nice and, although some are a reprint of the collectible minifigs in another colour, are suitable for the home ... but I think that considering the size of the set, maybe there should have been more, such as a monster-child. Several Glow-in-the-dark pieces are used, like the ghosts or the heads of the vampire and his bride. The ghost is new, compared to the one that appeared in the 90's. The chef's torso, which is stained, is also new.



In addition to the minifigs, there is a series of complements that are built in the first stage and that are used throughout the assembly process. Noteworthy is the bed (without a mattress) where the vampires sleep, a wardrobe, lamps and jars of preserves, paintings, the kitchen... but above all I loved a Gramophone built with a dozen pieces. Curiously gramophone trumpet is an explorer's hat. A truly original use for this piece.

With the second set of bags I proceed to build the ground floor of the haunted house. The main feature of the construction of the house is the lack of symmetry or repetitive steps in assembly. And of course, for someone who loves to build, this is one of the best things you can find in a set. I should point out that the House is completely closed, but can be opened with a few hinges, giving access to the Interior rooms. Both sides of the house are neither symmetrical in width nor in length. The







front which contains what could be considered the main façade is 16 studs wide and 24 long. The part with the rear façade is 8 studs wide and 32 long. This difference in length is due to the fact that the rear has a side door with a marquee, and it is the marquee that causes the increase of 8 studs.

The outside is built with a mixture of three colours: light bluish gray, sand green and dark tan. Columns, window frames and skirting boards are grey, the walls green and the peeled off part dark tan. Each window has a transverse plank that prevents access to the interior. The tile used to this end is brown and has a printed pattern that resembles wood. Obviously at the main entrance of the House there are a few steps with the necessary damage due to the passage of time... and the lack of care from the owners. From the stairs to door there is a small porch supported by four columns, topped by terrifying zombie heads. At the front there is the door and four windows, two flanking the door and the other two in the side walls. At the back there is a service entrance and a single window.

Continuing with the construction I proceed to build the second floor. The back is very similar to the ground floor without much to highlight. The front of the House, however, is much more elaborate. Aside from the two Windows in side façades, which "copy" those of the first floor, in the main façade there are three Windows but at two different levels. The central window is advanced 3 studs with respect to the ones on both sides. In addition; two of them have unhinged shutters, while the third is boarded with a wooden plank. As on the ground floor, there is a mix of wall and peeled off parts which give it the abandoned feeling that is necessary for a house like this. In order to lend more realism to these broken parts, they are simulated with a Brick Modified 1 x 2 with Masonry Profile. This look could not otherwise have been simulated so easily.

The last part to build is the roof of the House, built in black to simulate a slate roof, except in the central part of the main façade. As a continuation of the central window there is a tower with another window. This window gives light to the attic. Above each of the Windows on the ground floor, there is a small window that also gives light to the attic, and to follow

the structure of the house, they are all boarded up with a plank. The entire roof is topped with a profile with spikes as decoration. The tower follows the same pattern, with a slate roof and spikes for decoration. The window, unlike the rest, has both the plank and the unhinged shutter.

All the windows in the house have a black ornamented top, with a column on either side and a triangle in the middle. The base of the roof has a channel in light grey. To the side of either of the two doors there is a small dry shrub. On the left side of the façade the chimney rises for the fireplace that is inside.

To finish the exterior of the House, and in the last phase of construction, a metal fence with a great (squeaky) gate is added, which allows access to what would be the garden of the haunted house.

If you go into the House you will see that on the ground floor there is a kitchen, in which the oven and the stove (as well as the Zombie-chef) are placed, a table, a fireplace topped by a ship inside a bottle and the stairs that lead to the first floor. The fireplace can turn, allowing it to be placed in two different positions, depending if the house is open or closed. This ground floor is the most austere in terms of decoration.

There are stairs that lead to the first floor on the left side of the door. There we find a "study" room (as it were) with a table, a stool and a side table with a vase. This room is illuminated by the light that enters through the Windows of the main façade. The room of the vampires is on the other side of the House. As I have already mentioned, there is a bed in the centre without a mattress. The bed is flanked by two wall lamps and a frame with horns of deer in the centre. On one side there are a wardrobe and a box and on the other there are two paintings and a vase with a plant.

The way to access the attic is one of the pleasant surprises of the set. If we open a hatch in the ceiling of the "study", a folding ladder appears. That ladder has three sections that fold and are hidden in the attic when the hatch is closed. What can I say? It is the kind of think with which the guys at LEGO win our hearts. The attic is full of shelves and on them we can find many artefacts, such as books, a chest, bottles, showcases...

As in most sets, we cannot escape the use of stickers, although it is moderate in this case. It is appreciated that, at least, the wooden planks that board up the windows are printed, instead of using stickers.

The haunted house is a great novelty in the LEGO world (as is usual in recent years with many of the sets we are offered). The construction is very entertaining and even longer than usual, since there are no repetitive steps with which to build quickly. The minifigs and accessories are one of the strong points of the set.

With a good surrounding atmosphere you can make terrifying dioramas, which may even be added to CITY dioramas. Furthermore, with a little skill, eliminating the "broken" parts and redecorating the interior, it can become a splendid Victorian house.

Acknowledgements: LEGO® SYSTEM A/S and Jan Beyer for this set and LEGO Iberia S.A., Joachim Schwidtal for the official images.

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# Review 10229: Winter Village Cottage

## *A newbie's opinion*

By iatly

Images by LEGO® Iberia S.A.

**Set: Winter Village Cottage**

**Set number: 10229**

**Parts: 1490**

**Minifigs: 8**

I will start by saying that I accepted writing this article because I have special predilection for the Christmas theme. I like the Christmas atmosphere and the idea of building a set related to this theme attracted me. For that very reason I would have preferred to build the set during Christmas, but I must admit that for a couple of hours it seemed to me as if that lovely time of year had already arrived.

The most outstanding aspects of this set are: the large number of pieces it contains (it is fun to look for the piece you need at each time, better to build it without hurry, as it may drive you crazy... at more than one time I got the feeling Mr LEGO® forgot to include a certain piece in the set...). The other aspect that, in my opinion, deserves mention is the amount of detail the set contains. Worthy of mention are, for example, the chainsaw, the Christmas socks, the toys in one of the rooms (a bear and a plane), the chimney and fireplace, and the light that, when pressed and reflecting on the pieces simulates the



flames (a very attractive effect which, personally, I'd love to be able to leave on all the time). And the details I love best are the Christmas tree and the simulation of coloured lights which, at the end of the build, are placed on the roof of the house.

Construction is started with the complements that surround the main house (in my case it is a good way to get some training). The Igloo is very curious as it is not something I have seen a lot (I have seen more trucks, stalls...). Regarding the igloo I'd say it seemed feebly built and a little unstable... I was a little surprised. These complements lend a certain dynamism to the set, allowing a child to start playing, making the minifig ski or pushing bricks (or anything else at hand) with the snow plough on the truck or transporting goods on the sled.

The next step in building the set is the construction of the main house. The entertaining mosaic on the floor, the fireplace, the elements in the kitchen, the walls, windows and main door (the latter with a homely Christmas garland) and all the details I mentioned earlier (and many more) are added. I consider this to be the most interesting part of the construction of the set and the one that most deserves taking some time and enjoying the process without any hurry.







To finish off, this set has been one of the most entertaining to build, has a large number of pieces which initially may impress, but as you build you feel motivated to continue, because you see that what you are building, in a very entertaining way, starts taking shape and you get small results little by little.

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# Review 9396: Helicopter

By Jetro

Images by TechnicBricks and Brickset



**Set: 9396 Helicopter**

**Set number: 9396**

**Parts: 105**

I still remember it like yesterday. After successfully building my first Technic set (the 850 Fork-Lift Truck) I got my second, more complex set, the 8844 Helicopter. It was the third largest set of 1981 and contained only 316 pieces, but it got me completely hooked on LEGO® Technic. Since then LEGO has released a number of helicopters in Technic sets, either as main models, secondary models or as part of a universal building set. The 8856 Whirlwind rescue, the 1991 flagship with 517pc was the largest and most complex of these in the technic brick era. It incorporated the, unfortunately, discontinued Flex system, which allowed for an easy and elegant mechanism to change rotor tilt and had a retractable winch boom, in addition to the rotating top and rear rotors and retractable landing gear the earlier 8844 also had.

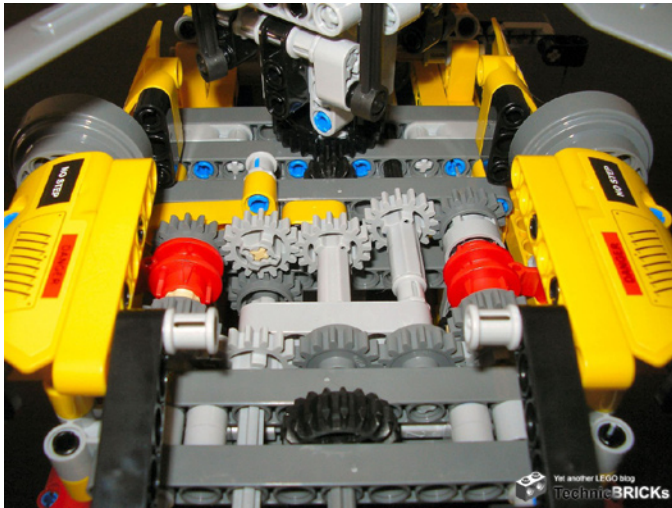
In the last few years LEGO has again released a series of Technic helicopters, this time built with liftarms and beams, in a growing scale, from the 8046 in 2010 (the second smallest set with 152pc) followed by the 8068 in 2011 (408pc, reviewed in HBM011) to the 9396 reviewed in this article – 1056pc and the third largest set of the year.

## Flagship?

We tend to assign the label “flagship” to the largest set in any given year, but looking back over the years the size of sets has changed dramatically. The largest Technic set in 1980 was the 8860 Car Chassis with 668 parts, a size that was not significantly surpassed until 1992, when the 8868 Air Tech Claw Rig was released, containing 954 pieces. 1994 brought the first 1000+ piece set, the 8880 Super Car with 1343 pieces and 2005 brought the 8421 Mobile Crane with 1884 Pieces, but the second largest set contained little over a third of that number. Since then there have always been at least two sets







with 1000+ pieces, with the 8110 Mercedes-Benz Unimog U400 breaking the 2000pc barrier with 2048 elements.

In 2012 three 1000+ sets have been launched: the 9398 4x4 Crawler (reviewed in the previous edition of HBM), containing 1327 pieces and no less than 3 new motors (2+1), the 9397 Logging truck with very few less pieces (1308) and a single motor and the 9396 Helicopter, containing a total of 1056 pieces, but with the added advantage that the set can be easily motorized using the add-on motor set or parts from other motorized Technic sets. If we look at price, it is obvious the Crawler is this year's flagship, but if we also take into account the number of Technic functions each model has, the 9396 Helicopter may not carry the title, but is most certainly the more technical set of the two. Add to that that it comes with instructions for a complete secondary model (as opposed to a different superstructure for the Crawler) and the size of the main model (58cm long), and you will see why "Flagship" is not such an obvious label for the Crawler.

Don't get me wrong. I'm very excited about the Crawler, mainly because of the new motors and the sturdy build, but the 9396 Helicopter is not a set that should be considered a second option. It is a first class, high level Technic construction with interesting features and an option to motorize. Because why should a set contain a motor to be considered especially interesting? It adds significantly to the cost (although this year the parts/price relation of the 9397 Logging Truck, which does include a PF "M" motor, is better than that of the 9396 Helicopter, but that must be put down to the large number of panels used on the latter), without necessarily adding much interest. True, everybody likes seeing how a set comes to life when you switch on the motor, but if, like me, the Helicopter isn't the first (or second) set you buy you probably already have a couple of motors lying around, waiting to be used. And again, a motor is a nice addition to this set, but by no means a necessity. All the functions can be operated comfortably by hand.





## Mechanisms

The 9396 Helicopter is a large in size, big in number of pieces, but does it really add something new to the existing collection of technic helicopters? Well, let's have a closer look at the mechanisms it incorporates. Like most of its larger predecessors, the 9396 has working main and tail rotors, the blades of which have been specially designed for this model. The blades for the top rotor measure no less than 24.5cm and have a soft rubber tip that, in addition to help maintaining momentum soften any accidental impact the blades might cause. These large blades are packed separately between two sheets of carton, in the same bag as the instruction manuals and the sticker sheet.

Whereas the 8856 features a mechanism to change the (simulated) cyclic pitch (changing the angle of the entire rotor block forwards or backwards, to make the helicopter go forwards or backwards, and left or right, to make it go sideways), this helicopter comes with a system to change the pitch of the rotor blades, also known as collective pitch (resulting in an increase or decrease of lift power, which in combination with cyclic pitch control is also used to increase forward/backward speed). Rather than using chain links or gears, the retractable landing gear is operated by a lever system connected to one of the small Linear Actuators that does an excellent job and with the added advantage that, like most of the other functions, it can be easily motorised adding a few PF elements to the set. This also goes for the winch, which despite not being retractable, is fun to operate with a motor.

The loading ramp is operated by a mechanism that is partially symmetrical to that of the landing gear, using the other small

Linear Actuator and a linkage system. Finally there are the sliding doors on either side of the helicopter, a simple, but ingenious design that adds to the overall playability of the set. All functions – except for the sliding doors – are operated from a single knob (a black 20t double bevel gear) and routed through a complex gearbox with two selector, one on either side of the model. This makes the model a lot more technic than might appear at first sight and it is here that most of the elements necessary to motorise this set are already in place. However, even without motorisation the model is fun to play with and easy to operate.

## The final verdict

Size, number of pieces, the complex gearbox, the new rotor elements for both the main and rear rotor, an attractive colour scheme – they all add up to make this set a must have for the real Technic fan. Add to that the fact that, although there have been a considerable number of Technic helicopters in the past this one is without a doubt the largest and most complex and moves away from the usual road vehicles. The set comes with a fair amount of stickers, and while they probably do make the set more attractive to the general public I am not a fan of stickers. Fortunately the set still looks very good without them. The only drawback: I'll need a helipad to store it!

Acknowledgements: LEGO® SYSTEM A/S and Jan Beyer for this set and LEGO Iberia S.A., Joachim Schwidtal for the official images.

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# Great creators of the world: Stefan Käsmayer

*By HispaBrick Magazine®*

*Pictures by Stefan Käsmayer*



**HispaBrick Magazine®:** Name?

**Stefan Käsmayer (-2x4-)**

**HBM:** Age?

**SK:** I'm 35 years old.

**HBM:** Nationality?

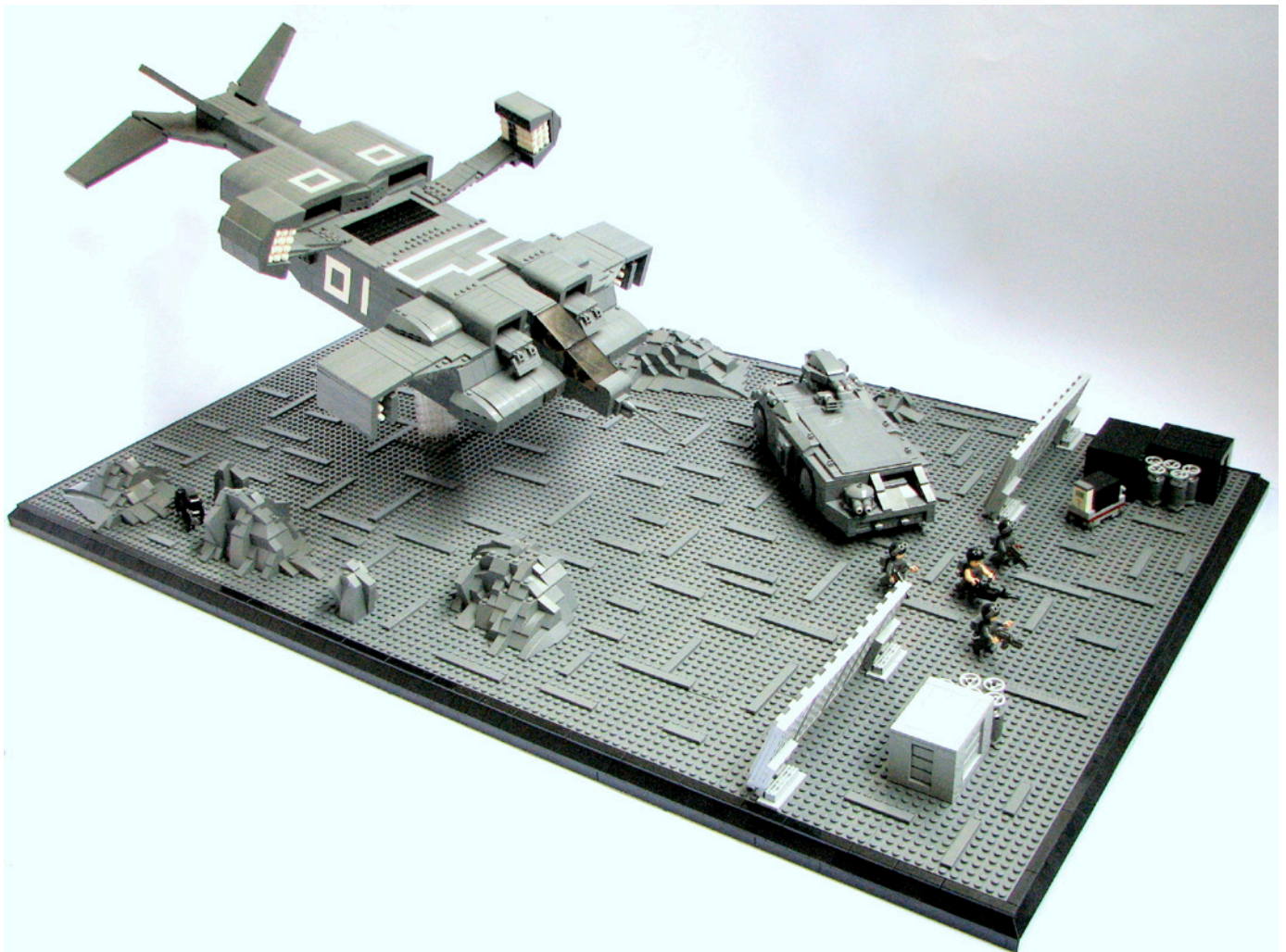
**SK:** I'm from Austria and I live in Vienna.

**HBM:** What do you do normally?

**SK:** I am a male nurse at the cancer ward of a hospital in Vienna since 2001. In my spare time I try to spend as much time as possible with my two sons, seven and six years old. Of course we usually play LEGO®.

**HBM:** When did you first start building with LEGO?

**SK:** I bought my first set very soon after the birth of my first child in 2005. It was the Viking Ship (7018). My first MOCs were created soon afterwards, but thank God, there were no pictures taken.



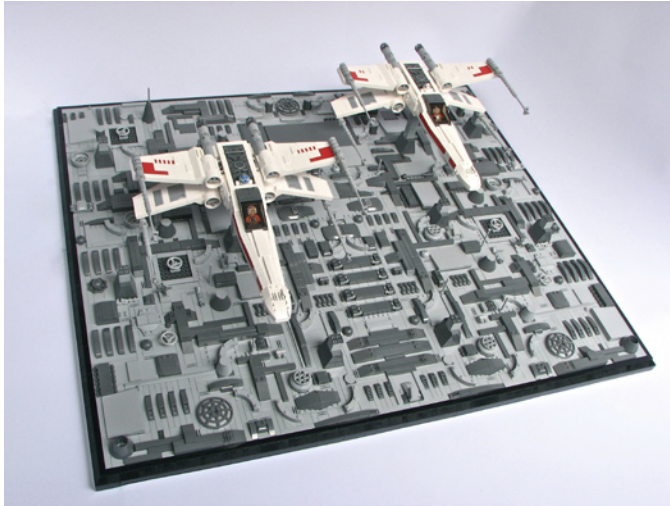












**HBM:** What is the last set you have purchased?

**SK:** 9472 Attack on Weathertop

**HBM:** What is your favorite commercial LEGO® building theme?

**SK:** That's difficult, at the moment I would say „Lord of the Rings™“, but I also fancy „Star Wars™“ and „Super Heroes“.

**HBM:** What is your favorite LEGO element and why?

**SK:** Of course it's the 2x4 brick! :) I think it's the best brick because you can build everything with it.

**HBM:** Which part would you like LEGO to produce?

**SK:** A plate with studs on both sides.

**HBM:** How many hours do you spend building with LEGO?

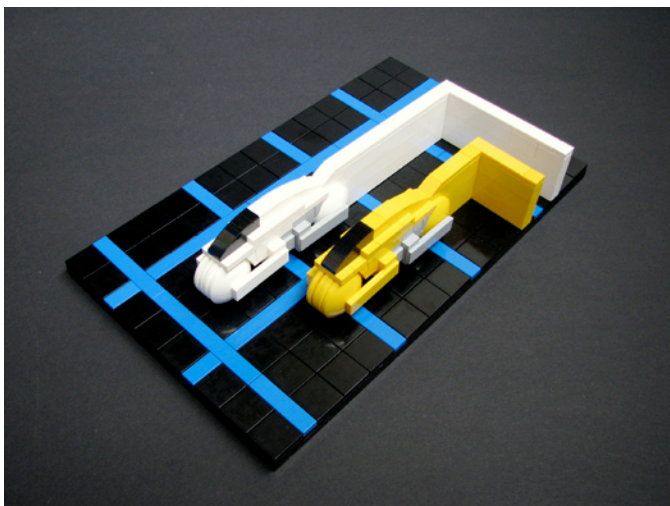
**SK:** This may vary pretty much, sometimes I build up to ten hours a day, but it may also be that I don't build anything for two weeks.

**HBM:** What do your family/friends think about this hobby?

**SK:** I think everyone likes it.

**HBM:** Do you draw or pre-designs before you start building?

**SK:** No, actually I always have a basic idea, which is



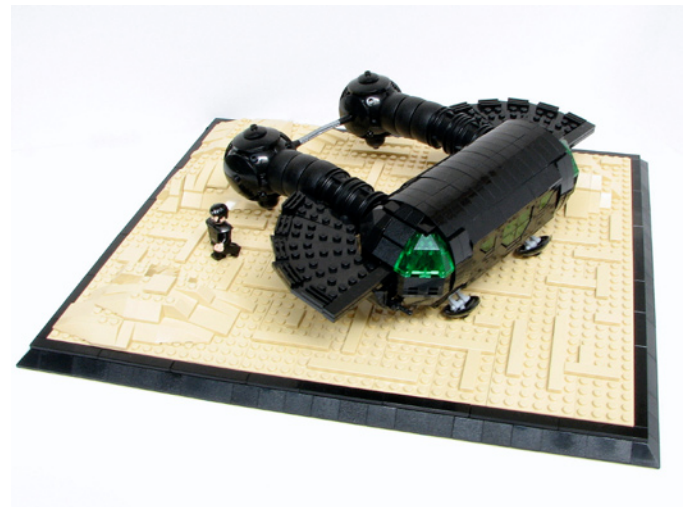
developed during building. Usually I try something and deconstruct it again, if necessary.

**HBM:** It's clear that the theme that you like the most is Sci-Fi, but sometimes you also build MOCs of other themes. What is your motivation to break the trend and build Samurai or Vikings MOCs

**SK:** The ideas mainly result from movies or TV series, but also from books and comics. If I like something particularly well, a MOC emerges from it very often. For example, after having read the comic series „Okko“ of the French author of comic books Hub, I wanted to build a samurai Moc at any rate. Finally I built my first Samurai House. Actually I always wanted to build a Viking ship, Skyrim from Xbox gave the final push then.

**HBM:** Sometimes you cut the scale to micro scale, is it more difficult for you to create at this scale?

**SK:** Actually, yes, one must be more imaginative, the advantage is to achieve much more with fewer parts.



**HBM:** If you had to choose one among all your creations, which one would you choose and why?

**SK:** My TRON Moc, because I still like it a lot, even a few years afterwards, and I would not like to change anything.

**HBM:** You have built several versions of some of your models, is it due to new techniques learned or the development of new parts?

**SK:** Normally, it's up to new techniques. I did not like the cockpit of my Viper for example and I wanted to modify it right from the beginning.

**HBM:** What do you think about the use of non-official parts (stickers, modified parts, non-LEGO elements,...)?

**SK:** I think everybody can do with his LEGO what he wants. I myself would not take different elements for my Mocs or modify pieces. Building would be less fun for me. To cut elements just to find a simple solution seems to me kind of cheating. Concerning figures it is different, because there are some nice custom minifigs, unfortunately I lack the necessary skills to do that. Anyway stickers can refine a Moc additionally. At present I only use LEGO Stickers, maybe I will create some of my own one day.

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## Merry Xmas!

*By AgusMartin*

Every beginner needs a challenge to start his training. This is exactly what this project meant to me. I am just starting to be an AFOL, although not my first try with studs, since other bricks filled my hands in my childhood. The first LEGO® set that arrived to my home was a present for my daughter, but as is typical, it made me as happy as she, maybe even more. And now we share the hobby.

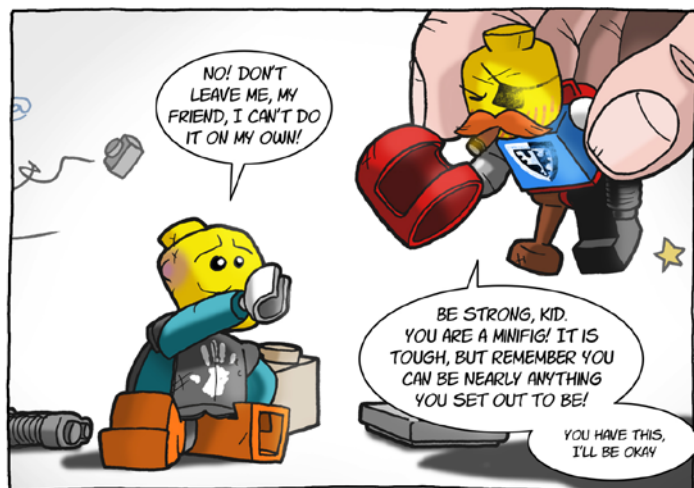
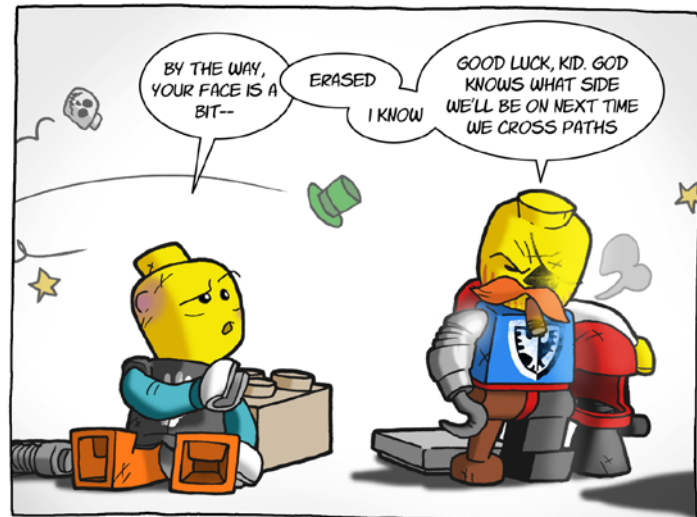
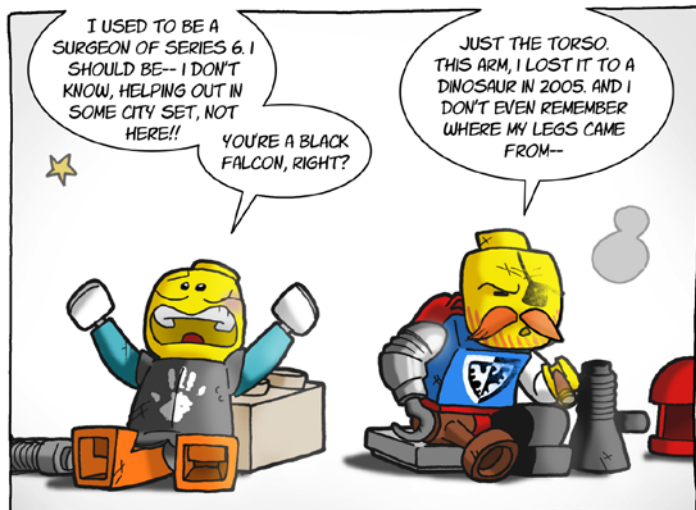
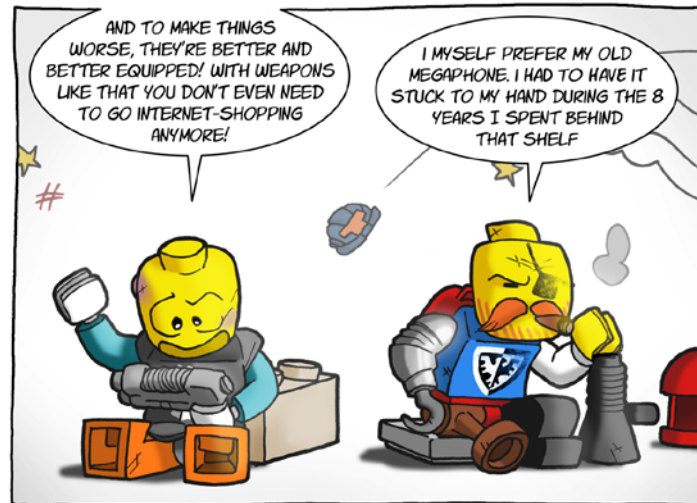
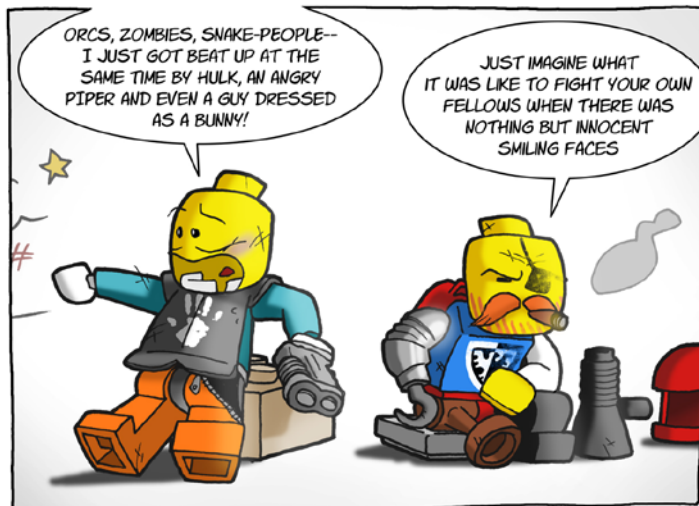
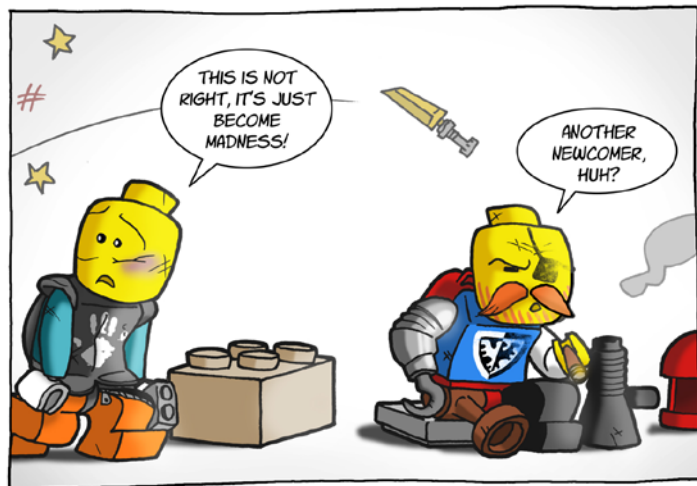
My wife was the one who challenged me to create a Nativity Scene with LEGO. I thought that it should not be difficult, just as easy as going to the shop and getting the right set. I was absolutely wrong. And that was the beginning of a weeks-long fun quest for the right minifig parts for each role. So in this project you can find parts coming from many themes: Prince of Persia™, City, Kingdoms, Harry Potter™, various series of minifigs, The Lord of the Rings™, standard parts... even Star Wars™ is coming to the scene. Balthazar, the last of the Three Wise Men, is on top, with parts from five different themes. As it was quite difficult to find some details, some non-official parts had to be used, as some capes, the figure for baby Jesus or the wonderful angel wings.



The last detail was the stable, a simple structure inspired on the desert, which was designed with LDD. It includes a carpenter's workbench for Saint Joseph and a chimney with transparent plates backlit with a LED.

I hope you like it and let me use this project to wish you a Merry Xmas and a New Year full of wonderful creations.

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