hispabrick

magazine

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Frontcover by Iain Heath

Backcover by Satanspoet

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Editorial

by car_mp

A new issue. It seems incredible that we have reached issue number 009 when few people believed we would go beyond the first issue. As most prominent landmarks I would like to highlight the number of international collaborations that we have in this issue. Gradually, the magazine goes global, and more importantly, little by little, people begin to know and appreciate our efforts. Perhaps our layout is not as professional it could be, or the quality of articles is not very homogenous... but I assure you that we do the best this bunch of amateurs can.

The inclusion of Mindstorms and Technic articles have had a good reception from the fans, so we have included materials on these lines in this new issue. We have also decided to show you two other applications for the design of your models on your computer. After all these issues with the LDraw tutorial we wanted to show you other solutions that are at your disposal.
I personally see them as complementary programs. Each has its strengths and weaknesses and if they were more compatible with each other every AFOL would have all three installed on their computers and would use the one best suited to what they have in mind.

I'd like to thank all the people who have contacted us at info@hispabrickmagazine.com, both to encourage us or to collaborate with us. I hope that trend continues and more and more people are encouraged to publish their articles with us.

Finally, people who complain about the long time between the issues, the only thing I can recommend is you can read Brickjournal and Railbricks in the meanwhile, two references in our LEGO® world.

See you soon
#

Kaneda´s bike by
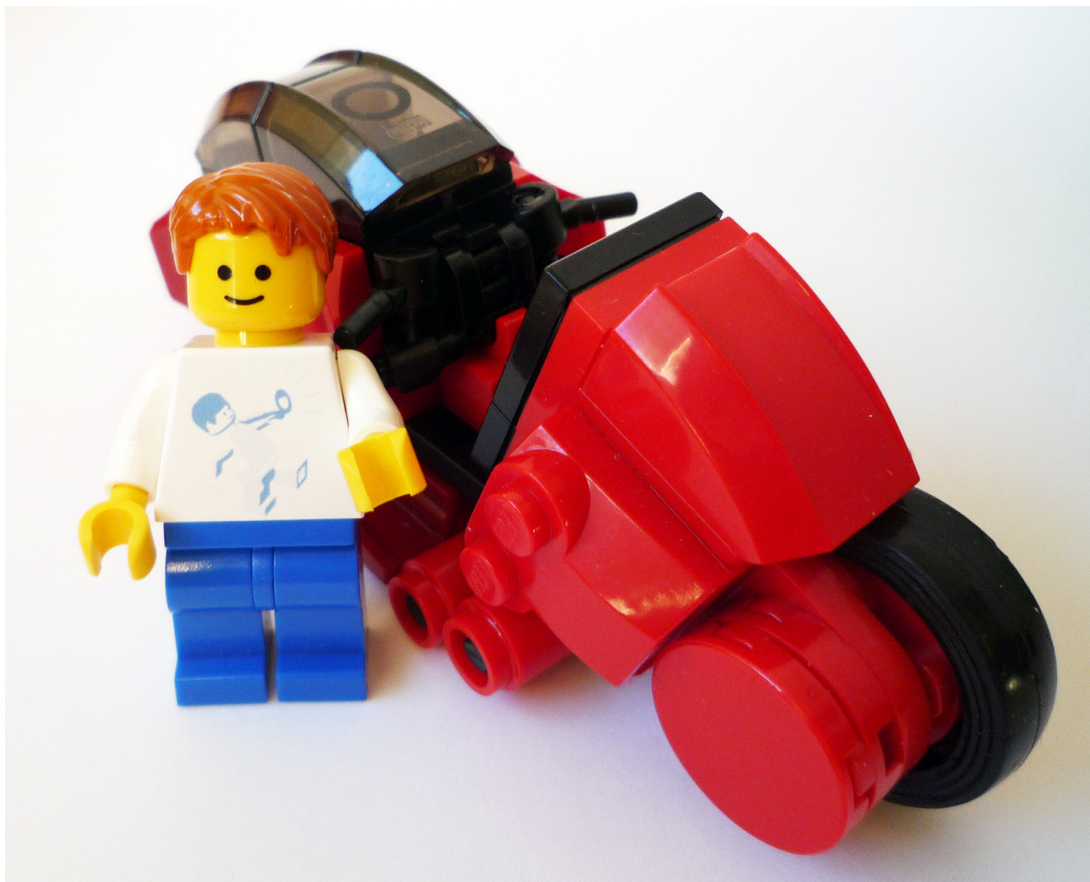
Miyazakitopia

A Tale Of Two Conventions

Text and pictures by Iain Heath

A Plot Is Hatched

2009 was turning out to be a great year for Zombies!

It's the first weekend of October, and in Seattle, BrickCon 2009 is in full swing. Several hundred LEGO® fans have spent the past couple of days frantically (yet meticulously) setting out their unique LEGO creations in this vast hall. And now, thousands of people swarm around us, pressing up against the barriers to get a close-up look at the fruits of our labor. And pointing a lot.

My own work is proudly laid out on a table in the very farthest corner of the auditorium. There probably wouldn't be much traffic down this end, except that I happen to be directly opposite the BrickArms booth. I watch the 6 foot deep throng of adolescents that surrounds them, a seething organism comprised entirely of flailing arms and black hoodies, surging endlessly forwards. The BrickArms guys have had to brace themselves between the table and the back wall to avoid being crushed like bugs. The crowd somehow reminds me of that demon from Princess Mononoke…

Andrew Becraft takes time off from the 'Zombie Apocafest' display to pay me and Lino Martins a visit. This is the second year that BrickCon has had a zombie display, and it's even bigger than the previous one. And there's a new zombie movie playing in theaters as well. Yep, definitely a big year for zombies.

Andrew knows the kind of stuff that makes Lino and me tick, and he has a proposal for us: "I think it's time to give the zombies a rest. What if next year's collaborative theme was Japan? We could call it something like Big in Japan! People could bring anything they like to do with the Japanese culture". Andrew grew up in Japan, and I'm a bit of a Japan-o-phile, so the three of us leap on the idea immediately, brainstorming then and there about giant monsters knocking over skyscrapers, epic samurai battles, and puppy vending machines. But at that instant, I know exactly what my contribution is going to be, even if at the time it seemed completely beyond my ability… I was going to build the ultimate LEGO tribute to legendary anime director Hayao Miyazaki. It would be big. It would be great. It would be a veritable "Miyazaki-topia"!

The Man Behind The Myth

You might never have heard of Hayao Miyazaki, or even know what "anime" is. Even so, you may still have enjoyed some of his movies without realizing it. I often meet people who remember seeing My Neighbor Totoro or Nausicaa of the Valley of the Winds when they were younger, without knowing anything about Miyazaki or his later works. In fact, a friend once asked me "What's so special about Miyazaki? There are a million anime directors in Japan". The answer is simple… Miyazaki is to Japanese animation, what Alfred Hitchcock was to American cinema. Except that Hitchcock never actually won an Oscar, whereas Miyazaki did! His movie Spirited Away won the Academy Award for Best Animated Feature in 2002.

Miyazaki's movies are works of art, taking years of painstaking hand-drawn animation to complete. They also feature wonderful characters and moving storylines. And if you've seen more than one, you'll have noticed some recurring themes: child protagonists; strong female characters; breathtaking landscapes; magical spirits; impossible flying machines. Nature is an integral part of every Miyazaki movie, and his storylines often carry a strong environmentalist message. And there's always plenty of action to enjoy too, although Miyazaki isn't afraid to pause things from time to time, and let you just soak in the amazing scenery!

Thanks to the efforts of folks like John Lasseter at Pixar, Miyazaki's movies are now far more accessible to Western audiences than ever before. His entire body of work is readily available on DVD, with redubbed soundtracks featuring some star-studded voice talent. My family enjoys them on a regular basis, and they occupy a very special place in our hearts. Children seem to find them particularly spellbinding. When we first got Nausicaa of the Valley of the Winds, we watched it 3 times in one weekend!

Mapping It All Out

While recovering from BrickCon, I began to plan the project. The first step was to draw up a list of the most iconic elements from each of the 9 movies (characters, creatures, vehicles, buildings and scenes). But at almost 100 items, the list was way too long! So I whittled it down to the most important 20 or so, limiting myself to just one or two key characters from each movie, and focusing less on vehicles, since that was one area that other people had already covered. For example, I had seen mini-fig scale versions of the Cat Bus, Porco's plane, and Flappters, as well as several different sized versions of Howl's Moving Castle.

I don't use mini-figs, but prefer to work nearer "miniland" scale - that's the scale of the little people you see in Legoland theme parks, or in the display cases at the LEGO store. I actually work at about double that scale, in order to create more lifelike poses and detailed facial expressions. So I figured I would just work in that style, but perhaps adding a larger central 'bust' of Miyazaki himself as a centerpiece.

I also wanted to integrate all of the models into some kind

of scene, probably a sweeping natural landscape spanning several baseplates. Flight and aircraft are very important themes in Miyazaki's movies, so I also decided that some of the models would have to be suspended to look as though they were flying, although at the time I had no idea how I would accomplish that!

BrickCon 2010 was still almost a year away, which seemed like plenty of time. But I knew I would have to be aware of my own limitations, to ensure I could complete enough pieces to make the diorama interesting. I don't have much experience with buildings, vehicles or scenery, and certainly nothing massive. So I planned to build those elements at "microscale" and place them at the back, to create the impression that they were far away.

Why Doesn't LEGO® Make Furry Bricks?

They always say "start as you mean to go on". I knew that if I just started working on the human characters, I wouldn't really be stretching myself enough to get round to the bigger stuff. So the first model I chose to build was Totoro.

Everything that wasn't a human was still going to need to be in proportion to the human characters, so that pretty much set the scale for Totoro – about 20 bricks tall - already way bigger than I was used to building. And another problem presented itself immediately. Look at Totoro… He's round and fuzzy! Both qualities you don't normally associate with LEGO bricks.

The previous summer, I had been working on a set of Star War figures, and ran into a problem making R2D2's cylindrical body and domed head. Every technique I used to recreate those curves, came out looking jagged and angular. But then I tried building the dome using half a Lowell sphere (named after it's discoverer, Bruce Lowell). Although the Lowell design has studs sticking out in every possible direction, somehow the overall effect was convincing. It looked round. Round and fuzzy, but round.

So I figured I could adopt a similar approach to create the rounded body of Totoro, using another technique called a Bram sphere (named after its inventor, Bram Lambrecht). Bram spheres create convincing ball shapes by taking 6 identical wedges made from stacks of LEGO plates, and attaching these in an overlapping fashion around a central cube. They can be built to any size, and Bram even has a web page where you can feed in the desired diameter, and it will generate a picture of the wedge you need to build. Bram spheres are fuzzy too, because the studs face outwards, but I figured this would actually work to my advantage when recreating a furry animal.

However, Totoro is not perfectly spherical. I have a book of artwork from the Totoro movie, so I was able to study him in detail and take some measurements. It looked like he was drawn using two overlapping spheres, a big one for body, and a smaller one for the head. I wondered if I could build two overlapping Bram spheres. I tried this idea out with some smaller spheres, and soon decided I lacked the engineering skills to make it happen! So instead, I decided to build just the larger sphere, but elongate the top half by a factor of two, to create a sort of egg shape.

It also seemed to me that each wedge was going to need a complicated outer shell of overlapping plates supported by an inner core of 'filler' bricks, and if I needed to make any adjustments to the shape later on, I was going to have to be endlessly tearing the wedges apart to replace a few plates. So in the end, I decided to construct the wedges as a series of very long 1-stud-wide strips, stacked side-by-side on top of some larger plates. This broke the process into simpler manageable steps, and took a lot of the guesswork out of the BrickLink orders, since I only needed plates of one width.

Of course, my 'egg' scheme made things more complicated. Firstly, it meant all 6 wedges would not be identical. Secondly, I discovered that when you elongate the top half of the sphere, the wedges don't mesh smoothly together any more. So a lot of additional 'sculpting' was required to achieve the effect of Totoro's gently rounded body. I also realized that the top wedge would need to retain its normal dimensions, to avoid turning him into a cone-head!

By the new year, Totoro's body was basically complete. I made an arm and tail in a matching 'fuzzy' style, although getting those to attach seamlessly to the body was tricky. After that, the rest was easy: facial details, the umbrella, and a set of smaller accompanying characters.

For the smaller sized Totoro, I went back to a Lowell sphere. And for Mei and Satsuki, I spent a ridiculous amount of time working on the facial detail, to make them as animated as possible. I'm particularly proud of Mei's face, especially the 'screaming' version! And with that, stage #1 of Miyazakitopia was complete!

Ramping Up

Winter gave way to spring, and I found myself distracted with other random LEGO projects and preparations for a different LEGO convention. By April, my next Miyazaki model was still just a work in progress, and it began to dawn on me just how little serious building time remained before BrickCon, and how much work I still had to complete.

It was time to get hard core, and take things up a notch!

Until that time, I had only ever worked on one model at a time, building as ideas or inspiration came to me. I tended to work with just the bricks I already had in my modest collection, and usually recycled old models to create new ones. I was still only a 'dabbler' with BrickLink at this point, being careful to only order exactly the bricks I lacked to complete each model. And I was still working on the living room floor, with a collection that was only primitively sorted into a dozen gallon-sized Zip-lock bags.

I realized I had to industrialize my building process, if I was to stand a chance of completing this project on time. I prioritized the to-do list and built to a strict schedule. I forced myself to "parallelize", working on several models at once, moving between them as I waited for various overlapping BrickLink orders to arrive. And I finally set up a proper work space, clearing out our spare room and bringing in a couple of collapsible picnic tables. The final step was to acquire a large number of clear plastic containers so that I could organize my growing collection of bricks. Having your bricks properly sorted saves you an enormous amount of time searching for what you need - or determining if you actually have what you need!

With the addition of an internet radio, I was ready to get down to it. What followed was a summer of many (uncomfortably hot) late night builds. At times it felt more like work than play! But towards summer's end, I had completed almost everything on the list.

Putting It All Together

Here's a closer look at the construction behind each of the various models. You can find detailed photographs of each one up on my Flickr photostream…

"Nausicaä on her glider" – This was the second model I

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attempted after finishing Totoro. The glider has a very particular curved design that was hard to emulate. Remember, I had never built a vehicle or aircraft before! The first step was to decide on a scale. I realized that if I created the pilot at my usual 2X miniland scale, the glider would be really huge. So against my natural instincts, I decided to make Nausicaa to the miniland 'standard'. In the past I've described the miniland standard as "horribly deformed". But this project made me realize that miniland is just another useful weapon in an AFOLs arsenal. When you only need to create the impression of a character, it's a very handy technique, and I use it quite often now! To create the pilot's wind-blown "hanging on" pose, I had to build her entirely studs-down, due to a lack of available brick types in medium blue.

"Spirited Away" – I wanted to capture the emotional state of the main character, as she goes from a nervous outsider to becoming part of the world around her. Hence, I created two versions of her, and developed a new larger head style that seemed to match the proportions used in the actual animation. No-Face's face would have been a lot easier if I'd just painted on the facial details; brick-building them took a very long time. His body was a lot simpler, though. Because it was black, I could get away with a fairly blocky outline, rounded off into a hood shape at the top using lots of long sloping bricks.

"Ponyo" – My dream here had been to recreate the rolling waves and leaping fish from the original chase scene. But that would have been an entire project in it's own right. So I settled on doing just the top of one fish, and adding a host of smaller details, such as the 'splashes' made from medium blue wing plates. Getting the contours of the big fish took some time to figure out, but a big bag of 1x6 curved slopes helped a lot.

"Laputa robot" – The first challenge here was choosing a color! The robot appears in several colors in the movie, none of which had a great match in the LEGO® palette. Light gray would have been the easiest to work with, due to the rich variety of bricks in that color, but it would have looked dull. So in the end I daringly chose dark orange, for a lovely rusted

effect. This made the design hard to figure out, since the range of brick types in that color is quite limited. But fortunately, 1x6 curved bricks are readily available, which meant I had a means to create his curved torso. The limbs needed to be flat, and getting the outstretched arm to curve upward required a fairly complex arrangement of hinges and supports along the back (..it barely stays in place, fighting under its own weight!). The head was also tough, since in the movie it is domed, the face plate is a bizarre shape, and the eyes are different sizes. So I had to apply the careful art of approximation to create something recognizable. The moss effect was simply a matter of replacing certain dark orange bricks with lime green ones. The miniland figures of Pazu and Sheeta, and the addition of a tiny flower in the robot's hand, helped evoke the feeling of a key moment in the movie.

"Kiki" – Sticking to the miniland standard helped keep this one simple. A dark tan bush from a Prince of Persia set made a great broom end. But it took a while to gather enough dark purple to make her billowing dress – yet another color with a very limited selection of brick types! I actually had to rebuild

this one twice over to make it more solid. Building for strength is an important part of my process: it becomes impossible to handle or finish a model that explodes every time you try to add another brick!

"Cat Bus" – A quick microscale design with some tan and dark tan, that I placed flying over the top of the Laputa castle in the final display. I actually enjoy microscale a lot, and hope to try some more ambitious things at this scale some day.

"The Ohm" – To simulate this creature's complex overlapping segments, I built it in "slices", and used a lot of different sloping bricks. The slices snap together with a 1-plate gap between them, to keep them visibly distinct. The eyeballs connect to the body like cuff-links, with a brick that goes through a small hole and is secured from the inside by a jumper. This gives them a little slack, so they naturally hug the curves of the body. But if you shake the model, it sounds like a rattlesnake! I also designed a "mini" Ohm that uses only a dozen or so basic bricks, and posted instructions online so that other BrickCon attendees could build their own and bring them along for a

宮崎トピア

Ochre Jelly (2010)

special "OhmLUG" display. Brad Krick in particular created some hilarious customized versions, including Star Wars™ Ohms and Classic Space Ohms!

"Hayao Miyazaki" – I decided to play it safe and create the Miyazaki bust at the same scale as my Sarah Palin bust from 2008. I started by deciding how to do the glasses, and that determined the size of everything else. The hair bang is secured with two hinge bricks that allow it to hang at a realistic angle. Funnily enough, the bust didn't really look like Miyazaki when I first completed it. After some time I realized that the nose was all wrong. As soon as I added those huge flared nostrils, Mr Miyazaki was suddenly looking back at me from across the table!

"Princess Mononoke" – At first I couldn't decide what scale or style to adopt for San, and was actually working on 3 prototypes at once, until I decided to go with my 'traditional' style. Figuring out how to build the war paint into the face took some time, as did all the flowing garments. In the end I went for a studs-sideways approach for the body, which I find makes it easier to get more detail into clothing. I wanted a dramatic action pose, and somehow this one just popped into my head. Despite a lot of effort, I couldn't get her legs to actually attach to the body in those positions, so they are actually free-standing. And as with many of my regular LEGO® figures, the eyes are painted in with a black sharpie. Ashitaka was fairly simple to do, and was finished much more quickly. Recreating the ghostly worms on his arm was kind of a spur-of-the-moment idea, and since they had to be dark purple, there were only a limited number of ways I could do them.

Something Is Missing

At this point I was pretty pleased with the collection, but it still didn't seem like enough to make an impressive, busy diorama. And I still needed to build a landscape to house it all. That was really worrying me. In the end, the bust I created of The Man Himself was pretty convincing, but not large enough to make a good centerpiece. I needed to something with a 'wow' factor to bring the other pieces

together. Also, many of the vehicles and buildings had been at the bottom of the list, and would probably not make the cut at this point.

Ordinarily, I spend a couple of hours a day scouring the internet for great LEGO creations by other builders and blogging about them. But with all the late nights, the number of posts was w-a-y down. But looking at other people's work is always so inspiring, it convinced me that I needed to try and step up to the bar that so many of my favorite builders had set, and try something big (…well, big by my standards!).

That's when I decided that the city of Laputa (from The Castle In The Sky) was to be the centerpiece.

It seemed like a crazy decision – I'd never created a building before, and now I was going to start by making one that flies and has no right angles! As always, the first step was to choose a scale. I usually find it's important to zero in on some small but vital detail of your subject, and figure out how you're gonna do that part, and then multiply up from there to determine the overall size of the model. In this instance, the vital details were the towers and archways set into the castle's outer walls. After much experimentation, I found a reasonable way to do the walls that could capture these details, allowing me to begin in earnest.

The dome at the bottom of the castle was clearly going to be another Bram sphere (well, half a Bram sphere), so building that was just a matter of ordering in the bricks and setting up a "production line" to assemble them. The real problem was gonna be arranging those ringed outer walls. There needed to be at least 3 rings, of the same basic design but different diameters, set atop one another, with grassy lawns in between. Once I had fabricated enough lengths of wall to play around with, I had to figure the exact width for each ring, that would keep them all in proportion, but also allow me to knit together a system of lime green wing plates for the lawns. The internal structure of the walls was also pretty complicated, with the various layers resting on top of one another like the layers of a wedding cake. In the end, the tree at the top was a very quick

n' dirty build, stacking bricks and plates by eye to create the overall shape. Adding all the little buildings was the fun part – so I saved that until last.

So there it was, my centerpiece. It looked great. All I had to do now was make it fly!

Show Time!

Summer ended, and BrickCon loomed. To ensure a smooth 'glide path' to completion, I sadly decided to called a halt to any further items on the to-do list, so that I could round off some other BrickCon projects and then figure out how to build the diorama.

But the reality was that creating a multi-baseplate landscape large enough to give each group of models room to breathe, was simply beyond my capabilities, my budget, and the time remaining. Plus, I just didn't have a clear picture in my head of what it would look like. So I decided to abandon that plan, and devise a non-LEGO® way of presenting Miyazakitopia.

So I decided instead to construct a set of round plinths of different heights, draped with fabrics, and placed on a larger bed of more fabric. But as the design of the plinths became more and more like fake sections of tree trunk, a thought suddenly occurred to me… "Wait a minute, I live in an area filled with trees! It's basically one continuous forest with some towns and roads sprinkled in." So I reached out to all the tree removal companies in my area, to see if anyone would be willing to save a few sections of trunk for me. In the end, with only a couple of weeks to go until BrickCon, one company said it could help out, and supplied me with a variety of interesting logs, bark still attached, covered in lovely mosses and lichens. Perfect!

I hastily estimated the heights I wanted for each log, and began the

task of sawing them down to size. For the "flying" models, I created poles using steel rods and lengths of doweling, set into wooden bases. The castle was holding up ok, but I just wondered it if was going to topple over at some point and smash to pieces! I took its central tree apart and hollowed it out to make the model less top-heavy. With a quick trip to the craft store to gather 'decorative' supplies, I was ready! I had no idea exactly how the diorama was going to look, since I hadn't had a chance to do a test run. I was just going to have to improvise...

And so the big day finally arrived. As I wheeled my collection of logs in on one of the large push carts, and started to set them down under the "Big In Japan" area for later, I could see the amused looks on peoples faces. Every so often someone would wander past them and joke "Hey, that's not LEGO!". To which I would reply "I know! And neither is my fist!". Well if they thought using wood to present LEGO models was a weird idea, I knew they were going to be really confused when I started pouring sand on the table!

It took me many hours to 'install' the Miyazakitopia diorama. Once I'd decided on the exact arrangement of logs and models, made an ocean for Ponyo, and a desert for the Ohm, I then proceeded to build a Japanese garden around it all, filling in the gaps with mosses, dried plants and river rocks. Yes, it was very ostentatious! And the mess of discarded vegetation that lay on the floor around me was epic. It was almost like performance art. But I was very pleased with the end result, especially the way the earthy tones of the garden brought out the brighter colors of the LEGO models. Just like Miyazaki does it in his movies, I thought to myself…

So finally, after a year of planning, preparation and hard work, it was done. Now I could sit back and enjoy the reactions of the public, as they spotted their favorite characters, or tried to see how many they could identify. But as fun as that part was, what really brought it all home for

me was talking with other AFOLs at the convention who were also big Miyazaki fans. Miyazaki's body of work affects different people in different ways – often one person's most favorite movie turned out to be another person's least favorite! There's no single crowd-pleaser, and each of Miyazaki's movies seems to have its own little fan base!

But it was great to talk with others about that deep connection that we shared to these wonderful movies. And being able to bring some of those feelings to life in a new way through our other shared love, LEGO®, was the most rewarding thing of all.

So my fellow AFOLs, I guess the moral of this story is… Build what you love!

About The Creator

Iain Heath lives in Seattle, Washington, and is an active member of SeaLUG (The Seattle LEGO Users group). On-line, he operates under the alias Ochre Jelly.

Images of the Miyazakitopia collection can be found at…
http://www.tinyurl.com/miyazakitopia

To see images of Iain's other LEGO creations, you can browse his Flickr photostream at…
http://www.flickr.com/photos/ochre_jelly

Or to read Iain's blog, The Living Brick, where he features the best "character" creations by LEGO builders from all over the world, go to…
http://thelivingbrick.blogspot.com
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A question of image

Introducing Stop-Motion

Text and images by Obsoleto

From the beginning of time, the man has tried to portray all that was happening around them either painting on the inside of a cave, in a huge canvas or in the Sistine Chapel. Curiosity made man mix chemicals and in 1816 create the first negative image, the forerunner of the current picture. But in 1895, man's obsession for perfection makes him put 24 of these pictures into a single negative to create a unique and wonderful second of moving image. That cold morning of December, the first motion picture was presented in France.

Much has happened between December 28, 1895 and August 25, 1978, when the first minifig goes on sale.
Much has changed as well since that short film by the Lumiere brothers to the masterpiece of animation that is Toy Story 3.

And it is when the image and LEGO® sets are combined for the first time that projects that unite these two arts arise from the imagination of a few . Those few now are many and active.

THEORY OF THE IMAGE

How many of us have imagined ourselves in the role of the main character in a movie when we saw it at the cinema? The magic of cinema is that their stories, near or far from us, make us forget for a time our surroundings and enter into this world that is before our eyes. The first short films made with LEGO sets and minifigs arise from the need to portray these stories we have seen the day before in the movies but giving it our personal touch. Those who are dedicated to this start from a simple premise: "I can not be Spiderman, but I can make a Spider-Man minifig fly over a LEGO City set".
And how do you make a Spider-Man minifig fly over a set of LEGO City? Very simple, with only four steps:
- Spiderman Minifig
- LEGO City Set
- A camera connected to a laptop
- Much time and enthusiasm

Is anyone surprised I use a photo camera instead of a video camera? I imagine that at this point where we would be able to make "Avatar", nobody is surprised ... and that is because if we record this sequence with a video camera, we would be able to see our fingers moving the minifig.
Returning to the end of the opening paragraph: "24 photographs made a second of motion"
We will be purists, replace "photos" with "frames" and "movement" with "animation".
Good. We already have the set, the minifig, camera, laptop and we know that this work will take a lot of time. What's next?

When I studied Image and Sound, I learned two things in the chapter on American Cinema:
- Their films are industry, not culture
- Their films are made thinking of the viewer, not the argument.

When recording a short film with LEGO figures you have to think how you will distribute it (and if not, why invest so much time and effort...?)
A little more theory:
- I want my movie to be seen online. I'm going to upload it to Brickfilms.com: Select a camera resolution of 640 x 480 pixels and edit it on the computer at 15 frames per second
- I want my movie to be seen in a cinema preceding the second part of Avatar: Select a camera resolution of 1920 x 1080 pixels and edit on the computer at 24 frames per second
- I want my movie to be seen on the Saturday night film show on Channel 1: Select a camera resolution of 720 x 576 pixels and edit on the computer at 25 frames per second.

I don´t want to disappoint you, but in the end you'll wind up showing your "wonderful film" to your friends on a computer. So I recommend the first option: the camera at 640 x 480 (the computer will take less time) and 12 to 15 frames per second (duplicating frames in the edition)

EXPERIENCE IS THE MOTHER OF SCIENCE

If this is your first experience in making short films (and you have time...) I would try the same method that is used by scientists: "trial and error."

Let me explain:

Frame by frame animations recorded with clay, wooden figures, peanuts, minifigs, etc ... is called "stop-motion"

"Stop-motion" is based on: Hand in. I move the doll. Hand out. Picture. Hand in. I move the doll. Hand out. Picture. Hand in. I move the doll. Hand out. Picture ... and so on 25 times to make a second of animation.

My first short LEGO® film I did it that way. I recorded three seconds of animation (75 photos), downloaded them to my computer and joined them with an editing program. Result: the minifig is moving in leaps. That was my TRIAL - ERROR.

Analyzing the failures I saw that I have to show more movement of joints than position changes

The work is meticulous, but it works. Only 6 pictures:
- Minifig with two feet on the ground
- Minifig lifts the right foot
- Minifig body tilted while low right foot. Left foot back
- Minifig stretched with two feet on the ground
- Minifig Left foot up
- Minifig body tilted while low left foot. Right foot back
- Minifig stretched with two feet on the ground (such as Picture 1, the loop repeats)
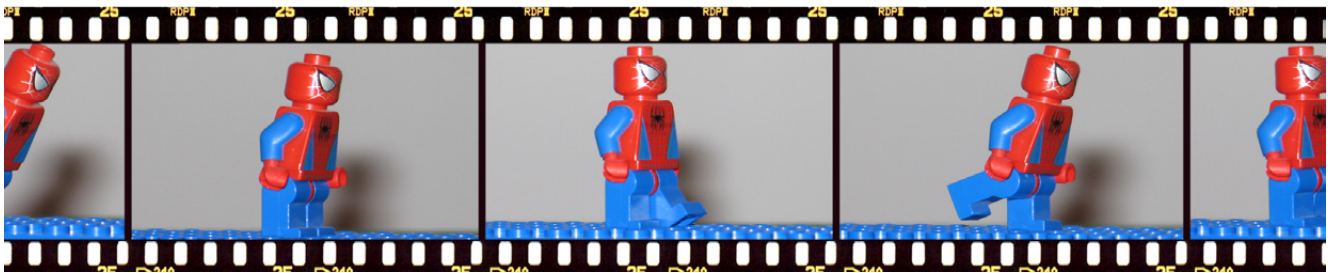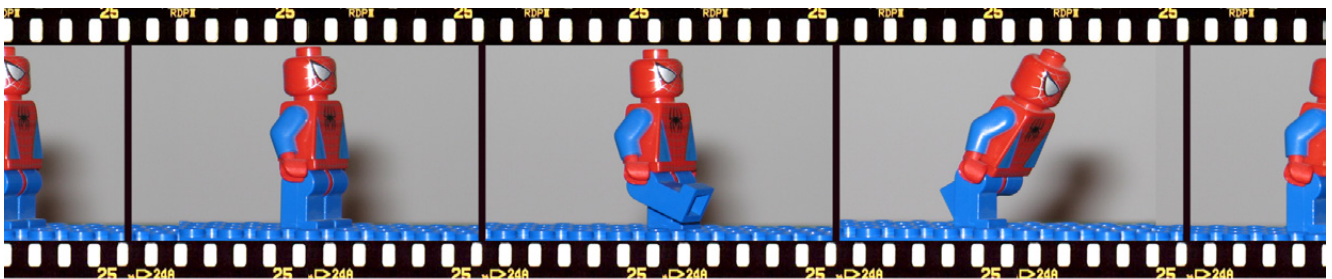
In ¼ second our minifig has completed two steps, and therefore in a second it will have taken eight steps (BLOW! Minifig IS RUNNING!)

The editing program you're using is very important. Personally, I bought "Adobe Master Collection CS4" which includes many "must have" tools for those who do this kind of things professionally, including Photoshop (photo editor), Premiere (video editing) and After Effects (video post-production).

Yet you can find very powerful freeware on the Internet.

The trick to not see the minifig run is related to how you import the pictures in the video editor. I recommend that each photo last two frames. So in a second you see 12 photos and the motion is more realistic (only takes 4 steps).
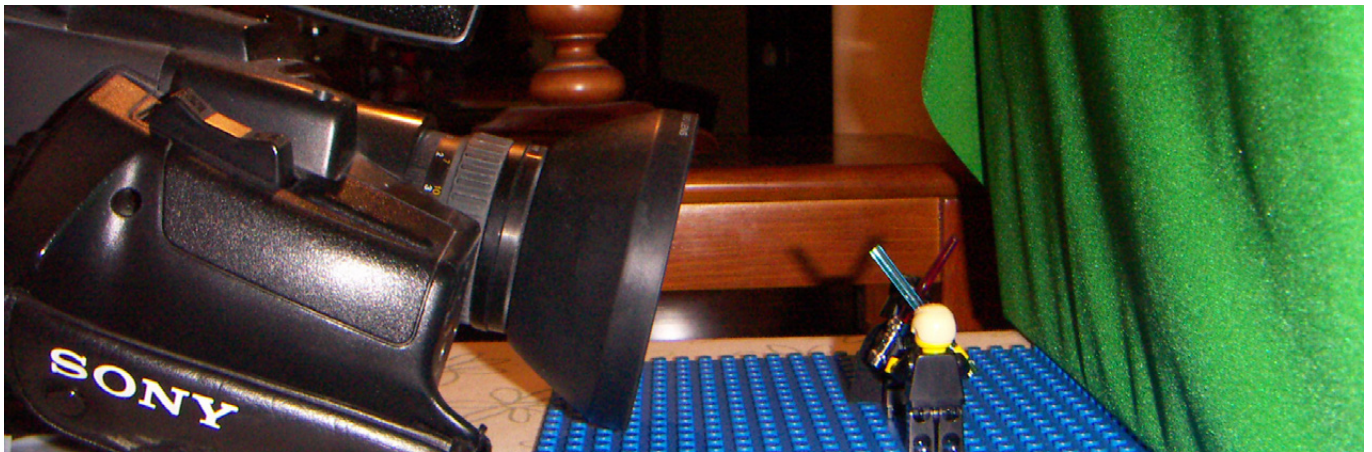
MY PERSONAL EXPERIENCE

Since 1992, when I finished my Image and Sound degree, I have been trying to use new technologies for animation. First I started with a short film, then I dared to write a long film and finally, after many curriculums on paper, I got a job in television. The use of LEGO® minifigs in my short films came from the need to make a storyboard. The storyboard is the film in your mind made shot by shot and drawn in pencil. This tool is essential to then explain to the crew what you intend to do. I am a terrible artist, so I started to take pictures of my LEGO.
Then one thing led to another (as I've already mentioned, I've made 75 pictures)...
On the other hand, digital photography was in its infancy, so what I did was use my video camera and an analog video capture card connected to my laptop. Once the photos where on the computer hard drive, I passed them through the photo editor to "eliminate" the cables and impurities arising during the shooting (otherwise it is impossible to make Darth Vader... fly)

The worst part of this work is the amount of time you have to take to make a movie with a decent length. So here I propose you write simple stories, without many effects. Making a LEGO version of Star Wars™ is a big temptation, but forces you to double the time needed because of the frame-by-frame editing to for example simply draw a lightsaber.
As technology progressed a bit more, it was time to take the next step. So, thanks to models already made with MLCad and a wonderful plugin called LDRAW2LWS and the program "Lightwave 3D" I was able to convert the "Millennium Falcon Mini (4488) " into a 3D animation in PIXAR style

The world of digital imaging advances in geometric progression and each year there are new tools that revolutionize the cinema screen. Just when we thought that after "Matrix" everything had been invented, "Avatar" by James Cameron came along in a spectacular 3D.
If, like me, you love the world of image and sound and you are an AFOL, investigate, search, find the right information and try to be the first to make a short "Real 3D Stereo" film, starring a Minifig. Hint: two cameras (right eye, left eye) and a separation of 65 mm between the two lenses.
There you have it.
#

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The Evolution of LEGO® Sorting

Here's a description of an evolution of LEGO collection sorting. It might be yours, at least in parts. It's certainly been mine.

Text by Remy Evard

I might turn this into an essay some day, but for now it will have to begin life as a series of unsupported claims. If you have any comments or additions, toss'em in.

Let's assume you start your LEGO® collection like most of us did: with one set.

1. You don't sort your LEGO. You just keep them in the box they came in.

(Then, over time, you get another set, then another, then another. And your pile of bricks grows. How do you cope?)

2. You start sorting your LEGO. You sort it by set.

(Your collection grows.)

3. You give up on individual set boxes and toss all your LEGO in a big storage bin or a LEGO denim bag, or a couple of your large set boxes. You become very familiar with the sound of someone digging through large bricks looking for a 1x1 transparent red plate.

(Your collection grows.)

4. You begin to sort your LEGO by category: normal-looking bricks in one set box, other pieces in another box.

(And grows.)

5. Ok, you realize you actually have to sort it. You decide to sort the obvious way: by color.

(And grows.)

6. You keep sorting by color, but you get pickier about how you do it, and you start filtering out by type for the first time: probably the first things you sort out by type are minifigs and wheels. You realize you already had baseplates sorted out separately.

(Let's just assume at this point that between every paragraph, your keep adding LEGO to your collection.)

7. You cave in and actually get a storage system. Maybe it's rubbermaid bins, or piles of blue buckets, or fishing tackle boxes, or ziplocks. But now you've got a system.

8. You grow weary of digging through all the yellow bricks looking for that one specialized yellow piece somewhere in 2 cubic feet of yellow. But you think of how much work it's going to take to split by part and you don't do it.

9. Sorting becomes difficult enough that you decide, in some cases, not to break some sets down and put them in your main pile of LEGO... instead, you store them as a set, because that set is so cool just the way it is. (Ok, so this set is from the 80s...) The pieces for that set are either in their box, or in a ziplock or something. Congratulations, you've just invented Set Archiving, and now you have two ways you store your LEGO: broken down by parts, and archived by set.

10. You give up and decide to sort your parts by type rather than by color. You go get more bins or tackle boxes or whatever your container of choice is, you dedicate an evening or a weekend or a month to it, and you split by type.

11. You have now invented your own LEGO categorization system. You have no doubt separated out bricks, plates, wheels, minifigs, slopes, and so on, but you've also clumped "things with curves" together, and doors and windshields together. You also have a category called "misc". Your categories, amazingly, don't look much like the LDraw categories.

12. You realize you have piles of stuff that don't fit easily into the categorization system: RCX bricks, train track, those huge A-shaped pieces, monorial supports, and rubber bands. You get a different sized drawer system for stuff like that.

13. Your collection is now clearly housed in many different types of containers ranging from buckets to drawers to bins to individual tackle box components.

14. You begin to develop large piles of LEGO in various states of being sorted, i.e:

● the sorted stuff

● the stuff you've kinda sorted and is ready to be put away

● piles of LEGO you aren't going to sort because you think you'll use it all to build something else anyway

● LEGO sorted some other way than the way you sorted into drawers to see if this way works better than that way did

● your building projects

● your new boxes of LEGO®, some opened, some not

● oh, and let's not forget your various models and MOCs

15. You begin to develop strong opinions on Plano vs. Stak-On and Rubbermaid vs. Sterilite.

16. The original categories you made begin to follow this life cycle:

 - They grow too large to fit into their container.

 - You divide the category into two categories in order to get them to fit into the containers... one for each category. (Now you have windshields, doors, and windows, each as a different category of pieces, each in their own containers.)

 - You store those subcategories together, but as parts of them become too numerous or too hard to find, you split them out. So your tackle boxes now have a different compartment for each type of door.

You realize that at this point the endgame is that you will have a different compartment for every type of piece you have.

16.5. Every once in a while, you open a drawer you haven't opened in a while and discover that you've been sorting some piece into two separate places in your drawers. This throws your categorization for a loop. How exactly do you categorize the 1x2 plate with the little robot-looking thing on it? Oh no... partsref doesn't have it either, augh!

17. You rearrange your house so that you can fit your storage system into, hopefully, just one room.

18. You give up on the "one compartment for every piece" theory because you can't keep up with that. Instead, you start putting some of the similar things into shoebox-sized bins. The way you decide what to compartmentalize and what to put into bins together is to think about how long it takes to find an individual element. It's ok to dig through a pile of windshields looking for the trans yellow blacktron hood. It's not ok to dig through a pile of slopes looking for the specialized corner cap slope.

18.5. You document your categories so you don't get lost.

19. You develop a multi-stage sorting system. It may take a piece several hops before it ends up in its final resting spot, but it's a bit more efficient to sort this way, and you can do some of it while watching a video.

20. Bizarrely enough, you actually give up and go back to sorting by color. Only this time, you sort by color after sorting by piece. So you now have a bin for yellow 1x3 plates, and a bin for black 1x3 plates, and so on.

21. Finally you create an "overflow" system of buckets, where, if the bin of 1x3 yellow plates is full, you just any additional ones into that overflow bucket, along with other plates. (One of the first indicators that you should do this was that you didn't have a compartment big enough to hold all your LEGO horses...)

22. You begin to toss most pieces directly into overflow.

23. You now have what, to a stranger, would be a bizarre sorting system. You have some parts thrown together in bins by type. You have some parts split out with a separate bin for each part. You have some parts split out with a separate bin for each color. You even have some parts split out by how old they are: red 1x2s from the 60s, red 1x2s from the 70s, new red 1x2s that hold really well, and all the other red 1x2s. And you have an alphabetized pile of large buckets for the overflow pieces and another one for the 1st stage of sorting.

23.5. That stranger would also think you were certifiably insane. Or at least retentive.

24. You start looking for a new house. One with a large basement.

25. Vision recognition becomes interesting to you.

26. You begin to long for the day when you could sit at your desk and actually reach every piece you owned without getting up.

27. You decide to keep a special set or two at your desk, away from the huge sorting system, just to play with a few great sets without having to sort them. And then you add another cool set. Pretty soon you're digging through 3 inches of bricks trying to find that 1x1 transparent red plate and you think about sorting your bricks...

Of course, somewhere along the way, you probably quit buying just sets, and started to do things like:

- Buy LEGO sets in bulk, to the point where you have 10s to 100s of unopened boxes.

- Work on very large construction projects.

- Acquire other people's collections.

- Run large auctions over the net.

And those bring up entirely new sorting challenges.... but those won't be written about tonight, at least not by me.

-r'm

Remy Evard / evard@mcs.anl.gov

Alternates

Building alternative models with the parts contained in one set is probably the first facet that any fan of LEGO® develops.

Text and pictures by Nathanaël Kuipers

Some might know me under the name industrialdesigner, others by NK DeSign-er, but my real name is Nathanaël Kuipers. With so many talented LEGO® builders out there, there's a good chance that you've never seen or heard any of these names. If you ask people from the LEGO community to say in one word what they might know me for, I think 3 words come to mind: supercar, alternates and LEGO-designer.

That's correct, for a few years I worked in the product development department in Denmark as a designer for LEGO TECHNIC, which I think leaves the biggest impression to most people. I would rather be remembered though for the models I designed and the inspiration they gave. Especially that last bit is a major drive for me; I want to stimulate others to be creative, to inspire them with cool models that can be recreated by anyone. This brings me to one of the other words: alternates. What better way to motivate people by showing them what else can be made with only 1 set that they have as well! Of course the challenge is to get them so far, so the main driver to me is coolness, because a dull model is not very inspiring. This means that my alternates preferably have to be as big and impressive as the official model. I decided to use the Creator line for most of my alternates as those sets contain a lot of basic bricks and are focused towards building.

Besides a cool model I try to stimulate the brain further by including a tricky part in my models, built in an unusual way. This makes the build more interesting for me, but I believe also for others as they have to overcome this challenge. It's amazing to see what kind of inventive solutions people come up with when they try to re-create a model. Unfortunately this problem solving mentality seems to slowly disappear out of society as I have often received requests if I could just give the building instructions instead. It's like the trend has become consuming instead of studying and thinking for ourselves...

Anyway, back to alternate models. People often would like to know where to start and how to get ideas. For me there's no standard formula to do this, but I can share some scenarios.

It is however essential to begin with the right mind set by convincing yourself that with the available pieces you can build pretty much anything you want. (Although I personally prefer to stay in the same theme as the original model.) The 'only' thing to do now is putting them in the right place just like a jigsaw puzzle. It is also beneficial to do a bit of preparation before you start building by having a good look at the parts inventory; which come in pairs - as a model is often symmetric - and how many parts there are to change the brick orientation. Especially those last ones are highly valuable when building alternates, as it gives the possibility to look at, and use parts in many different ways, so use them wisely.

It's probably the easiest if you know in advance what you would like to build, but also if that is not the case, there's no need to panic. In some cases I don't know what I am going to build with a certain set either, so I just start to put some pieces together that might form an interesting shape. Other times I begin by looking at pieces from different perspectives to see what else they could represent. Generally speaking these exercises give me some ideas to expand on what to build. However it does happen sometimes that I get stuck at some point, so then I just go a few steps back or start anew. This is not considered a failure, but a learning curve as this experience gives me new knowledge and insights for next time on what works and doesn't work, and on the limitations of a set.

One last thing I would like to mention is the process of swapping elements, which is a key feature when building alternates. Basically it means trying to use every element available in the most effective way; either using them for constructive, or aesthetic purposes, but preferably both. Even when you think the model is done, it's always a good idea to experiment with swapping elements, because maybe there is still room for improvements. I recommend however to set a time limit on this, because I know from experience that otherwise the alternate will never get finished…

So all of this sounds nice in theory, but what about practice? Let me try to illustrate these scenarios with some examples of alternates that I've built over the years.

When I wanted to build something with 4508 Titan XP in 2004 - when the line was actually not called Creator but still Designer Sets - it was difficult to decide on a direction, so I just started to put some bricks together in an unusual and interesting way. The shape that I then created looked like some high heel pump shoe, which gave me the idea to start working on a female humanoid. After I had spent a lot of time trying to get the proportions of the rest of the body right, the most important characteristic to do was left: the face. Besides the pony tail I used a pair of 1x1 'tooth' elements as eye lashes to accentuate her feminine side.

With the alternate of 4896 Roaring Roadster from 2006 it all started by looking at, and using parts in a different way. In this case 2 silver metallic 'engine' elements were used back to

back to form the logo on the grill of a car. It reminded me of a classic Mustang with all the chrome, so then the idea was to create a muscle car. It's quite interesting to think of that only 2 parts can be the inspiration to a whole new creation.

Sometimes it happens that I have problems solving the puzzle to build the alternate(s) I want. This was for example the case with the 4403 Air Blazers set from 2003. In the instructions manual there were also several ideas presented at the time for inspiration. One of them was a jet which had folding wings and other similarities with an F-14. Because I didn't like the looks of it, nor the simple mechanisms, I wanted to see if I

could come up with something better. I quickly found out that this was not so easy, because I had to combine a slick and fast looking design with some advanced mechanisms. My first attempt didn't last very long and after changing direction it resulted in a helicopter that was similar to the main model. My second attempt didn't go much better and instead I started to experiment with SNOT (studs not on top) techniques, which led to some futuristic flying hover vehicle.

Because I didn't give up on the jet and had learned some new tricks from other builds, the third attempt actually started to look like something. The tricky shape of the cockpit, the wing sweep mechanism and a retractable landing gear finally came together in one package.

Up to this day the model is still one of my favourites, because combining form and function worked out well, because it was a real challenge to design, and because I like the unusual construction, even though I now know that many solutions are officially not allowed.

Another of my favourite alternates was made from a set that came out in 2003 as well: 4099 Robobots. This set has special memories, as my first chance to build with it was in a workshop organised by the LEGO® Company. Because I felt under pressure, and because many elements were new to me, my first experience and result wasn't so great. Of

Nathanaël Kuipers © 2005 nkdesign@hotmail.com

course I had to buy the set when it became available, just to see if I could do better. In the end I created a transformer, which I called BlueSky. If only I had built this at the workshop… Up to this day I think it's not possible to create anything better with this set, so therefore it deserves to be a favourite on my list.

The last model which I think is worth mentioning is again from 2003, this time made from 4404 Land Busters. The coolness is in this case neither the functionality nor special features, but the size, the looks and the way it's built. Pretty much all the yellow bricks in this set have been used, and, just like the original, hardly any studs are visible, which is especially important considering that this has to be a slick looking Formula 1 car. To be able to achieve this, I had to integrate SNOT techniques all over the model in various directions. Because the different sections

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not the most desired by builders due to a pretty basic parts palette, but therefore very rewarding when you can come up with an interesting model. I actually bought this set, because Joe Meno, who is responsible for BrickJournal, asked me to do an alternate for his magazine. In this case I had a hard time to get inspired so I first built the 3 original models. Suddenly I was 'in the zone' and that's why my first alternate of this set came together in pretty much no time [1]. After publishing this alternate, I continued to build with this set and ended up with 3 differentiated models compared to the originals. It just proves again that the only limit is our imagination…

Hopefully my little story has given some ideas and insights on how to build a successful alternate. If you'd like to get some inspiration or just see what else I have designed (we haven't touched on the word 'supercar' for example, which may be something for another time), you could have a look here:

http://www.brickshelf.com/gallery/industrialdesigner, http://mocpages.com/home.php/174.

Possibly you will find an alternate from a set that you have as well. In that case, what are you waiting for? I challenge you to build this, or another cool alternate from this set. Of course you can do the same with any other set you like. Give it a try and do not get discouraged.

I always say that any model you design and create yourself is much better than an official set, because it's based on your own ideas. Make sure you always remember that!

[1] Joe Meno put together some basic instructions here: http://www.brickjournal.com/files/PDFs/6745.p38.pdf
#

fitted almost seamlessly in this difficult shape to create the smooth surface, I believe it also deserves a special place on the list of my alternates.

Maybe the reason why many of my favourite alternates are from the early period when I started to build again after my 'dark-ages', is because there were so many new things for me to discover and explore with. Trying to master new elements, new ideas and new techniques was great fun, especially because the whole SNOT concept was new to me. Nowadays it's more about refining the different skills.

So what to buy when you want to build alternates? Like I said earlier I recommend the Creator line, and sets in the range of this year's 5867 Super Speedster are probably a good start; they are not too expensive, but they still have a decent amount of useful elements to build some diverse models with. It also takes maximal only a few hours to create a good alternative, even though some strong design decision making is still required. I also had for example a lot of fun with the set from 2009 in the same price range: 6745 Propellor Power. Maybe

Nathanaël Kuipers © 2005 kuipers_n@hotmail.com

Euromap

A collaborative project in a different way.

Text and images by Tobias Reichling

On the last evening of the LEGO® Fan Weekend 2009 in Skaerbaek Bruno Kurth and I (Tobias Reichling) sat together and built one of the Architecture sets. This led to the idea, to build other buildings in this style. At the same time the plan was born to embed these buildings into an Europe-relief.

After several months of planning, we could start in April 2010 with designing and in June with building. At the same time we obtained much building-support from many other European LEGO fans!

Number of bricks: ca. 53.500 (only relief)
Area: 480 studs x 480 studs (3,84 m x 3,84 m)
Number of studs: 230.400 studs in the base area plus 453.026 studs additional
Time: April till September 2010

The relief was built by Vanessa Graf, Tanja Kusserow-Kurth, Torsten Scheer, Bruno Kurth and Tobias Reichling.
#

Places Of Interest

Puerta de Europa towers (Torres KIO)
Madrid, Spain
by
Carlos Mendez Potes
#01

Eiffel Tower
Paris, France
by
Eric Borrega
#02

Tour St.-Nicolas & Tour de la Chaine
La Rochelle, France
by
Eric Borrega
#03

Riga Radio and TV Tower
Riga, Latvia
by
Heiner Berg
#04

Edinburgh Castle
Edinburgh, Scotland
by
Heiner Berg
#05

Parthenon (Acropolis)
Athens, Greece
by
Torsten Scheer
& Bruno Kurth
#06

Cathedral Santiago de Compostela
Santiago de Compostela,
Spain
by
Torsten Scheer
#07

Windmill
Rotterdam,
The Netherlands
by
Bruno Kurth
#08

St. Patrick's Cathedral
Dublin, Ireland
by
Johannes Köhler
#09

Monument of the Martyrs
Algiers, Algeria
by
Johannes Köhler
#10

National Library Minsk
Minsk, Belarus
by
Bruno Kurth
#11

Bronze Horseman
Saint Petersburg, Russia
by
Bruno Kurth
#12

Colosseum
Rome, Italy
by
Luca Giannitti
#13

Leaning Tower
Pisa, Italy
by
Luca Giannitti
#14

Barken Viking
Gothenburg, Sweden
by
Marco Chiappa
#15

Mother Motherland
Kiev, Ukraine
by
Marco Chiappa
#16

Cathedral Cologne
Cologne, Germany
by
Michael Jasper
#17

Titanic
Atlantic
by
Patrick Bendt
#18

Aircraft Carrier Charles De Gaulle
Mediterranean Sea
by
Patrick Bendt
#19

Atomium
Brussels, Belgium
by
Serge Belsack
#20

Ferry boat
Atlantic
by
Serge Belsack
#21

Arcul de Triumf
Bucharest, Romania
by
Sever-Mihai Alicu
#22

Prater (Travel Wheel)
Vienna, Austria
by
Verena Schaden
& Thomas Muskovich
#23

Hagia Sophia Museum
Istanbul, Turkey
by
Verena Schaden
& Thomas Muskovich
#24

Big Ben
London, England
by
Volker Draschka
#25

Helsinki Cathedral
Helsinki, Finland
by
Volker Draschka
#26

Chain Bridge
Budapest, Hungary
by
Thorsten Scheer
#27

Palace of Culture and Science
Warsaw, Poland
by
Thorsten Scheer
#28

Yivli Minare Mosque
Antalya, Turkey
by
Thorsten Scheer
#29

Millennium Cross
Skopje
Republic of Macedonia
by
Tobias Reichling
#30

Stonehenge
Amesbury, England
by
Tobias Reichling
#31

Turning Torso
Malmö, Sweden
by
Tobias Reichling
#32

Jet d'eau
Geneva, Switzerland
by
Tobias Reichling
#33

Arctic Cathedral
Tromsø, Norway
by
Tobias Reichling
#34

Genex Tower
Belgrade, Serbia
by
Tobias Reichling
#35

Hallgrímskirkja
Reykjavík, Iceland
by
Bruno Kurth
#36

Offshore Wind Farm
North Sea
by
Bruno Kurth
#37

Oil Rig
North Sea
by
Bruno Kurth
#38

Cruise Ship
Mediterranean Sea
by
Bruno Kurth
#39

Belém Tower
Lisbon, Portugal
by
Bruno Kurth
#40

Stave Church
Borgund, Norway
by
Ina Nilsson
#41

Stadshus Stockholm
Stockholm, Sweden
by
Ina Nilsson
#42

Brandenburg Gate
Berlin, Germany
by
Jürgen Hoffmann
#43

City Hall Oslo
Oslo, Norway
by
Jürgen Hoffmann
#44

Euromap Relief

Builders:	Vanessa Graf, Tanja Kusserow-Kurth, Torsten Scheer, Bruno Kurth and Tobias Reichling
Bricks:	ca. 53 500 (only relief)
Area:	480 studs x 480 studs (384 cm x 384 cm)
Studs:	230 400 studs in the base area plus 453 026 studs additional
Time:	April till September 2010
Last Words:	**Many thanks to all people who helped us to realise this project!**

SuperCar 8865

The eighteightsixfiveism

Text by arvo

Images from Blackbird´s Technicopedia

It was 1988 when the sexiest, reddest and most technical SET ever designed appeared on the scene.

(Now is when the editors should add that "... the magazine is not responsible for the opinions ... etc, etc ...)

At that time, someone, back in the Denmark, in a cold and white room jumped up from his seat shouting, "I demand my canonization...my canonization ... !!!". Although probably the artist responsible of the design was never aware of his achievement. Unless he were an Illuminati, most likely after turning off his computer, he took his ham sandwich and his umbrella and went to have lunch on his favourite bench (BTW, in 1988, Did computer design exist?, "Did they use an Amiga?, or an ATARI?)

But let that go. Let's talk about 8865, of what it meant, of what it inherited and of what it introduced, but above all, of what would become impossible to improve in later models. It fits into the famous series of supercars.

Starting from the outside in, the box was more compact and discreet than its predecessor (SET 8860). Its image, something more technical with all those dimensions in the background, gave it an air of prototype (we must remember that after 8 years, trends in the field of design were very different.) In any case its weight told us that it contained one of the most complete constructions of that time.

A clear plastic thermoformed tray housed some of the characteristic parts of the model (wheels, gears, technic bricks, etc) and protected the compartments, made in cardboard, which contained the remaining parts, 892 in total.

A more than worthy evolution of the fabulous 8860, it inherited much of its technical specifications but introduced important innovations. The first and most obvious, its striking red fairing, with the folding seats in blue, and Technic Wheels 24 x 43, this time in white, endowed the model with an exclusive sporty look. On the other hand, the chassis, denser, increased in complexity to be able to host a great amount of detail, as the front suspension and steering compatible with the use of rods (even closer to a real system and becoming a standard from this model), headlights with activation lever (it wasn´t state of the art, but it was amusing to be able to lift them from a lever, especially effective when dealing with a double lamp model) or V-engine.
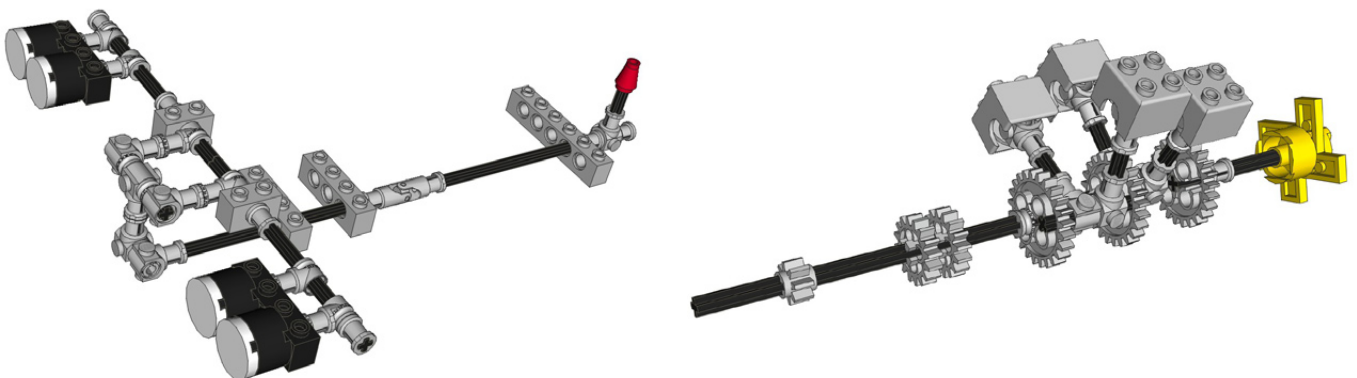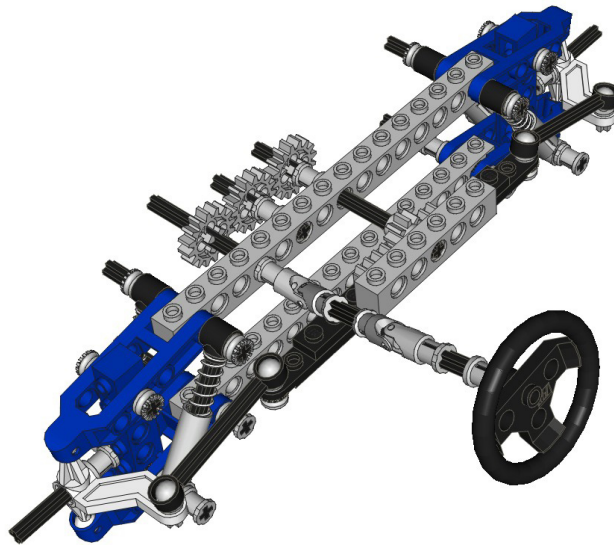
Its construction is not very complex (instructions has no more than 19 pages, 12 for the main model and 7 pages for the secondary model), but again it seems perfectly optimized. It uses large Technic bricks and building frameworks to create its structure, obtaining a rigid and light scheme where all its parts are fully integrated.
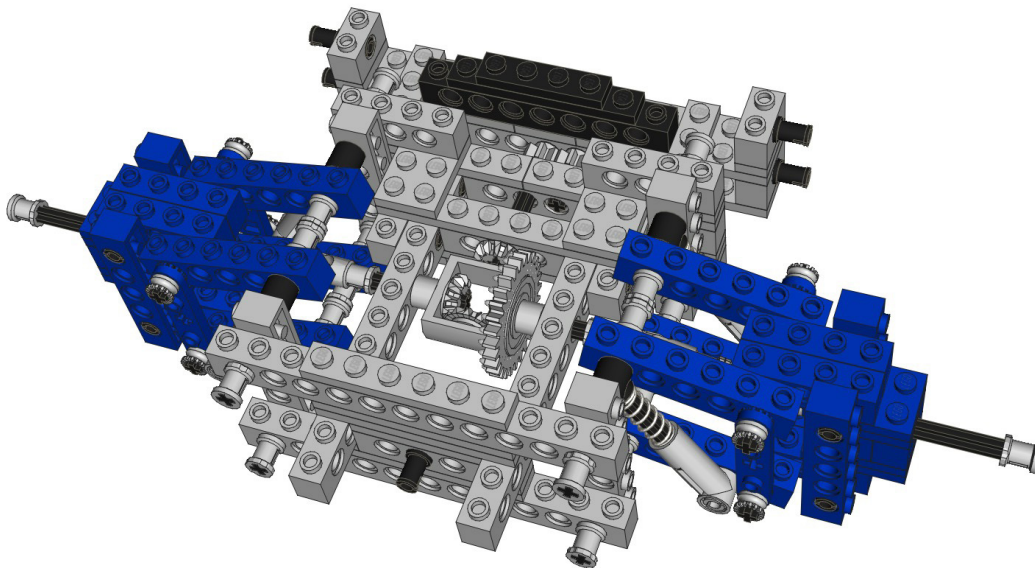
In short, a fun model to build, with a perfect size that makes it manageable without ceasing to be what it truly is ... a big torpedo!

But none of this would result in the masterpiece we believe it is, even now, if we were talking about a handful of good details that are lost in a mediocre result. No.

This is the real feat. They managed to cram all that technique in a sleek, attractive and inspiring evening dress. The proportions were chosen with care, especially the height of the suspension, ridiculously accurate, the front appears to counterbalance the "excess" in the rear, without altering the profile. No other model gives a cushioned feel like this one does, it is not the number of shock absorbers, their inclination or distribution, whether or not soft ... the secret seems to lie outside the system: it is the general sense of delicately supported poise, where each of its four wheels enjoy the right amount of space (while the rear wheels have vertically space, the front wheels, thanks to the inwards alignment of the Technic bricks, have it horizontally ... what genius!)

Blakbird 2009

But, why not repeat this feeling in later models? ... We believe there are several reasons, the famous and criticized "abandonment" of the Technic brick in favour of the lift arm may be one, but not decisive. In our opinion this is a model that "suggests" but there is nothing explicit ... the fairing is so simple that there are more pieces "unseen" than "seen" ... the gaps are distributed in a very balanced way that let you see all the model without "impregnating" it with a non existent vacuum. To put it more graphically and brief, the designers were able to stop in time.

The secondary model, a pretty good Jeep, could have been a set in its own right (like almost all secondary models), although it would have been impossible to stand out next to the this 8865 TEST CAR. Technically it included almost all the details of the main model, except the V engine and the change in rear suspension (much simpler and borrowed from other "minor" models). Although the design is very successful, this was not the first time we saw a jeep, so if repeated in a larger size it would have gone completely unnoticed.

In conclusion we must confess something you will have surely noticed. We can not write about this model without spending more time on describing the feeling it gives us than on its specifications. At the end of the day it is just a LEGO® car that almost drove us crazy.
#

Blakbird's TECHNICOPEDIA

Revisiting Technic

A look at today´s Technic through the eyes of an AFOL "disconnected" from Technic for years

Text by car_mp

Images by LEGO® Systems A/S

Although as an engineer perhaps these things should attract me more, I only had two Technic sets before my "dark ages", the bulldozer (856-1) and truck (8848), both from the pre-liftarm era. In addition to these sets, I also built some of my older brother's sets in those days, such as the Auto-chassis (8860). I absolutely admired it and its assembly entertained me over the weekends. I found them fun to build and liked to play with their mechanisms, but I found it difficult to create MOCs, probably due to my short age then. I was able to make vehicles with steering, differential and that sort of things, adapting them from official models I had built previously, but I could not innovate. I must confess that I have a very special love-hate relationship with this line. Sometimes, models I build normally would require a good Technic skeleton. Or maybe I would like to add some motors and give them some kind of life of their own. At those moments I would like to master this world. But normally they don't attract my attention. Forgive me if I offend anyone but in my eyes, Technic is only a cousin of classic LEGO®. And although I have had occasional more or less fortunate dealings with Technic parts in recent years, now, taking advantage of a Technic model that has fallen into my hands (motorbike 8051) I've decided to try this line again.

My first impression is the amount of new parts. Of some of them I could not imagine their use without seeing the instructions. And then there are the liftarms. There isn´t a single Technic Brick in the entire model ... I must confess that I missed them during the construction. Yes, I know the new world of possibilities for liftarms, with its angles, their different thicknesses .... But I feel old to learn all these tricks.

Besides the typical parts that seem to emerge from the solid unit of existing ones (they look like pin groups fused to form a single part), others that just look like old parts that have been stretched for some obscure reason, or rubber parts, there are some that have been the center of the development in recent years. First came the PF (Power Functions) revolution, a world of motors and infrared lights that have allowed Technic models to take the road without an umbilical cord that joined them to their masters. And the newest, LA (Linear Actuators), they are great for converting a rotary motion into longitudinal. I must say that I soon

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surrendered to PF, but the "LA" have left me quite cold. Probably everything is the result of my ignorance, but I think everything LAs do, could be done by other methods before, maybe not so simple but for me more technically beautiful. You may ask, where did this guy leave Pneumatics?. This line began when I dropped out of LEGO® life and although I know it (my brother is a devotee of it) I must say it is a line that scares me a little. Don´t scream, I will explain myself. I think that Pneumatics functionality is incredible and it is an important part of technology in real life, which LEGO has recreated quite rightly in my view. However, when motorized, when I see the different compressors that people have designed, circuits, etc, I always expect something will go flying somewhere. Yes, I know that I am exaggerating, but you knew what this article was about, when you started reading it anyway, right?.

But let's continue. When building the model the differences are clear. The build script takes you from the inside of the model out, while leaving many axles and other types of anchors loose, waiting for a later step that will make them acquire sense. It's hard also to get used to the parts that do not have a clear position when assembling. Let me explain myself. When you insert, into the same axle, several parts (liftarms, gears ,...) you find that the positions are not defined unequivocally as the studs on the bricks. Many times you have to adjust the position to match the gears properly. You must learn to hold the pieces in places other than the usual when applying force to insert parts such as gears onto the axle. Finally I can tell you that it's easy to forget a part so you have to go back to it later. Separate parts of each step and make sure you put them all in.

Technic models use panels for aesthetic purposes. Honestly I think it is the best solution for these models. They are lightweight and give more than acceptable results if you're a little skilled. We shouldn't abuse of them, the beauty of these models are their capabilities, and seeing how a cascade of gears moves can be hypnotic.

You can read everything about Liftarms-Technic Bricks in issue number 001 (Spanish only), and about gears in issue number 007. Since my times, many new parts have appeared... and in different colors. It might seem a purely aesthetic issue, but no. Often colors speak of their characteristics, as a prime example pins with or without friction. It's an uncomfortable leson to learn - the first time that the wheels of your vehicle don't spin, you'll understand.

The best thing you can say about Technic is that it is real as life itself, and you can reproduce almost any mechanism of modern engineering. I will continue with my normal bricks ... for now.
#
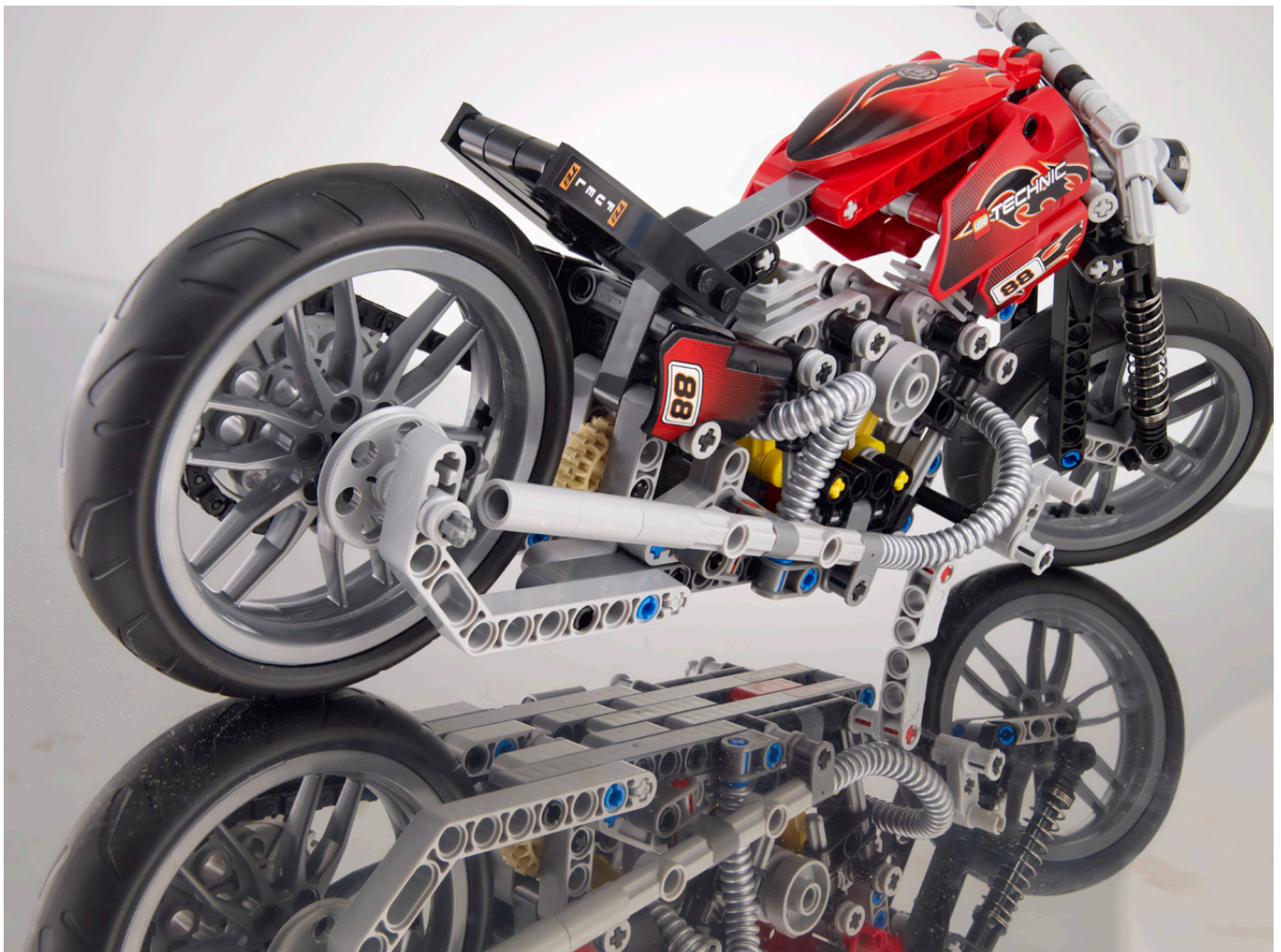
Technic today?

An overview of building styles in Technic

Text by Nicolas Lespour (Nico71)

Images property of their respective owners

The Technic theme appeared for the first time in 1977, as a "Technical Set". The term technic would be know later, after succeeded to the "pro-builder set". You can find the complete sets overviews year per year on the Technopedia by Blakbird. Everyone know the technic theme, his gears, his motors his complex linkages... But the most interesting part is what technic builders make with it.

Technic Creations

The aim of this article is to show you what Technic creation are today.

M_longer

Machinery and heavy-equipment

The heavy equipment such as earth-moving equipment or handling equipment is one of the most active fields for Technic builders. The reason is that this type of equipment can be easily remote controlled and each functions can be powered by a motor or pneumatic devices (raise a arm, drive a steering...), which enables builders to have a remote controlled vehicle. LEGO® has also released lot of official set in this field but most of these were manually operated, not designed to be completely remote controlled. Before the appearance of Power Functions System, the mocs were powered by old wired motors. Most of the controllers are outside the moc, and the design was reasonably studfull. As a result, the mocs look like model team with a high definition of details but depend of length of wire and aren't very powerful.

Zbiczasty

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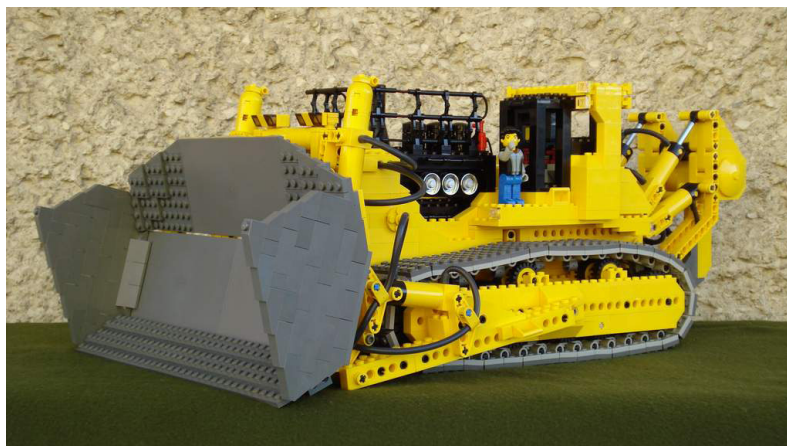
Since 2003, the Power Functions System appeared and especially the InfraRed receiver. The IR receiver allows builders to have the battery box in the moc, then it was remote controlled with no wires, which is a great breakthrough for the autonomy and playability. In addition, the new studless parts allow you to build with more complex lighter and smaller constructions. The design was studfull (many details), studless (more affordable) or both (mix up the advantages).

Cars and Supercars

LEGO® has officially released many supercars. Because of the design and the functionalities, people like cars for what they represent and how they were build. Most of supercars from technic builder are unpowered : all functions are manually operated. The standard package includes a complex drivetrain with gearbox, steering, opening doors, roof or trunk and suspension. The new studless parts enable the builder to develop new designs or new functionalities. The flex parts and the new panels are used for the design, which give a smooth design (comparably with the 8880 studfull design). The new suspension arms or differentials enable builders to have smaller and lighter constructions. Today, the supercars are lovely and nice, with a lot of functions (manually and sometime remotely), which explains why builders like building supercars.

Nathanaël Kuipers © 2009 kuipers_n@hotmail.com

Nathanael Kuipers

Trial Truck

The trial truck field was a young field, initially developed by the east-european builders. The reason is that this type of competition is widespread in their countries. The aim is simple : build a offroad vehicle, self powered by motor(s) which can pass obstacles without assistance, like real offroad vehicles. This sport attracts builders because of the complex building and driving skills that are basic requirement to have a good Trial Truck. The appearance of the Power Function system was the most important breakthrough, because it enables the builders to have a complete package in the truck : motor, Battery box, receiver : no wire. Also, the PFS motors are more powerful than the older motors, so they are better liked in a sport where the power of the drive train is very important. This field has had an important blossoming thanks to east-european builders like lugpol or klockilug builders and is today one of the most active field.

Emilus

GBC

GBC takes a completely different approach as the modules for this construction are mostly statical. However, they are a major attraction at LUG events because they provide continuous action for the visitors to observe. You can read more about GBC in issue 002 of this magazine.
#

MCP

The origins

Text by Jetro

In the previous edition of Hispabrick Magazine you could read an interview with Kjeld Kirk Kristiansen in which he stated that the very fist time LEGO® turned to the AFOL community for collaboration on the development of a new product was in relation to LEGO® MINDSTORMS®. The experience turned out to be so positive it was later applied in other product lines.

So how did this all come about? The LEGO MINDSTORMS Robotics Invention Set (the predecessor of the NXT set, including the RCX) was launched in 1998 and supported from the MINDSTORMS headquarters in California from 1999 to 2001. After that support for the RCX and RIS software on the retail side was discontinued [1]. In a way MINDSTORMS entered its Dark Ages.

In 2003/2004, The LEGO Company (TLC) was going the trough a difficult time. There was a financial crisis and many things had to be rethought. There were however some clear indicators of what direction to follow. Even though support for the RCX had disappeared and no publicity was made for the set, four years after its release it was selling very well: and the MINDSTORMS products accounted for roughly 25% of the annual sales in 1999-2000. An interesting fact was that about half these sales were to adult fans of the product. With this level of success among fans, the product needed and deserved to be revived.

LEGO had learned an interesting lesson when the RCX was released. Only months after the product became available both the RCX and the RIS software had been hacked and information about it was freely available on the internet [2]. Although initially LEGO was quite worried about this, after some time it realized this might actually be a good thing and decided to release some technical information for the fans. [3]

LEGO also realized there were people out there who knew more about their product than they did them selves, and so it was that when LEGO started developing the new generation of MINDSTORMS they decided to get some input from that AFOL community. The project was of course still secret so they had a good look at the community, made a shortlist of active people with interesting ideas and decided to contact 5 of them. Four of these – John Barnes, David Schilling, Ralph Hempel and Steve Hassenplug – responded to the sparse email they received asking them to sign an NDA[4]without knowing what they were getting into other than that LEGO was interested to talk to them. After that they were given access to a special forum which initially didn't contain any information. They soon worked out what they had in common. After a few days, Søren Lund, the director of MINDSTORMS, informed them that a new generation of MINDSTORMS was in the works, but that it was still very early days and they needed their input to help with the design. And so the MUP – MINDSTORMS User Panel was born.

The input from the MUP was crucial to the way the final product looked and worked. The original retail RCX set only featured two touch sensors and a light sensor. Later on a Rotation sensor, a temperature sensor (only for Education) and the Vision Command add-on which included a USB camera were released.

The ultrasound sensor, the 'hassenpin' and the battery pack which was released later are all the result of the efforts of the MUP. Steve Hassenplug and David Schilling even travelled to Billund and were invited to revise the set inventory and prototypes for the NXTs circuit boards. Of course the MUP had many more great ideas, but not all of them fitted in the idea and budget LEGO had. [5]

After about half a year the MUP were asked to propose names of other people who could help out in the project and MUP2 (informally called the "Muppets") was started with 14 members who continued to work together with LEGO on what would finally become the NXT 1.0 set.

In 2006, when the NXT was almost ready for production, LEGO put the word out at CES Las Vegas that it needed 100 beta testers for a new generation MINDSTORMS product. Even though LEGO specifically mentioned the product would have a cost of $150 (in an effort to limit the number of submissions to people with a genuine interest in testing and developing models for the NXT) they received over 9000 applications!

They then sifted through applications to find people who fitted one or more of the criteria for selection – had they written a book about MINDSTORMS before, did they have specific knowledge on programming or electronics, were they accomplished builders, etc. The MUP were asked to act as moderators on the forum that was set up to collect the feedback from the MDP – the MINDSTORMS Developer Program.

It soon became clear that several additional sub-forums had to be created to cater for all the different areas of interest that the MDP came up with. An example of such an area is the work of Jason Railton did on the NXT's black and white screen to get it to display grey values or Andreas Dreier who wound up writing nxtRICedit[6] to allow for animated images on the NXT screen. The

MDP also came up with a number of inspiring models, custom sensors, alternative programming languages and other interesting uses for the NXT. To compensate them for their efforts and the fact that they had initially paid for a pre-production product they received a complementary NXT 1.0 kit once the product was ready for distribution.

When the MDP came to an end some were happy to move on to other things, but others expressed the desire to somehow be able to keep in touch and continue in the spirit of what had been started. To cater for this need and because LEGO also valued the chance of continued collaboration the MCP – MINDSTORMS Community Program – was created. The program is now in its fourth cycle since its start in 2006.

Sometimes priorities and personal situations change and some of the people who have been involved from a very early stage have moved on to other things. LEGO® also discovers new talents and people with a strong community spirit who are invited to new editions of the MCP. But the general spirit of this collaboration between LEGO and MINDSTORMS AFOLs has not changed and the impact is noticeable both in the product LEGO produces and the community around MINDSTORMS.

I'd like you to meet some of the people who are and/or have been deeply involved in one way or another in the MINDSTORMS AFOL – TLC symbiosis so you can get a first hand glimpse of history of the MCP.

[1] In 1980 LEGO Education came into existence to cater for the specific needs of educational institutions who wanted to use LEGO in the classroom. As of 1998 it included LEGO MINDSTORMS for Schools and hardware and software support has been available through that channel from then on. The FIRST LEGO League (FLL) was started in 1998 (with a first competition in 1999) and the number of teams that participate has continued to increase significantly from year to year, starting with just under 1000 in 1999 and reaching almost 15000 in 2009. You can learn more about the core values of FLL in the previous edition of Hispabrick Magazine.

[2] The first to publish specific information on the internals of the RCX in terms of hardware and communication protocols was Kekoa Proudfoot. You can still find the information at http://graphics.stanford.edu/~kekoa/rcx/

[3] LEGO released the SDK or Software Development Kit for the RCX , Scout and Spybotics range in order to provide additional information about the programming of these elements. It is currently available at http://www.philohome.com/sdk25/sdk25.htm. It contains documents on the commands the RCX 2.0 firmware accepts, the communications interface between the LEGO USB tower (for IR communication with the RCX) and the computer and more.

[4] Non Disclosure Agreement – confidentiality agreement

[5] It may be interesting to note that although there are many adult users of MINDSTORMS who are taken into account in the development of the product, there is also another important target group, aged 10-14. Since MINDSTORMS is not only robotics, but also a toy, this puts heavy constraints on the possibilities and needs in terms of safety, ease of use, etc.

[6] http://ric.dreier-privat.de/Docu/index_eng.htm
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Interview: John Hansen

By Hispabrick Magazine

Name: John Hansen
Age: 46
Occupation: Software Engineer
Nationality: United States
Website: http://bricxcc.sourceforge.net and http://www. mindboards.net/

How did you get involved in MINDSTORMS?:

I happened upon the LEGO® TECHNIC Search Sub (http:// guide.lugnet.com/set/8250) on clearance at the local Zainy Brainy store back in June of 2000. I posted on lugnet back then (http://news.lugnet.com/loc/us/tn/nas/?n=7):

I'm relatively new to LEGO and Lugnet. For no rational reason I started dumping cash into LEGO in March of 2000. I found some clearance items at ZanyBrainy back then. I bought some stuff from TRU during the BOGO 50% sale. I snagged shuttles and barcode multi-sets from KayBee Toy Outlet at 100 Oaks and Factory Stores of America.

Then in August of 2000 Mark Overmars, the author/creator of RCX Command Center (RcxCC), posted this message on Lugnet (http://news.lugnet.com/robotics/rcx/nqc/?n=720):

I decided to make the source code available such that others can do these things. The source code is now available on the RcxCC home page

http://www.cs.uu.nl/people/markov/lego/rcxcc/index.html

RcxCC was written in Delphi. The program is reasonable well structured (I think) but not very well documented. So better be an experienced Delphi programmer before you start working on it. Good luck, and please keep me updated about new versions.

Since I was an experienced Delphi programmer I decided that I would take on the challenge of adding support in RcxCC to the new RCX 2.0 and the Scout bricks. I downloaded a copy of his source code and started working on replacing the communication layer with a Delphi version of the code used in Dave Baum's NQC compiler. I posted on lugnet in April of 2001 (http://news.lugnet.com/robotics/rcx/nqc/?n=1052):

I'm working on a revision to Mark Overmars' fantastic RcxCC program. I'm an experienced Delphi programmer so that's no problem. But I'm not all that experienced with NQC or the RCX generally. I've got a the latest version of NQC, a Cybermaster,

an RCX 1.0, the 2.0 beta firmware, the VisionCommand firmware, and a Scout. So I'll be testing it myself over the next few days. But I'd like to ask for volunteers to try it out.

John Barnes from HiTechnic was one of the folks I worked a lot with early on, adding a number of features that he requested. Later, Dave Baum asked me to take over the NQC project (http://news.lugnet.com/robotics/rcx/nqc/?n=1560) since I had worked with him quite a bit while making changes to RcxCC and eventually renaming it at the request of TLG to BricxCC (http://news.lugnet.com/robotics/rcx/?n=1448). Bricx is pronounced Bricks to indicate that the IDE supports more than one brick and keeps the R, C, and X from the original name.

When The LEGO Group (TLG) began working on the NXT they got 4 AFOLs together to form the MINDSTORMS Users Panel. A year later they expanded that group, at which time I was invited to join because of my work with BricxCC. I had worked with Michael Barrett Anderson, a former LEGO employee, for a number of years while implementing support for new programmable bricks released by TLG, such as the Spybot. He was also in the MUP2 group. He and I began working together on a text-based programming language that would work with the standard NXT firmware. Michael named the resulting language NeXT Byte Codes or NBC. It was an assembly language compiler and it was first used by a group of programmers within TLG to migrate their LEGO Assembler programs that worked with the RCX to new text-based assembly language programs that worked with the NXT. A bit later I implemented a C-like programming language on top of the NBC layer which I designed to be very similar to Dave Baum's Not Quite C (NQC) for the RCX/Scout/Cybermaster/ Sypbot. I called it Not eXactly C since it was a lot closer in many ways to C than NQC. Since then I have been honored to participate in each of the subsequent community partner groups organized by LEGO for the MINDSTORMS product line.

How do you contribute to the MINDSTORMS community?:

My main contribution has been enhancing, extending, and improving the BricxCC IDE to give users of LEGO MINDSTORMS bricks a wide range of useful tools for programming robots. When the NXT arrived on the scene my contributions included developing the first and only cross-platform compiler for text-based programming languages for the NXT. It is used on Mac OS X, Linux, FreeBSD, and Windows OSes around the world. While the BricxCC IDE is still a Windows only tool, most of its tools that support the NXT

are also available in a GUI utility called NeXT Tools on both Mac OSX and Linux. I also have made a number of fixes and enhancements to the LEGO NXT firmware and make it freely available in binary and source code form as the enhanced NBC/NXC firmware which is 100% compatible with the standard firmware and can be used when programming with NXT-G using the LEGO® MINDSTORMS NXT software.

In addition to the tools that I provide to the community, I also have participated on blogs and forums, such as on news. lugnet.com, the old nxtasy blog and forum, and, now, the newly created MINDBoards website at www.mindboards.net, forums. mindboards.net, and blog.mindboards.net. I try to help people learning about LEGO MINDSTORMS when they either have questions about one of my tools or programming languages or generally about firmware issues or hardware problems.

I also have had the privilege of writing a book about programming the NXT using Not eXactly C. It's called "NXT Power Programming, Robotics in C", published by Variant Press. The 2nd edition was released in September of 2009 and is available for purchase from Amazon.com and other online bookstores.
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Interview:
Ralph Hempel

By Hispabrick Magazine

Name: Ralph Hempel
Age: 48
Occupation: Electrical Engineer specializing in Embedded Systems
Nationality: Canadian
Website: www.hempeldesigngroup.com

How did you get involved in MINDSTORMS?

When the RCX came out, I was one of the people who, within a few weeks of it being released, cracked the firmware code, and then I made one of the first replacement firmwares – pbLua. Marcus Noga made the legOS firmware and we were all invited to the Extreme Mindstorms panel at Mindfest [1].

After that, I kept in touch with Michael Andersen and I kept showing him updates to the pbForth tools, such as a servo driver, and even a DCC train controller.

He passed this on to Flemming Bundgaard and (I'm guessing here) when it came time to get the NXT ready for release, LEGO contacted a group of known community leaders that had individual specialities. John Barnes had the third party sensor development, Steve Hassenplug and Dave Schilling were builders and robot competitors, and I had lots of firmware experience.

So basically, keeping in touch with LEGO insiders over the

years made it possible for the original MUP to participate and grow into the MCP program.

How do you contribute to the MINDSTORMS community?

I have been involved with MINDSTORMS since the early RCX days when I wrote pbLua which I continue to maintain. In 2006, a few weeks after LEGO released the source code for the NXT firmware I had pbLua working on the NXT. I also created the pbForth firmware for the NXT, which allows you to write software that is compiled on the brick itself.

In 2007, I helped Chris Anderson (Editor in Chief of Wired) with decoding raw GPS signals from the Bluetooth port. Although Chris went on to use RobotC in his project, my contributions helped to make the project a reality.

I'm a co-author of a chapter in "Lua Programming Gems" available on Amazon...

I also co-authored a book entitled "Extreme MINDSTORMS", together with Dave Baum and Luis Villa and I wrote a book on Spybotics, another programmable LEGO brick.

[1] http://www.hempeldesigngroup.com/lego/mindfest/panel. html
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A PID Controller For LEGO® MINDSTORMS Robots (Part 2)

We bring you the second and last part of the MINDSTORMS tutorial. We hope you feel encouraged to send us more suggestions

Text and pictures by J. Sluka

Adding "I" To The Controller: The PI Controller ("I": what have you done for me lately?)

To improve the response of our P controller we will add a new term to the equation. This term is called the **integral**, the "I" in PID. Integrals are a very important part of advanced mathematics, fortunately the part we need is pretty straight forward.

The integral is the running sum of the error.

Yep, it's that simple. There are a few subtle issues we'll skip for the moment.

Each time we read the light sensor and calculate an **error** we will add that **error** to a variable we will call **integral** (clever eh?).

> **integral = integral + error**

That equation might look a little odd, and it is. It isn't written as a mathematical statement, it is written in a common form used in programming to add up a series of values. Mathematically it doesn't make any sense. In computer programming the equals sign has a somewhat different meaning than in math. (I'll use the same typewriter font I used for the pseudo code examples to highlight that it is a programming form and not a proper mathematical form.) The "=" means do the math on the right and save the result in the variable named on the left. We want the computer to get the old value of **integral**, add the **error** to it then save the result back in **integral**.

Next, just like the P term, we will multiply the **integral** by a proportionality constant, that's another K. Since this proportionality constant goes with the integral term we will call it **Ki**. Just like the proportional term we multiply the integral by the constant (**Ki**) to get a correction. For our line following robot it is an addition to our **Turn** variable.

> **Turn = Kp*(error) + Ki*(integral)**

The above is the basic equation for a PI controller. **Turn** is our correction for the motors. The proportional term is **Kp*(error)** and the integral term is **Ki*(integral)**.

What exactly does the integral term do for us? If the **error** keeps the same sign for several loops the **integral** grows bigger and bigger. For example, if we check the light sensor and calculate that the **error** is 1, then a short time later we check the sensor again and the the **error** is 2, then the next time the error is 2 again, then the **integral** will be 1+2+2=5. The **integral** is 5 but the **error** at this particular step is only 2. The integral can be a large factor in the correction but it usually takes a while for the **integral** to build up to the point where it starts to contribute.

Another thing that the integral does is it helps remove small errors. If in our line follower the light sensor is pretty close to the line's edge, but not exactly on it, then the **error** will be small and it will only take a small correction to fix. You might be able to fix that small **error** by changing **Kp** in the proportional term but that will often lead to a robot that oscillates (wobbles back and forth). The **integral** term is perfect for fixing small errors. Since the **integral** adds up the **errors**, several consecutive small **errors** eventually makes the **integral** big enough to make a difference.

One way to think about the **integral** term is that it is the controller's "memory". The **integral** is the cumulative history of the **error** and gives the controller a method to fix errors that persist for a long time.

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Some subtle issues with the integral

Yep, the integral has more detail. Fortunately they aren't too painful.

I glossed over a minor issue (OK, it really isn't minor but we are going to make it so), the time. The integral is really the sum of the **error***(delta time). Delta time (**dT**) is the time between the last time we checked the sensor and the time of the most recent check of the sensor;

> **integral = integral + error*(dT)**

So every time we add to **integral** the thing we should add is the **error** times the **dT**. It is fairly easy to have the robot measure the **dT**. We would just read a timer each time we read the light sensor. If we subtract the last time from the current time we get the time since the last reading **dT**. (There are better ways to do this but I'll skip'm since they are not needed.) But wouldn't it be nice if didn't have to measure the **dT** and do the multiplication? Well, what if the **dT** is always the same? Every time we add to **integral** we have that same **dT** term. So we can take that factor of **dT** out of **error*(dT)** and just do the summing the way we did before;

> **integral = integral + error**

Only when we want to do another calculation with **integral** do we actually need to multiply by **dT**. But wait there's more...

We can do even more to hide the time term. The integral term in the PI controller equation is **Ki*(integral)*dT**. But **Ki** is a parameter that we have to fine tune (just like **Kp**) so why not just replace the **Ki*dT** part with a new **Ki**? The new **Ki** is different from the original but since we don't know either one it doesn't really matter which one we use or what we call it. No matter what we call it or what it represents we still have to find the correct value largely by trial and error.

So we have completely removed the time element for the integral term with the restriction that all the times steps, **dT**s, are the same (or about the same).

The integral has a memory like an elephant

One last detail should be mentioned about the **integral**. Usually the **integral** can only be moved towards zero, where it doesn't contribute anything to the controller, by having **error** values added that are the opposite sign of most of the ones that we have already collected in **integral**. For example, if over several cycles through the loop the **errors** are 1,2,2,3,2,1 that adds up to an **integral** of 11. But the **error** at the last data point is only 1, which is much smaller than the **integral** at that point. The only way for the **integral** to move towards zero is to get a string of negative **errors** to counter balance the earlier string of positive **errors** to "wind down" the **integral**. For example, if the next few errors are -2,-2,-3 then the integral will drop from 11 to 4 and we would still need more negative **errors** to get the **integral** down to zero. In addition, the **integral** wants the total **error** to be evenly distributed between positive and negative errors.

If something happens that pushes our line following robot to the left of the line's edge the **integral** term not only wants to get back to the line's edge it also wants to overshoot the edge to the right by as much as the original disturbance was the left. So the integral tends to "wind-up" if there are large errors that persist for a while. This can cause problems with controllers that include an **integral** term. Sometimes this tendency of the **integral** term to want to overshoot when it tries to correct the error is a big enough problem that the programmer must do something to the **integral** term so it won't cause problems. If **integral** wind-up is a problem two common solutions are (1) zero the **integral**, that is set the variable **integral** equal to zero, every time the **error** is zero or the **error** changes sign. (2) "Dampen" the integral by multiplying the accumulated **integral** by a factor less than one when a new **integral** is calculated. For example;

> **integral = (2/3)*integral + error**

This reduces the previous integral value by 1/3 each time through the loop. If you think of the integral term as the controllers "memory" then this damping is forcing it to become forgetful of things that happened a "long" time ago.

Pseudo code for the PI controller

To add the integral term to the controller we need to add a new variable for **Ki** and one for the **integral** itself. And don't forget that we are multiplying our Ks by 100 to help with the integer math restrictions.

```
Kp = 1000            ! REMEMBER we are using Kp*100 so this is really 10 !
Ki = 100             ! REMEMBER we are using Ki*100 so this is really 1 !
offset = 45                  ! Initialize the variables
Tp = 50
integral = 0                 ! the place where we will store our integral
Loop forever
  LightValue = read light sensor    ! what is the current light reading?
  error = LightValue - offset       ! calculate the error by subtracting the offset
  integral = integral + error       ! our new integral term
  Turn = Kp*error + Ki*integral     ! the "P term" and the "I term"
```

```
Turn = Turn/100              ! REMEMBER to undo the affect of the factor of 100 in Kp !
powerA = Tp + Turn                   ! the power level for the A motor
powerC = Tp - Turn                   ! the power level for the C motor
 MOTOR A direction=forward power=powerA       ! actually issue the command in a MOTOR block
 MOTOR C direction=forward power=powerC       ! actually issue the command in a MOTOR block
 end loop forever                    ! done with this loop, go back to the beginning and do it again.
```

Adding "D" To The Controller: The Full PID Controller ("D": what is going to happen next?)

Our controller now contains a proportional (P) term that tries to correct the <u>current</u> **error** and an **integral** (I) term that tries to correct <u>past</u> **errors** is there a way for the controller to look ahead in time and perhaps try to correct **error** that hasn't even occurred yet?

Yes, and the solution is another concept from advanced mathematics called the **derivative**. Ahhh, there's the "D" in PID. Like the **integral**, the **derivative** can represent some pretty serious mathematics. Fortunately for us, what we need for the PID is fairly simple.

We can look into the future by assuming that the next <u>change</u> in the **error** is the same as the last <u>change</u> in the **error**.

That means the next **error** is expected to be the current **error** plus the <u>change</u> in the **error** between the two preceding sensor samples. The change in the **error** between two consecutive points is called the **derivative**. The **derivative** is the same as the slope of a line.

That might sound a bit complex to calculate but it really isn't too bad. A sample set of data will help illustrate how it works. Lets assume that the current **error** is 2 and the **error** before that was 5. What would we predict the next error to be? Well, the change in error is the **derivative** which is;

(the current **error**) - (the previous **error**)

which for our numbers is 2 - 5 = -3. The current **derivative** therefore is -3. To use the **derivative** to predict the next **error** we would use

(next error) = (the current **error**) + (the current **derivative**)

which for our numbers is 2 + (-3) = -1. So we predict the next **error** will be -1. In practice we don't actually go all the way and predict the next **error**. Instead we just use the **derivative** directly in the controller equation.

The D term, like the I term, should actually include a time element, and the "official" D term is;

Kd(derivative)/(dT)

Just as with the **proportional** and **integral** terms we have to multiply by a constant. Since this is the constant that goes with the **derivative** it is called **Kd**. Notice also that for the derivative term we divide by **dT** whereas in the **integral** term we had multiplied by **dT**. Don't worry too much about why that is since we are going to do the same kinds of tricks to get rid of the **dT** from the **derivative** term as we did for the **integral** term. The fraction **Kd/dT** is a constant if **dT** is the same for every loop. So we can replace **Kd/dT** with another **Kd**. Since this K, like the previous Ks, is unknown and has to be determined by trial and error it doesn't matter if it is **Kd/dT** or just a new value for **Kd**.

We can now write the complete equation for a PID controller:

Turn = Kp*(error) + Ki*(integral) + Kd*(derivative)

It is pretty obvious that "predicting the future" would be a handy thing to be able to do but how exactly does it help? And how accurate is the prediction?

If the current **error** is <u>worse</u> than the previous **error** then the D term tries to correct the **error**. If he current **error** is <u>better</u> than the previous **error** then the D term tries to stop the controller from correcting the **error**. It is the second case that is particularly useful. If the **error** is getting close to zero then we are approaching the point where we want to stop correcting. Since the system probably takes a while to respond to changes in the motors' power we want to start reducing the motor power before the **error** has actually gone to zero, otherwise we will overshoot. When put that way it might seem that the equation for the D term would have to be more complex than it is, but it isn't. The only thing you have to worry about is doing the subtraction in the correct order. The correct order for this type of thing is "current" minus "previous". So to calculate the **derivative** we take the current **error** and subtract the previous **error**.

Pseudo code for the PID controller

To add the derivative term to the controller we need to add a new variable for **Kd** and a variable to remember the last **error**. And

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don't forget that we are multiplying our Ks by 100 to help with the integer math.

```
Kp = 1000              ! REMEMBER we are using Kp*100 so this is really 10 !
Ki = 100               ! REMEMBER we are using Ki*100 so this is really 1 !
Kd = 10000                 ! REMEMBER we are using Kd*100 so this is really 100!
offset = 45                ! Initialize the variables
Tp = 50
integral = 0               ! the place where we will store our integral
lastError = 0              ! the place where we will store the last error value
derivative = 0             ! the place where we will store the derivative
Loop forever
  LightValue = read light sensor      ! what is the current light reading?
  error = LightValue - offset         ! calculate the error by subtracting the offset
  integral = integral + error         ! calculate the integral
  derivative = error - lastError      ! calculate the derivative
  Turn = Kp*error + Ki*integral + Kd*derivative      ! the "P term" the "I term" and the "D term"
 Turn = Turn/100          ! REMEMBER to undo the affect of the factor of 100 in Kp, Ki and Kd!
  powerA = Tp + Turn       ! the power level for the A motor
  powerC = Tp - Turn       ! the power level for the C motor
  MOTOR A direction=forward power=PowerA      ! actually issue the command in a MOTOR block
  MOTOR C direction=forward power=PowerC      ! same for the other motor but using the other power level
  lastError = error        ! save the current error so it can be the lastError next time around
end loop forever           ! done with loop, go back and do it again.
```

We now have the pseudo code for our complete PID controller for a line following robot. Now comes what is often the tricky part, "tuning" the PID. Tuning is the process of finding the best, or at least OK, values for **Kp**, **Ki** and **Kd**.

Tuning A PID Controller Without Complex Math (but we still have to do some math)

Very smart people have already figured out how to tune a PID controller. Since I'm not nearly as smart as they are, I'll use what they learned. It turns out that measurement of couple of parameters for the system allows you to calculate "pretty good" values for **Kp**, **Ki** and **Kd**. It doesn't matter much what the exact system is that is being controlled the tuning equations almost always work pretty well. There are several techniques to calculate the Ks, one of is called the "*Ziegler–Nichols Method*" which is what we will use. A google search will locate many web pages that describe this technique in all it's gory detail. The version that I'll use is almost straight from the Wiki page on PID Controllers (the same treatment is found in many other places). I'll just make one small change by including the loop time (**dT**) in the calculations shown in the table below.

To tune your PID controller you follow these steps:
1. Set the **Ki** and **Kd** values to zero, which turns those terms off and makes the controller act like a simple P controller.
2. Set the **Tp** term to a smallish one. For our motors 25 might be a good place to start.
3. Set the **Kp** term to a "reasonable" value. What is "reasonable"?
       1. I just take the maximum value we want to send to the motor's power control (100) and divide by the maximum useable error value. For our line following robot we've assumed the maximum error is 5 so our guess at **Kp** is 100/5=20. When the error is +5 the motor's power will swing by 100 units. When the error is zero the motor's power will sit at the **Tp** level.
       2. Or, just set **Kp** to 1 (or 100) and see what happens.
       3. If you have implemented that the K's are all entered as 100 times their actual value you have to take that into account here. 1 is entered as 100, 20 as 2000, 100 as 10000.
4. Run the robot and watch what it does. If it can't follow the line and wanders off then increase **Kp**. If it oscillates wildly then decrease **Kp**. Keep changing the **Kp** value until you find one that follows the line and gives noticeable oscillation but not really wild ones. We will call this **Kp** value "Kc" ("critical gain" in the PID literature).
5. Using the Kc value as **Kp**, run the robot along the line and try to determine how fast it is oscillating. This can be tricky but fortunately the measurement doesn't have to be all that accurate. The oscillation period (**Pc**) is how long it takes the robot to swing from one side of the line to the other then back to the side where it started. For typical LEGO robots **Pc** will probably be in the range of about 0.5 seconds to a second or two.
6. You also need to know how fast the robot cycles through it's control loop. I just set the loop to a fixed number of steps (like 10,000) and time how long the robot takes to finish (or have the robot do the timing and display the result.) The time per loop (**dT**) is the measured time divided by the number of loops. For a full PID controller, written in NXT-G, without any added buzzes or whistles, the **dT** will be in the range of 0.015 to 0.020 seconds per loop.
7. Use the table below to calculate a set of **Kp**, **Ki**, and **Kc** values. If you just want a P controller then use the line in the table marked P to calculate the "correct" **Kp** (**Ki**' and **Kd**' are both zero). If you want a PI controller then use the next line. The full PID controller is the bottom line.
8. If you have implemented that the K's are all entered as 100 times their actual value you <u>don't have to take that into account in these calculations</u>. That factor of 100 is already take into account in the **Kp** = Kc value you determined.
9. Run the robot and see how it behaves.
10. Tweak the **Kp**, **Ki** and **Kd** values to get the best performance you can. You can start with fairly big tweaks, say 30% then try smaller tweaks to get the optimal (or at least acceptable) performance.
11. Once you have a good set of K's try to boost the **Tp** value, which controls the robot's straight speed.
12. Re-tweak the K's or perhaps even go back to step 1 and repeat the entire process for the new Tp value.

13. Keep repeating until the robot's behavior is acceptable.

Ziegler–Nichols method giving K' values (loop times considered to be constant and equal to dT)				
Control Type	Kp	Ki'	Kd'	
P	0.50Kc	0	0	
PI	0.45Kc	1.2KpdT/ Pc	0	
PID	0.60Kc	2KpdT / Pc	KpPc / (8dT)	

The primes (apostrophes) on the **Ki**' and **Kd**' are just to remind you that they are calculated assume **dT** is constant and **dT** has been rolled into the K values.

I couldn't find the equations for the PD controller. If anyone knows what they are please send me an email.

Here are the values I measured for my test robot (the one in the video linked later on). Kc was 300 and when **Kp**=Kc the robot oscillated at about 0.8 seconds per oscillation so **Pc** is 0.8. I measured Pc by just counting out loud every time the robot swung fully in a particular direction. I then compared my perception of how fast I was counting with "1-potato -- 2-potato -- 3-potato ...". That's hardly "precision engineering" but it works well enough so we'll call it "practical engineering". The loop time, **dT**, is 0.014 seconds/loop determined by simply running the program for 10,000 loops and having the NXT display the run time. Using the table above for a PID controller we get;

Kp = (0.60)(Kc) = (0.60)(300) = 180
Ki = 2(**Kp**)(**dT**) / (**Pc**) = 2(180)(0.014) / (0.8) = 6.3 (which is rounded to 6)
Kd = (**Kp**)(**Pc**) / ((8)(**dT**)) = (180)(0.8) / ((8)(0.014)) = 1286

After further trial and error tuning the final values were 220, 7, and 500 for **Kp**, **Ki** and **Kd** respectively. Remember that all of my K's are entered as 100x their actual value so the actual values are 2.2, 0.07 and 5.

How changes in Kp, Ki, and Kd affect the robots behavior

The table and method described above is a good starting point for optimizing your PID. Sometimes it helps to have a better idea of what the result will be of increasing (or decreasing) one of the three Ks. The table below is available from many web sites. This particular version is from the Wiki on PID controllers.

Effects of increasing parameters				
Parameter	Rise time	Overshoot	Settling time	Error at equilibrium
Kp	Decrease	Increase	Small change	Decrease
Ki	Decrease	Increase	Increase	Eliminate
Kd	Indefinite (small decrease or increase)	Decrease	Decrease	None

The "Rise Time" is how fast the robot tries to fix an error. In our sample case it is how fast the robot tries to get back to the line edge after it has drifted off of it. The rise time is mostly controlled by **Kp**. A larger **Kp** will make the robot try to get back faster and decreases the rise time. If **Kp** is too large the robot will overshoot.

The "Overshoot" is how far past the line edge the robot tends to go as it is responding to an error. For example, if the overshoot is small then the robot doesn't swing to the right of the line as it is trying to fix being to the left of the line. If the overshoot is large then the robot swings well past the line edge as it tries to correct an error. Overshoot is largely controlled by the **Kd** term but is strongly affected by the **Ki** and **Kp** terms. Usually to correct for too much overshoot you will want to increase **Kd**. Remember our first very simple line follower, the one that could do nothing but turn right or left? That line follower has very bad overshoot. Indeed that is about all it does.

The "settling time" is how long the robot takes to settle back down when it encounters a large change. In our line following case a large change occurs when the robot encounters a turn. As the robot responds to the curve it will correct the **error** and then overshoot by some amount. It then needs to correct the overshoot and might overshoot back the other way. It then needs to correct the overshoot ... well, you get the idea. As the robot is responding to an **error** it will tend to oscillate around the desired position. The "settling time" is how long that oscillation takes to dampen out to zero. The settling time responds strongly to both the **Ki** and **Kd** terms. Bigger **Ki** gives longer settling times. Bigger **Kd** gives shorter settling time.

"Error at Equilibrium" is the error remaining as the system operates without being disturbed. For our line follower it would be the

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offset from the line as the robot follows a long straight line. Often P and PD controllers will end up with this kind of error. It can be reduced by increasing **Kp** but that may make the robot oscillate. Including an I term and increasing **Ki** will often fix a P or PD controller that has a constant error at equilibrium. (This assumes you even care about a small remaining error as the robot follows the line. It just means it is offset to one side or the other by a small amount.)

How well does it work?

Here's a short video of a basic LEGO Mindstorms robot following the line on the test mat that comes with the set. The video quality isn't very good.

The light sensor is about 1/2" above the mat and offset to one side of the robot's center line. The **Tp** (target power) was set at 70%. The robot averages about 8 inches per second on this course. The robot is a left hand line follower and is following the inside edge of the oval. The inside edge is a bit harder to follow than the outside edge.


MPEG4 - MP4 (644KB)   QuickTime - MOV (972KB)

Overall the line follower appears to work pretty well. If you watch the video closely you'll see the robot "wag its tail" a bit as it comes off the corners. That's the PID oscillating a little. When the robot is running towards the camera you can see the red spot on the mat from the light sensor's LED. It looks to be tracking the line's edge pretty well.
The basic PID controller should work for many different control problems, and of course can be used as a P or PI controller instead of a PID. You would need to come up with a new definition of the error and the PID would have to be tuned for the particular task.
#
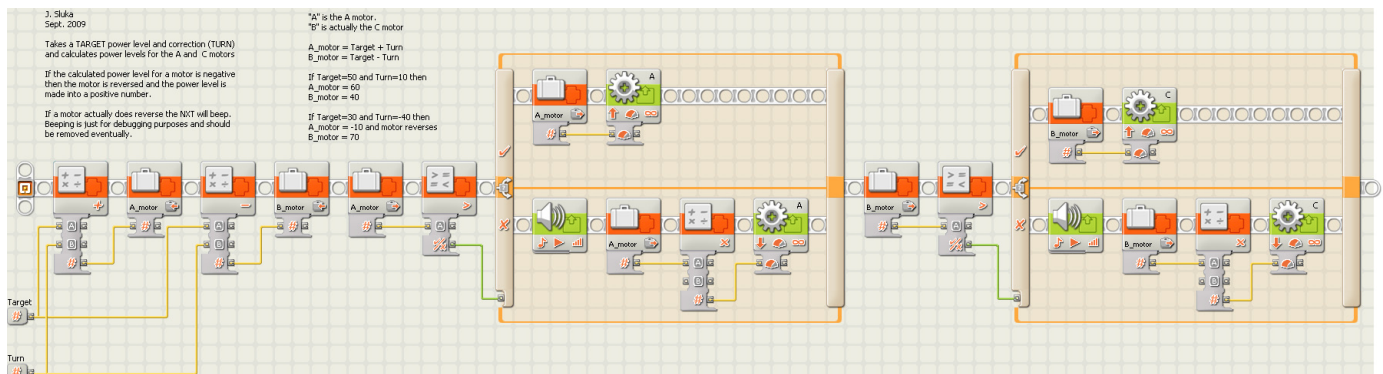
Building trees (VIII)

Higher, stronger... and simpler.

Text and pictures by Legotron

The article in this issue is a response to some requests relating to the construction of larger trees. In particular, there are several questions about the possibility of building trees that are more than 30 bricks high, strong enough not to coma apart during construction and simple enough to build as many trees as needed to form forests.

With this in mind I started the design phase. The easiest thing was to choose the starting point, for which I chose the tallest tree in the collection, specifically the one shown in the second article in this series [1]. With the idea of building trees with a height of 35, 40 or more bricks, I used the same technique described in that article, but it was a fairly complex task, in which the tree suffered continuous breaks, and after much effort, it resulted in a 35 bricks high tree which was extremely fragile.

Since the look of the tree was quite good for the desired result, the only thing I had to do was find a different technique to build it. The internal system of bars to strengthen the trunk did not give the desired result because they are quite short and start and end of each new bar is a critical point where the trees tend to break. Therefore, I looked for an alternative that would replace the bars with another more adequate element that could be easily used, and the result was the tree of this article.

Parts required

The parts list is very simple and requires very few types of parts. It is mainly based on the list of tree parts of the second article of this series. As usual, we use the naming criteria used by the Web Bricklink [2]:
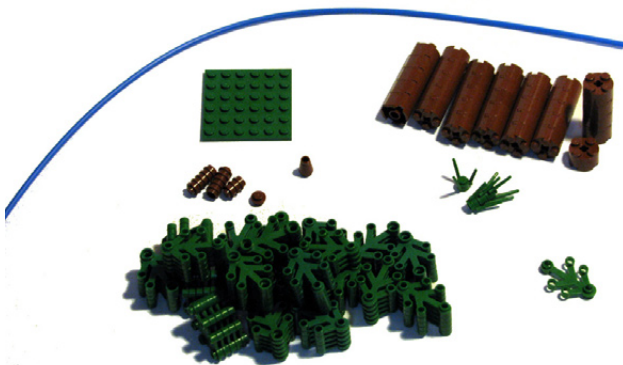
For the base:
- 1 6x6 green plate.
- Three or four green flower plant stem to decorate the base.
For the trunk:
- 30-40 brown 2x2 round bricks.
- 12-15 brown 1x1 round plates.
- A brown 1x1 cone.
- A 3 mm D rigid hose at least 40 bricks in length, of any color.
To make the branches:
- About 120 green 4x3 plant leaves.

Construction

The key part in the construction is the 3mm D rigid hose. This piece is going to give the tree the necessary strength and will determine the height it can reach. Furthermore, the use of this piece will simplify the construction process significantly.

We begin by placing about 15 2x2 round bricks over the 3mm D rigid hose which form the lower trunk. We place them on the base and add a couple of 4x3 plant leaves and a pair of 1x1 round plates in the free stud son the last brick. These pieces, placed on the bricks, leave enough space in the center to pass the 3mm D rigid hose, so you can keep putting new bricks along the entire length of the hose. On each group of leaves and 1x1 round plates add a couple of 2x2 round bricks, and again put a new configuration of sheets and plates, if possible, in a different configuration from the last one. The space of two bricks is more than enough to allow proper handling of the branches; we can leave even more space to crate parts of the tree without branches. This process is repeated until the desired height. Be careful when fitting the following bricks in order not to force the 3mm D rigid hose. It may bend. Leave fewer leaves and more 1x1 round plate at the bottom and in the upper stages of the trunk and place stages with four pieces of leaves in the central part of the trunk. Depending on the length of the 3mm D rigid hose we can build lower or higher trees. Crown the top of the trunk with a 2x2 round brick 2x2

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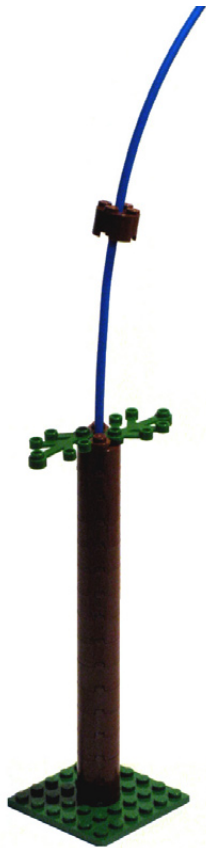
and 1x1 cone, over which we will put a couple of 4x3 plant leaves. This simple process can be done in just 5 minutes, and with this we have completed the structure of the tree. Now you just need to add more 4x3 plant leaves to give it its final look.

This process can be done in several phases. In a first phase, starting from the bottom, you place two leaves forming 120-150 degrees, alternatively, at the end of each leaf, some in the bottom and others on top of the previous leaves. At each height leaves are positioned so they cover the holes in the lower altitudes. Once this phase is over, have a look at the general appearance of the tree and use the remaining 4x3 plant leaves to give the final touch. You might want to create greener areas and others with long branches trying to break the symmetry of the tree. Remember that it is desirable that the leaves aren't too far from the trunk, since handling these high trees can cause them to fall.

This simple tree, built on a height range of 35 to 40 bricks, allows us to make a small forest with a spectacular appearance. Also the same technique can be used for younger, smaller trees to be placed among the larger ones.
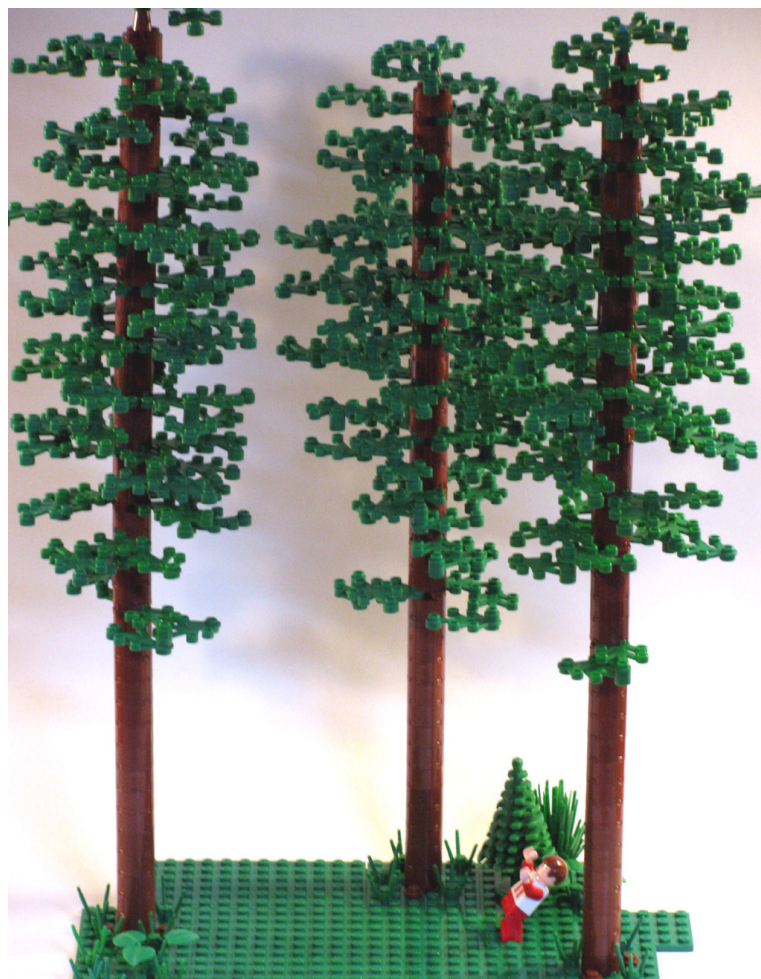
References:
[1] Hispabrick Magazine #003
[2] Portal selling unofficial LEGO® on the Internet: http://www.bricklink.com
#

Panzerbricks

An introduction to Robotics with LEGO® MINDSTORMS (VI)

Programming tools for the NXT

Text and images by Koldo

When LEGO® launched the first generation of LEGO MINDSTORMS it was hard to imagine wealth of programming tools that would become available. A community started to grow on the Internet, developing ideas and tools of their own. When the company realized that offering this community the necessary information to develop its full potential, they published documentation to develop new programming tools.

8 years later a new MINDSTORMS generation was launched: the NXT. By then the community had become very important to LEGO, so they enlisted the help of MINDSTORMS users through development programs in which people with a certain level of expertise in different aspects related to building and programming LEGO robots. When the NXT was launched, LEGO published the necessary information to enable others to develop new programming tools and sensors to be used with the NXT.

There are numerous programming tools available, so there is something to cater for all needs and interests. You may even develop your own tools if you know enough about that. This article aims to provide a general overview for a newcomer and includes some recommendations.

Selection criteria

There is no doubt that in order to learn something, certain basic conditions must be met: you need to want to learn it, have the necessary time and be willing to experiment. Practice, make mistakes and try again. It is the best way to learn. And something that is of great help is being able to share what you do with others, so the existence of a community is an important factor.

You can learn in your room, in a classroom or university or anywhere else. If we are in charge of the learning process, having good documentation to help us along is another factor to keep in mind.

Not all programming environments have the same learning curve or require the same level of previous knowledge. NXT-G, for example, requires no previous knowledge and allows you to create working programs from the very first moment.

Another important factor, in some cases the most important one, is the reason why we want to learn to program. Is it a hobby? Will we learn something at school or university? DO we build and program robots to test out solutions to problems I some cases the choice of programming language will be a given.

Introduction to robotics

I will start out with the group of people between 0 and 99 who

start with LEGO MINDSTORMS without any prior experience. In many cases these people don't have anyone to ask questions in their immediate surroundings while others may resort to parents, siblings etc. But even in the case of someone who can count on some help the starting point may be the same.

Although it is not it's official name, the original LEGO software is usually called NXT-G (G for graphic). NXT-G is great to get started. It has been specifically designed to start out with programming and be able to create a program to make a robot move in les tan 5 minutes. Not a bad start.

NXT-G comes with a guide to build and program the official models and there are many different models and programs available on the Internet that can help you in your learning process. A great source is NXTprograms [1].

On the other hand, NXT-G provides the programming structure of the traditional programming languages: use of variables, multitasking, conditionals, loops… in other words, it is a good start even if you want something different afterwards.
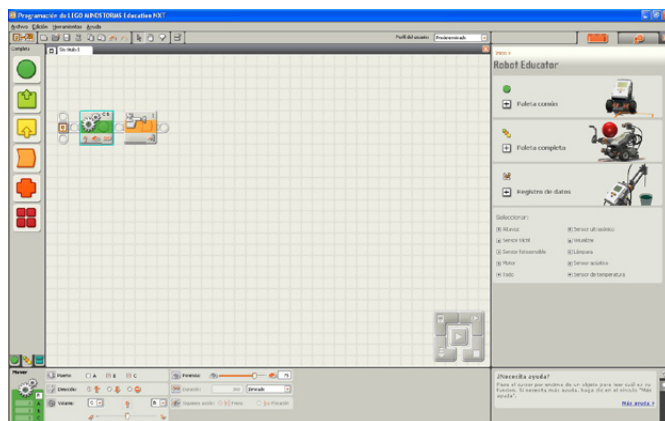
The next step

Whether because you have the feeling you have outgrown NXT-G or simply because you want to learn to use a more powerful tool you may find yourself wanting to choose a new programming environment. There is an ever larger selection of tools and choosing the right one may seem difficult, but it really isn't vey much. Unless you have strong professional or educational reasons, it is convenient to select just one and forget about the rest, at least for a time. Concentrating on a single language will allow you to reach a better level without getting sidetracked.

When choosing one or another, an important factor is the online community that can help you out when you get stuck, and another one the economical aspect. In this article I will not mention any commercial programming environments and concentrate on just two free tools: NXC and LeJOS.
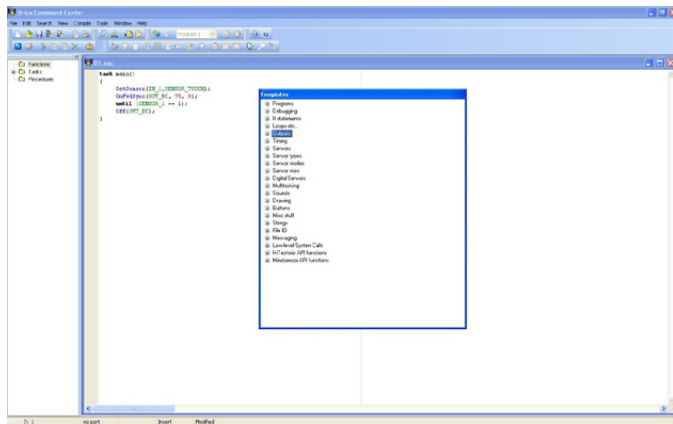
NXC is based on C and enjoys a large tradition among LEGO® MINDSTORMS fans. It has an editor that makes developing programs for the NXT easier: Bricx Command Centre [2]. There is good documentation and a large community around it, and several books have been published on the subject, including one by Daniele Benedettelli [3] and his surprising projects

As for LeJOS, I have to say I have never used it, even though Juan Breña Moral [4], who is a big fan of Java, has often tried to get me to. Learning LeJOS is learning Java and learning Java is learning to use a tool used in servers, mobile equipment… It's an interesting option, although in my case I have not yet tried it because I cannot do everything.

On the Lrobotikas forum [5] there are people who can help you in your decision to use one or the other.
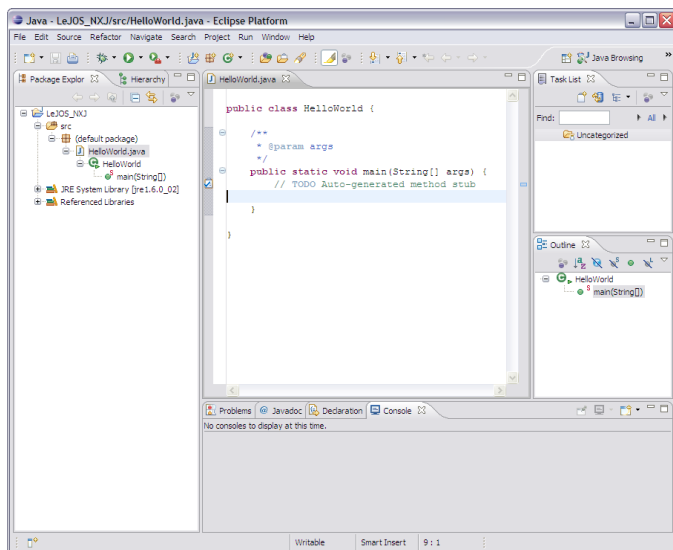

Advanced users

This group contains mostly engineering student, professionals and similar people who at some time have learned to program and in some cases in several different programming languages.

There is a wide range of option to choose from and the final decision depends on the objective and in many cases on the curriculum or the teaching needs.

From LabVIEW (with a free version for students that can be used with the NXT), to Microsoft Robotics Studio and Java, RobotC, Urbi, Matlab, etc. there is an ample range of possibilities that responds to virtually any need.
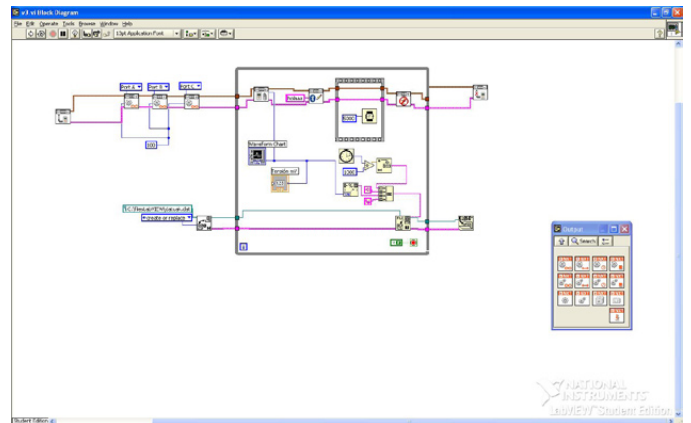
On the Lrobotikas wiki [6] you can find information and links for the different tools mentioned in this article.

[1] http://www.nxtprograms.com/
[2] http://bricxcc.sourceforge.net
[3] http://robotics.benedettelli.com/
[4] http://xurl.es/lejos
[5] http://foro.lrobotikas.net
[6] http://xurl.es/NXT
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LDraw Tutorial (IX)

Anatomy of an LDraw part.

Text and images by Jetro

We all know what our beloved bricks are made of (in case anyone isn't sure: ABS), but what are virtual bricks made of? The easy answer would be 'bytes', but in this article we'll learn a Little more about the internal structure of LDraw elements and how they are made.

One of the major strong points of the way James Jessiman designed what we now know as LDraw is that the system feeds itself. When LDraw was created computers had little power compared to what we are now used to and it was necessary to make the most of what was available to ensure everything would work well. Graphical applications require a lot of memory and processor power and it was therefore necessary to create a system that was both simple and efficient. At the same time, rendering a single brick may not require a lot of resources, but creations tend to get bigger, and the bigger, the more complicated to render.

In CAD (Computer Aided Design) the designer normally has to draw an object line by line. In MLCad we are presented with bricks and other LEGO® elements that have been completely predesigned, but which are originally also made up of just lines. LDraw does not include the possibility to draw circles or curves. For this reason a single stud is made up of a 16-agono that represents the top of the stud and 16 quadrilaterals (or quads) representing the side of the stud. If you look at a 2x4 brick (LDraw reference 3001) you will see it contains 8 of these studs. In order to simplify matters and since the stud is a recurring element, it has been converted into a 'primitive' or shape that can be recycled and serves as a basis for other elements. If you turn the brick over you will see three identical tubes. These are also available as primitives. In this way they only need to be drawn once after that you only need to indicate how many you need for each LEGO element and where they need to be placed. This simplifies the design process of new elements enormously. The concept of the recycled studs and cylinders can be further expanded. In addition to studs and tubes, a brick is made up of boxes, one to describe the outside shape and one for the inside shape. Combine studs, cylinders and boxes and all you need are four quads to bridge the gap between the boxes on the bottom side of the brick.

It sounds simple (and doesn't need to be much more complicated) , but evidently that's not all parts are quite that easy to convert to LDraw and the design process needs to follow some basic rules to ensure the final quality of the parts. To learn a little more about this process and what it involves I conducted a short interview with Alex Taylor, an experienced LDraw Parts Author:

- Can you describe the process of creating a new part?

It depends heavily on the part - sometimes it's possible to start out with an existing part and modify it, other times you have to start from scratch. For patterned parts, including stickers, the
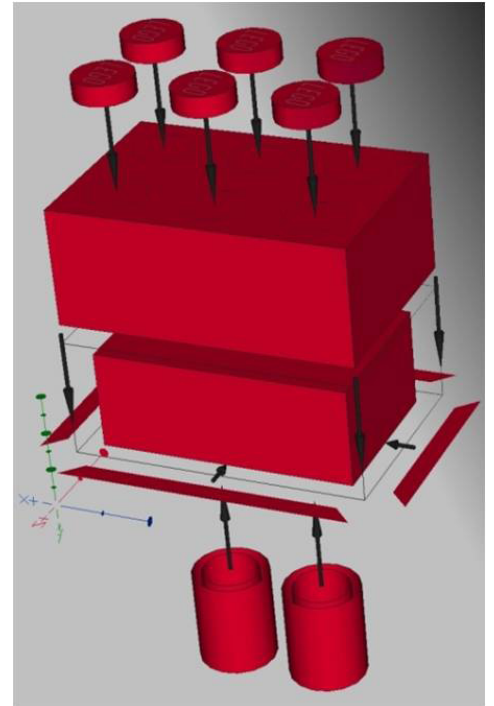
starting point for me is a high-resolution scan of the pattern which can then be 'drawn' over with LDraw elements. For a physical shape I usually start by adding common elements like the studs and then work from there.

In all cases it's important to get the dimensions as accurate as possible, within the limits of the LDraw system, since the part has to mate with others. Unfortunately, there's no definitive way

```
LDDesignPad for LDraw
File  Edit  Search  Tools  Window  Help

C:\3001.txt
 1  0 Brick  2 x  4
 2  0 Name: 3001.dat
 3  0 Author: James Jessiman
 4
 5  0 BFC INVERTNEXT
 6  1 16 0 24 0 36 0 0 0 -20 0 0 0 16 box5.dat
 7  1 16 0 24 0 40 0 0 0 -24 0 0 0 20 box5.dat
 8
 9  0 STUDS
10  1 16 30 0 10 1 0 0 0 1 0 0 0 1 stud.dat
11  1 16 10 0 10 1 0 0 0 1 0 0 0 1 stud.dat
12  1 16 -10 0 10 1 0 0 0 1 0 0 0 1 stud.dat
13  1 16 -30 0 10 1 0 0 0 1 0 0 0 1 stud.dat
14  1 16 30 0 -10 1 0 0 0 1 0 0 0 1 stud.dat
15  1 16 10 0 -10 1 0 0 0 1 0 0 0 1 stud.dat
16  1 16 -10 0 -10 1 0 0 0 1 0 0 0 1 stud.dat
17  1 16 -30 0 -10 1 0 0 0 1 0 0 0 1 stud.dat
18
19  0 TUBES
20  1 16 20 4 0 1 0 0 0 -5 0 0 0 1 stud4.dat
21  1 16 0 4 0 1 0 0 0 -5 0 0 0 1 stud4.dat
22  1 16 -20 4 0 1 0 0 0 -5 0 0 0 1 stud4.dat
23
24  0 QUADS
25  4 16 40 24 20 36 24 16 -36 24 16 -40 24 20
26  4 16 -40 24 20 -36 24 16 -36 24 -16 -40 24 -20
27  4 16 -40 24 -20 -36 24 -16 36 24 -16 40 24 -20
28  4 16 40 24 -20 36 24 -16 36 24 16 40 24 20

C:\4-4disc.txt
 1  0 Disc 1.0
 2  0 Name: 4-4disc.dat
 3  0 Author: James Jessiman
 4
 5  3 16 0 0 0 1 0 0 0.9239 0 0.3827
 6  3 16 0 0 0 0.9239 0 0.3827 0.7071 0 0.7071
 7  3 16 0 0 0 0.7071 0 0.7071 0.3827 0 0.9239
 8  3 16 0 0 0 0.3827 0 0.9239 0 0 1
 9  3 16 0 0 0 0 0 1 -0.3827 0 0.9239
10  3 16 0 0 0 -0.3827 0 0.9239 -0.7071 0 0.7071
11  3 16 0 0 0 -0.7071 0 0.7071 -0.9239 0 0.3827
12  3 16 0 0 0 -0.9239 0 0.3827 -1 0 -0
13  3 16 0 0 0 -1 0 -0 -0.9239 0 -0.3827
14  3 16 0 0 0 -0.9239 0 -0.3827 -0.7071 0 -0.7071
15  3 16 0 0 0 -0.7071 0 -0.7071 -0.3827 0 -0.9239
16  3 16 0 0 0 -0.3827 0 -0.9239 0 0 -1
17  3 16 0 0 0 0 0 -1 0.3827 0 -0.9239
18  3 16 0 0 0 0.3827 0 -0.9239 0.7071 0 -0.7071
19  3 16 0 0 0 0.7071 0 -0.7071 0.9239 0 -0.3827
20  3 16 0 0 0 0.9239 0 -0.3827 1 0 0
21  0

C:\stud.txt
 1  0 Stud
 2  0 Name: stud.dat
 3  0 Author: James Jessiman
 4
 5  1 16 0 0 0 6 0 0 0 1 0 0 0 6 4-4edge.dat
 6  1 16 0 -4 0 6 0 0 0 1 0 0 0 6 4-4edge.dat
 7  1 16 0 0 0 6 0 0 0 -4 0 0 0 6 4-4cyli.dat
 8  1 16 0 -4 0 6 0 0 0 1 0 0 0 6 4-4disc.dat
 9  0

1:1
```

to convert from real-world measurements to LDraw units - a good approximation is that one LDraw unit (LDU) is 1/64 of an inch - so compromises have to be made from time to time.

The next step is then to see what areas of the part can be represented using LDraw's library of 'primitives' - common shapes such as boxes, cylinders, cones, studs and so on[1] - and 'subparts' - sections of parts which are intended for reuse. Using these both saves time and keeps the filesize down!

With this done, any remaining areas need to be filled in, and this process can range from simply adding a couple of triangles to freehand 3D modelling.

Some examples:

Part 3001, the ubiquitous 2x4 brick, consists of two five-sided boxes (one for the outside, one for the inside), four quadrilaterals (to make up the base), eight studs and three stud-tubes. This part is almost entirely built from LDraw primitives, with only the quads needing to be drawn by hand.

47990, a skull brick, uses a small number of primitives (e.g. cylinders, the Technic pins), but the bulk of it was drawn by hand.

3069bpa4.dat, a 1x2 tile with a pattern, uses a subpart (3069s01, the 1x2 tile but without its top surface) and a pattern painstakingly drawn by hand from a 640dpi scan of the actual part.

There are a variety of tools available to assist parts authors, ranging from simply generating an array of triangles to cover a defined area all the way up to taking a 'pattern' and warping it to fit onto a non-flat surface. So far as I know, the only graphical editor currently available which supports parts authoring at all is MLCad (although due to bugs in the current

release (v3.3) it is necessary to use v3.2) but even with these tools there's still a fair bit of manual work involved! More recently it has become possible to perform 3D scans of actual LEGO® bricks - the Fabuland figures which have appeared recently had their heads created in this manner.

Finally, the LEGO Universe Team have begun releasing 3D data to us, so we have a number of parts which would have been otherwise extremely difficult to model. A good example of this is 2543, the Minifig Rag Hat.

- On average, how long does it take you to model a part?

Again, it depends on the part :-) Something like 3001 would take just a few minutes to complete, whereas 3069bpa4 took several hours to draw the pattern. On occasion I've knocked out half a dozen parts in a single evening; other times I've spent days working on a single piece.

- What is the most difficult part you have ever modeled and why?

Well...some of the patterned parts I've drawn were tedious to do, but I don't think I'd call them 'difficult' :-) I'd say probably x948 and x949, the blue-era railway points (or 'switches' if you're American) due to their complex shapes.

- What special techniques and programs did you use to model that part?

Sheer bloody hard work! As I recall, I started out by drawing the basic shapes - the straight rails and similar - and then spent some time calculating the radii of the curved rails. These were then divided up into segments to simulate a (reasonably) smooth curve, and a subpart was created which could then be replicated around as required. The whole process took a couple of weeks.

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- Why isn't a part immediately available after you model it?

Technically it's available as soon as it's uploaded to the LDraw Parts Tracker, but it doesn't become 'official' until it appears in a release of the LDraw Parts Library. Releases happen two or three times a year on average and the number of parts in a release varies depending on how much activity there's been since the last one.

Once a part goes on the Tracker, it needs to be reviewed by other authors before it can be released. The reviews are to check the part for accuracy (both to the original LEGO® part and to make sure there are no technical errors in the modeling), compliance with the LDraw library standards and to allow other people to make suggestions. A reviewer can either 'certify' or 'hold' the part; a part must have at least two 'certify' reviews an no 'holds' before it can move on to the next stage.

After being reviewer-certified, one of the Parts Tracker administrators must also certify the part. At this point the part is eligible to go into the next Parts Library release, provided that it does not make use of any subparts or primitives which have not yet been admin-certified. If the part passes all these hurdles, it will most likely be included in the next release, at which point it becomes 'official'.

So long as a part remains on the Tracker, it is considered 'unofficial'. Anyone may download and use these parts in their models, so long as it is understood that these parts are subject to change and that changes may result in your model no longer looking quite right :-)

'Official' parts may still be modified, but with some restrictions: the origin and orientation may not be altered (so as not to 'break' models which are using the part).

- What are the requirements for someone who'd like to become a part author?

None - anyone is welcome to jump in! You do need a login on www.ldraw.org, but once you've got that simply drop an email off to the admins via the LDraw website[2] to request authoring privileges on the site. You're now able to upload your creations to the Parts Tracker.

Parts authors don't automatically get 'reviewer' status - this is requested separately, and usually requires that you've done a bit of authoring first.

[1] http://www.ldraw.org/library/primref/
[2] http://www.ldraw.org/library/tracker/
#

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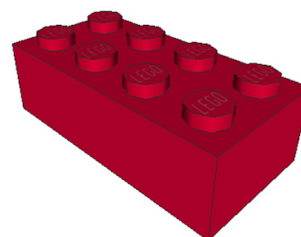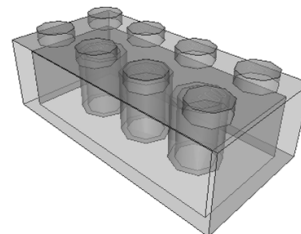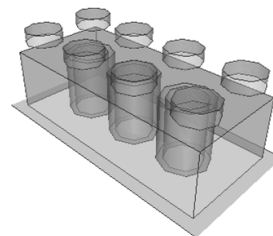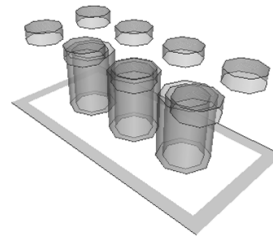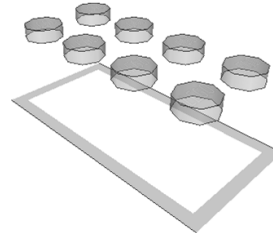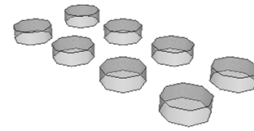
LDD 4 - The latest release of LEGO® Digital Designer

An interview with LDD Development Manager Claus Matthiesen

By Johan S. (a.k.a. Superkalle)

After trying it out the new LEGO® Digital Designer version 4.0, I had an opportunity to get together with LDD Development Team Manager Claus Matthiesen to talk about some of the new features and about the development of LDD in general.

**Johan** – Hi Claus, thanks for taking the time for this interview.

Claus – No problem, I'm glad to be of help

Johan - Let me start by say that testing the new LDD 4 has been a great experience. It's easy to tell that your team has been working hard to get all the new features in place.

Claus – Yes, we started planning for LDD 4 already in 2009, and have been programming and testing all spring and summer of 2010 to get all the features in place.

Johan - How many persons are you working with LDD development?

Claus - We are about 10-12 people in the 3D Studio department here in Billund (depending how you count) focusing on design and development. Then we have sub-contractors, mainly producing digital bricks, helping us with shaders and physics engine code. We also have testers in other parts of the world. It is a lot of people, but we work on many other things apart from LDD; we have, for instance, done a lot of work for LEGO Universe.
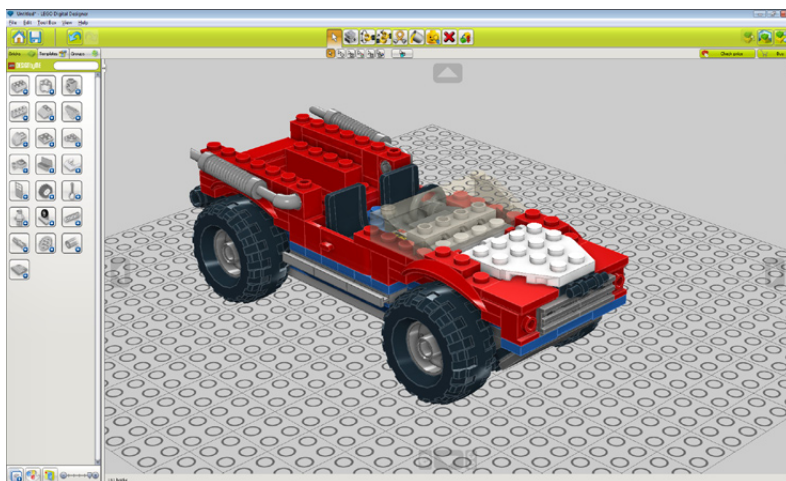
LDD 4.0 user interface

Brick outlines and shading

Johan - One of the major new features in LDD 4 has got to be the new brick edge outline. It certainly gives a whole new experience in using the software. Can you tell me something about the feature?

Claus – Well, one of the key criticisms in earlier version of LDD was that you couldn't see the brick outlines. This made it difficult to see the structure of your model, for example how and if bricks overlapped in a wall. And besides, without brick outlines, the models tended to look too clean and frankly a little uninteresting, with perfectly smooth surfaces. That's not how LEGO looks.

Johan - I notice that also the building guides now have outlines.

**Claus** – Yes, since we had the technology, we decided to add the same brick outlines to the building guide as well.

Johan - How is the brick outlines done technically? Did you need to re-model all bricks and add bevels on the edges?

Claus – No, adding bevels to all bricks would take too much time, and it would yield even more surfaces that have to be rendered in the software. Our goal is to make LDD run on computers that are not state-of-the-art, so we spend a lot of time trying to find algorithms to reduce the stress on the computers 3D system. The solution we ended up with is a novel approach where we basically use the mark-up we already have on the bricks for which edges should be outlined (we use that in our building instruction renderings that you see in the boxes you can buy in a shop). Using this information, we can use the shader on the graphics card to generate the precise effect we want when rendering the brick, so the look of the edges may change in future releases of LDD.

Johan – Speaking about shading, I noticed that you have added improved reflections on the bricks themselves. Looks really cool I must say.

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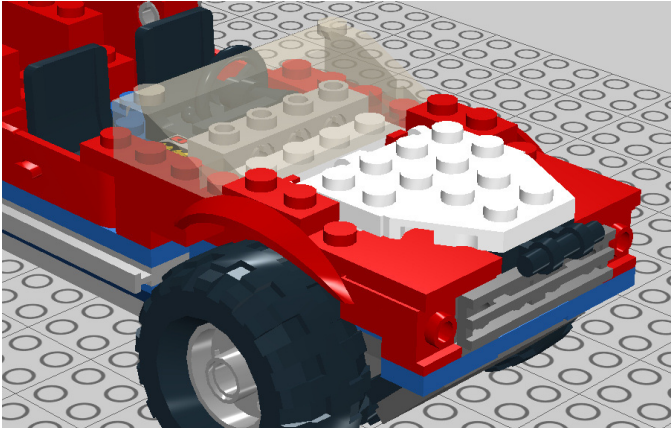
Without brick outlines and shading
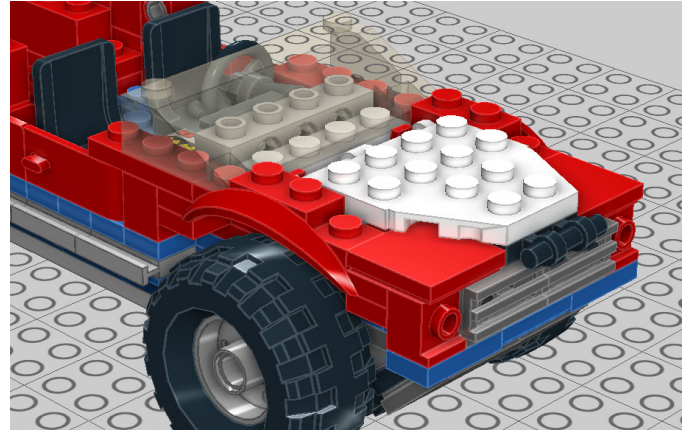
With brick outlines and improved shading turned on

Claus – Yes, and apart from looking cool, it also helps the builder understand the spatial relationship between the bricks when he or she is building. This way, neighbouring bricks will cast subtle shadows on each other, which helps the eye decode where they are in relation to each other. It is based on a technique called SSDO, Screen-Space Directional Occlusion.

Johan – Another thing I noticed regarding brick appearance in LDD is colours – they seem much more saturated compared to LDD 3.

Claus – Yes, already now we can see that this has prompted some discussion. The "old" colours didn't match the actual brick colours very well and were mainly chosen because the simple rendering style needed bright colours in order to make the various parts of your model stand out more. We have wanted to align the colours more with the "real" LEGO® colours for a while, but this is actually a very tricky subject – for instance, just the way your monitor is set up at home affects the colours a lot, and that is impossible for us to control. However, the "new" colours are closer to the real LEGO brick colours and align better with the new rendering pipeline in LDD. You may see the colours change again in future releases, but that will be because we show the colours differently in the rendering pipeline, not because the brick colours themselves are changed

Flexing the elements

Johan – Another interesting feature is the Flex tool.

Claus – The Flex tool allows you to take an element, like a tube or a string, and flex it so that it looks like it would on a real model. We tried to make it easy and intuitive to use since many of our users are younger.

Johan – I notice only a few elements can be flex at the moment, like one flex tube, a string and a chain. Will you add flexibility to more items in the future?

Claus – We started with the DbM elements, because DbM is our main "customer" for LDD, but basically we're going to make any element that's in LDD and bendable in real life flexible. We're looking into how quickly we can do this.

Johan - Being able to bend strings and chains in LDD has been wanted by users for a long time. Do you listen to the LDD fans much when you plan new features?

Claus – We sure do. But the fans are actually only a part of the LDD user base, which also includes quite a lot of children, many of whom are using DesignByME. We have actually started with the tasks that would benefit the most of our entire user base, mainly to make LDD more accessible and better integrated with DesignByME. This has been a success, and we are now generally turning more towards the issues that have been a major concern for the fan base. We have ambitious plans for LDD 5 and 6, and though I cannot say anything specific about them now, they do incorporate many more issues the fans have brought up than earlier

Even more bricks

Johan – In LDD4 you have added even more bricks. In LDD 3 I think there were about 1750 bricks, and now we're up to over 2000. Is this an ongoing trend that you're adding more bricks?
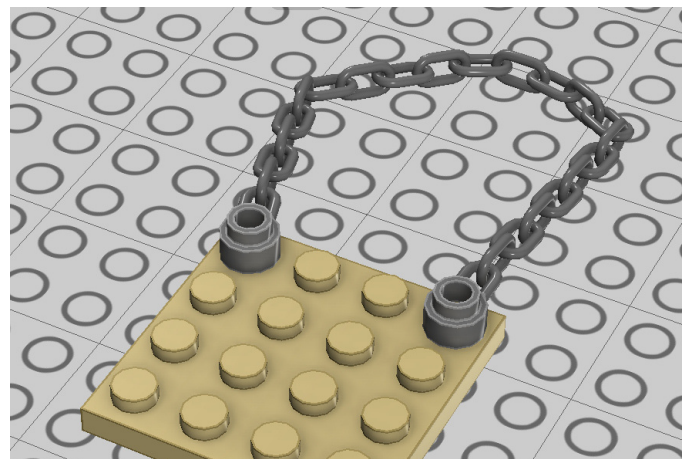
Flex Tool allows you to bend chains and strings

Claus – Yes. There is a small subset of bricks we can't release digitally for various reasons, but aside from them, we will continue to add bricks gradually over the coming releases until we have most of the bricks currently used by LEGO® in LDD

Johan – So that means if the brick wanted by fans are not in LDD 4, then they could be added later on?

Claus – Yes, releasing new bricks is much easier than releasing a new LDD version, so they may very well be added later on in an update. But I can't say anything about which bricks will be added and when.

Johan – Sometimes the users finds problems with a few bricks, mostly in LEGO Universe mode. How focused are you on fixing these?

Claus – This is exactly the reason why the "Universe mode" in LDD isn't actually public and for the time being unsupported by us. Brick production takes time just as adding flex to bendable bricks takes time, and we have not yet sufficiently developed and quality assured everything in LDD's Universe mode to support it to the same level we support the rest of the application. Having said that, we are very happy that people find the mode useful, despite is beta-like status, and making it releasable is an ongoing process.

Part#: 3031 Name: PLATE 4X4 Color: 5 - Brick Yellow

Selecting a brick will display part information

Johan – Many fans are asking also for older bricks, bricks that may not be used in any of the current sets. Will you add these to in the future?
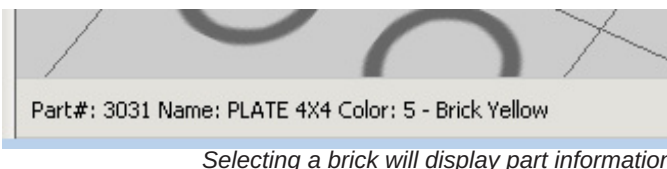
Claus – Well, we're focusing on bricks that are in production right now, but LEGO Universe has needed a number of old bricks which have then been made. If we have good reason we may add other vintage elements, but they are not the first priority as such.

Johan – Finally, before we leave this topic about bricks, what are your plans about adding more decorations to the various bricks? For example there are Castle fans that would love some castle graphics on minifigs, horses and shields.

Claus – The main focus now is to continue adding bricks, but decorations are on the agenda for the next releases of LDD.

Finding the bricks

Johan – You've added quite a few features regarding brick management that I know many fans will be thrilled about.

Claus – Yes, we realized that for more advanced users it was kind of difficult to know basic stuff, like brick count, so we added a few goodies. The first thing we did was add a new status bar at the bottom of the screen. You can now click on a brick in your model and immediately see part number, part name and colour. Also the status bar will give you the count of bricks, both of the entire model, and of the selected bricks. We also added a filter function so you easily find the bricks you're looking for. Just type in the LEGO Part ID or brick name, and it will filter out all matching bricks.

Johan – Well, after trying these features I must say they are somewhat of a blessing. Still, many fans use the BrickLink or Peeron part names and numbers. Is there support for those in LDD4?

Claus – No, unfortunately not.

Enhanced tools

Johan – You've added quite a few other tools too that seems to be aimed at more advanced users, for example the possibility to enter an angle in the Hinge tool.

Claus – The free degree rotation in Hinge Tool we understood was requested by many users, so we decided to add that.

Johan – And I noticed it accepts both comma and period as delimiter. That's a nice touch ☺

Claus – Thanks! Another new feature I can mention is the extended Colour palette, which now includes not only the currently used colours, but also all old LEGO colours.

Johan – I also noticed that old and new colours are mixed. Isn't there a potential risk that the user will mix these up, and for example by accident use old grey, when they wanted the new grey? And when they want to order the bricks it won't be possible since that brick won't exist in that colour.

Claus – We have made many changes to the interface in this release. We need to see now how they play out when the applications is subjected to actual users in the real world. We have received a few comments on the colour palette and it's possible we can improve it for the next release.

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Wanted features

Johan – I also noticed the new Invert selection feature

Claus – We added that quite late actually since it was so easy to do. I understand users are also asking for more advanced selection features. We are aware of the requests, and we'll see what we can do for the future.

Johan – Are there any other fan features you know of?

Claus – I understand better generated building instructions are something many are asking for. Regarding this I can say that we are well aware about the limitations of today's guide, and we're working on getting it better

Johan – Some LDD users have suggest using groups in the model to act as a guide for the Building Guide generator.

It's now possible to enter any angle in the Hinge Tool

Claus – Yes, that is one of the things we are considering. Speaking of groups, other things we know fans are asking for is better grouping, so that you can click on a brick in a model and see which group it belongs to.

Johan – And, wrapping up the feature section, there are a lot of Technic users out there too. What can you say to them?

Claus – One of the limitations we have today is the physics simulation capabilities of LDD – it doesn't allow us to make technical simulations, rotation of axles and cogs etc. Therefore we haven't focused on fine tuning the Technic elements in LDD. I can tell you that this is something we're looking into.

The future

Johan - What can you tell us in general about the future for LDD? So far it has been a tool aimed at supporting the DesignByMe business concept.

Claus – What has happened is that the fundamental functionality of LDD – how to build with bricks, how they connect, etc. – has been separated out into an independent component we call BrickKit. Quite a lot of new projects that are being developed not just by us but also by other departments with BrickKit as a component, and by default, when they request a new feature for BrickKit it also goes into LDD. So in the future you will probably see LDD's feature set broaden while

Extended color palette

the various modes will be more focused – Mindstorms mode even more integrated into Mindstorms, DesignByMe even more integrated into the DesignByMe experience and so on.
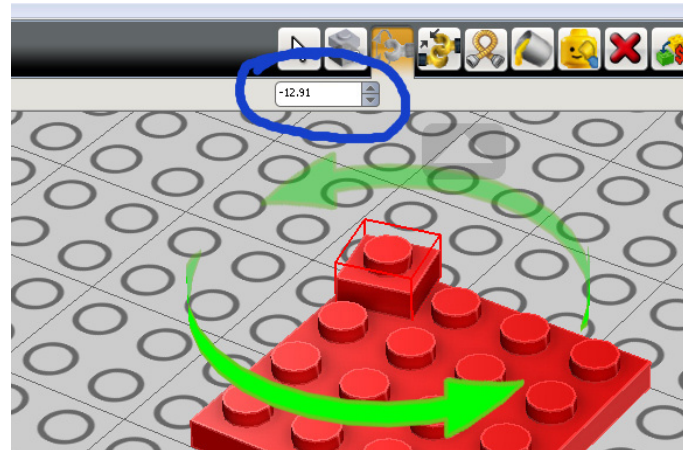
Johan - LEGO Universe has a building experience that is fairly similar to LDD with bricks that snap into position. I know many are wondering if there will there be an import/export from LDD to Universe and vice versa.

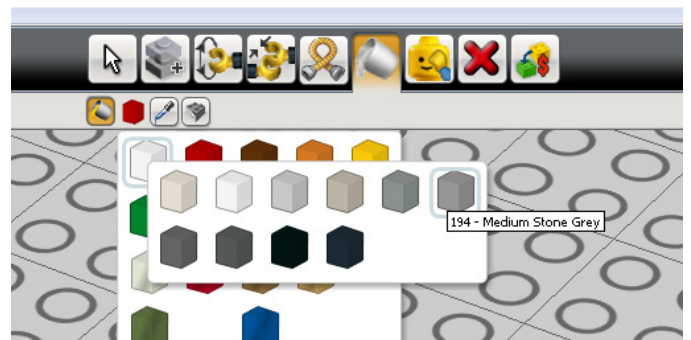**Claus** – It isn't planned, but under consideration

Johan – OK, thanks Claus once again for taking the time.

Claus – You're welcome. It was nice talking to you.
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Todo sobre el modo LU y LDD:

http://www.eurobricks.com/forum/index.php?showtopic=40794

Si tienes más dudas el foro de Eurobricks sobre LDD:

http://www.eurobricks.com/forum/index.php?showforum=128

SR 3D Builder

A LEGO® CAD tool specific for Technic models

By Sergio

Many of you at least once may have search for a CAD allowing you building virtual LEGO® models with the PC.

The most common entry point for many of you will probably be LEGO Digital Designer for its intuitive interface. Many others, due to LDD parts limitation may prefer MLCad that, even if with an old interface and graphics, it is still the preferred AFOL software. But in the last 2 years another innovative application is arising: SR 3D Builder. It mixes the fully 3D environment of LDD with the part richness of MLCad offering a com-fortable development ambient especially for SNOT and technic builders.

It will be hard to graphically describe something that it is basically 'ani-mation', but I will try. First of all, …

A short history

This is the 3rd version of the application, but is the 1st made public. It was in mid 2007 release (ver 0.1.0.15) was published on a website and soon many positive feedbacks, hints and encouragements arrived from users. In version 0.2.0.0 was added the first very basic support for hinges movements and in 0.2.2.0 the first two gears keeps working together!!

But it was in march 2009 when I published first application videos on you-tube that my application downloads exploited. From an average of 20 daily access jumped to over 60 and continue grown.

In these three years many improvements have been made to the appli-cation making it one of the most advanced in its genre.

The user interface

The user interface is not so intuitive like LDD one, but after a pair of hour you will fill comfortable with it; on the other side, what it offers in func-tionality is incomparable. Anyway it is highly recommended to have a look to the manual. The image quality is good enough and the render speed is incredibly fluid even with some thousand parts models.

In the application you can find many tools helping you in model crea-tion. Starting from 'Searching the part you want to add', you can search it by type, by name or using a part type Quick Search Pane showing the most common selection. There are four way for selecting parts: one by one, connected

parts, grouped parts or by color. You can make your se-lection transparent allowing you select hidden parts.

There is a powerful mirror tool that helps you in building symmetric models: you build a side and the other is automatically built by the appli-cation that also takes care of choosing non symmetric parts. Moreover, when a part is common to both side of your model go beyond the mirror plane (like a roof top for example), the mirrored part automatically dis-appears allowing you a really quick building. Must try this!
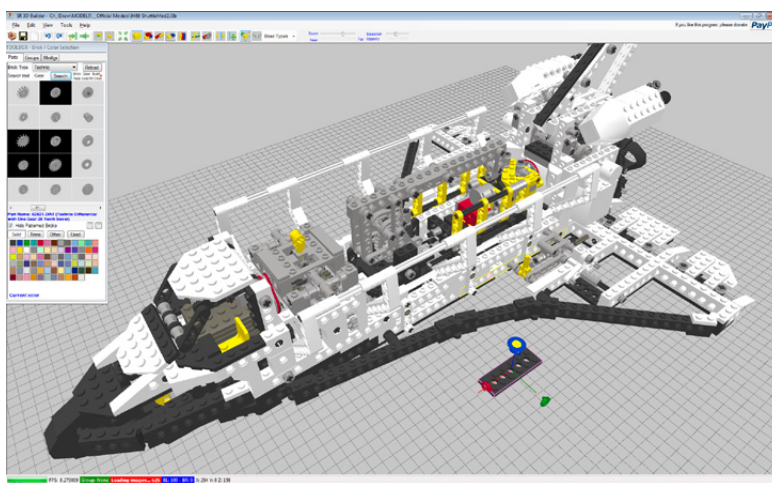
SR 3D Builder performs REAL connections between parts, so your model will be consistent like a real one. A powerful AutoOrient feature allows parts to orient and snap to correct position when an available connection is in the neighbor. So when you try to place an axle in a technic brick, it will automatically rotate in the way it can fit. The same happens with gears, pins, wheels, hinges, everything!

All the parts in the images result perfectly connected and assisted by the auto orient feature.

A latest addiction to the application allows realtime creation of flexible parts like hoses, tube and similar. Notice that this kind of functionality is usually offered only by some commercial (and really expensive) soft-ware!

The Tire Manager tool allows easily association between tires and wheels. A tool is available for aligning connection like the LDD Align tool, but with this you can choose the axles to rotate
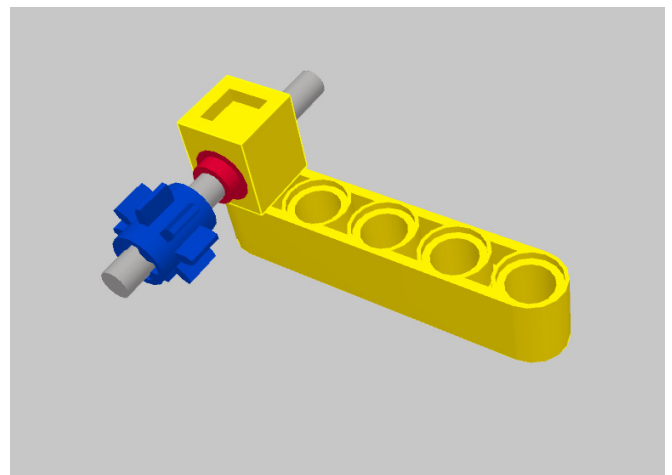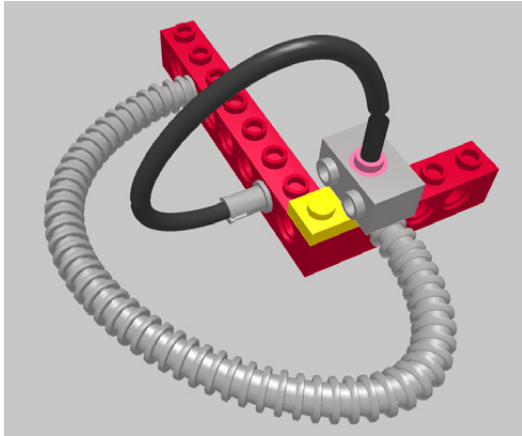
parts around. The Belt Generator can be used to connect pulley or pegs or bushes. There are also tools for taking model images, creating and modifying visual instruc-tions for your model as well as creating the parts inventory used in your creations.

A dynamic grid assist part placement giving the user the full control of where the part will be placed. Using the grid you can change the refer-ence system of your model: if you need to work on a sloped plane, you can set the grid to reference to that plane so you will work like if you where in a horizontal plane!

Model analysis capabilities

As mentioned before, SR 3D Builder can detect commonly used connec-tions type (Mid stud connections, a back stud connection between 4 stud, and many 'special' connection like mid technic stud with antennas, studs in beams etc., are also detected and supported) and take care of them.

Hinges are natively supported so nearly any connection and movements of real LEGO® parts can be reproduced: a door can open, a wheel can ro-tate, any hinges can rotate!

But is with technic models that the application gives its best! SR 3D Builder is capable to detect not only connections, but also avail-able rotation axles, gear connection, gear to rack
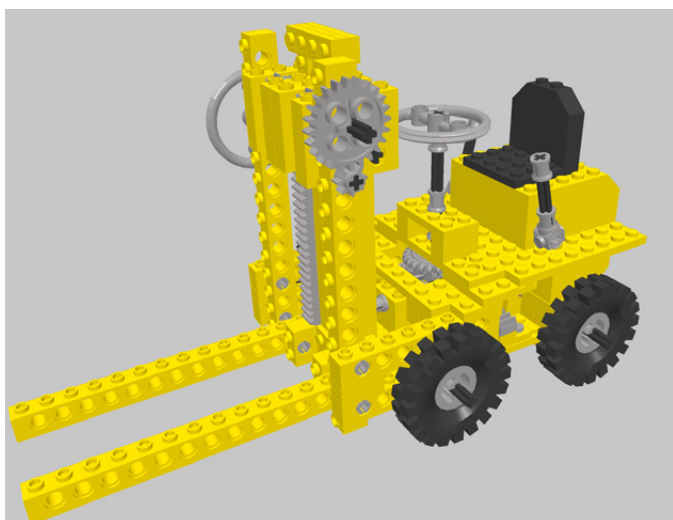
connection, universal joint, differential, kinematic, inverse kinematic and combining the effect of all those elements. The result of this is that when you rotate an axle or pull a handle, its effect is to move the model like if it was real. No needed to define parts interaction (like you need in Solidworks or other similar program), rotation axis, speeds or what else. Just build your model, switch to Animation Mode and … it will move!! And it does it in real time!! And no need to wait for processing time: SR3D can animate the LEGO official model 8840-Shuttle in the previous page image at over 30fps on nowadays entry level graphic card.

While in animation mode, you can make static parts transparent in order to display only moving parts explaining how the mechanism works.

Compatibility

SR 3D Builder uses the same MLCad parts library and also file formats are basically the same with the exception of some special features not supported by MLCad. This way part availability is subjected to lDraw (www.lDraw.org) parts releasing. Actually the part library reports near 5000 LEGO parts.
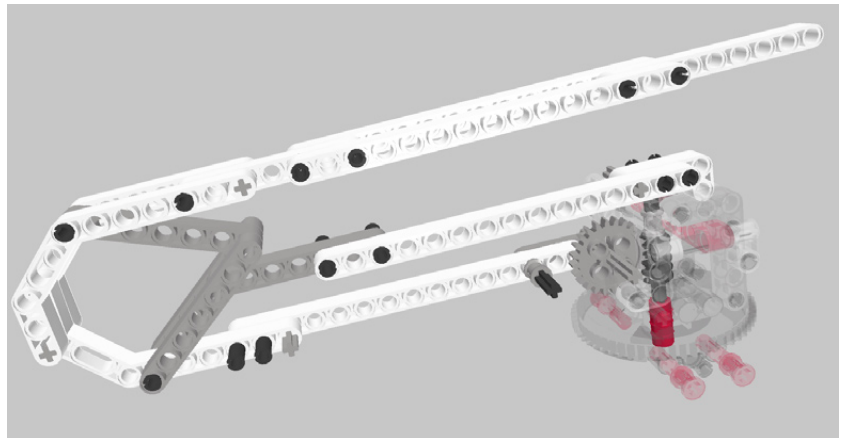
Support and Availability

First of all is important to remember that the application is still in development (as specified on official web site) so some errors may occur while playing with it. On the other side you can expect continuously new functionality and better stability Main support for problems is given from program author via email. The user manual is available in English, Holland and German, while the ap-plication itself is available in English only (no translations are planned at the moment). Over the web you can find many forums discussing about the application and an official forum is currently being activated. Also, some videos and video-lessons can be found over you tube.
The application is still in development but is substantially stable; anyway is a good practice to save your model often. The part library is updated at any new application release. It is distributed for FREE on its actually official site:

http://staff.polito.it/sergio.reano

Enjoy building!!
#

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Skaerbaek 2010

Fanweekend in the land of the brick

By Otum
Images by lluis

On September 24, 25 and 26 the Legofan Weekend was celebrated in Skaerbaek, Denmark. As the name indicates, it is a weekend full of bricks, organised by the Danish AFOL friends as well as by LEGO® itself. Additionally, this edition was also listed as the first EuroLug event.

Four HispaLUG members had the opportunity to visit the event in this edition: Satanspoet, Rick83, our Ambassador Lluis and I, Otum. Enough introduction lets get to the part you are all waiting for…

The fist thing that causes a big impression is the location of the event: a bungalow park – like the ones where families like to pass their holidays, virtually taken over by the event, with the fans sleeping in bungalows for up to six people, which are located near the pavilions of the exhibition (you read that well: pavilions!!). We were fortunate to be in one of the nearest bungalows. In addition to the pavilions for the exhibition, there were a number of rooms for meals, strictly for those attending the event, an acclimatized swimming pool with slide and even a bowling alley. As you can see, it was the perfect place for a great weekend even if you get tired of bricks (¿did I say that?).

Most of the participants of the event arrive around noon on

Friday and the afternoon is spent building up – it's a coming and going of tables and lots of saying hello. As a personal note, I'd like to add that it was very enriching to meet members of other LUGs and talk with them as if we had known each other for years, for the simple fact of sharing the same hobby.

During the build-up there is time to walk around the entire exhibition and learn about building-up techniques, or even guess what is being built up. I will never forget our surprise at seeing a pine tree in milky white. At about 5 in the afternoon everybody stops whatever it is they are doing and goes to the area prepared by LEGO®. A number of boxes have turned up… About 20 boxes are placed on the floor and everybody tries to get a glimpse of what may be inside until suddenly, Hands up!! Five seconds later everybody was on the floor, pushing and shoving like during sales, trying to get as many parts as possible. I believe Rick managed to fill three bags and the rest of us got our fair share too. We may be well behaved, but not stupid, the truth be said.

Before the day is over, there is time to have a look at some bricklink shops that are present at the event, and find some rare parts and even vintage sets in good conditions. But everything stopped again when we caught sight of a

suspended bridge that was being built in the middle of one of the dioramas.

After dinner we wanted to go straight to bed – we had been up for over 40 hours – but our neighbours in the next door bungalow built a "small" party which inspired us to stay up for a little longer and share our first impressions and show off the parts we had gathered.

On Saturday morning you can already feel the ambience during breakfast and before the official opening of the event to the general public, the attendants have a couple of hours to continue enjoying the dioramas quietly. What really stands out is that about 95% of all dioramas are City, with the exception of a scene from "The attack of the clones", and a very funny medieval diorama.

The official opening of the event was done by one of LEGO®s bigwigs. Unfortunately this time Kjeld Kirk Kristiansen could not make it. After the opening speech it was time to enjoy. I will start with pavilion 1, where the official LEGO® stand was
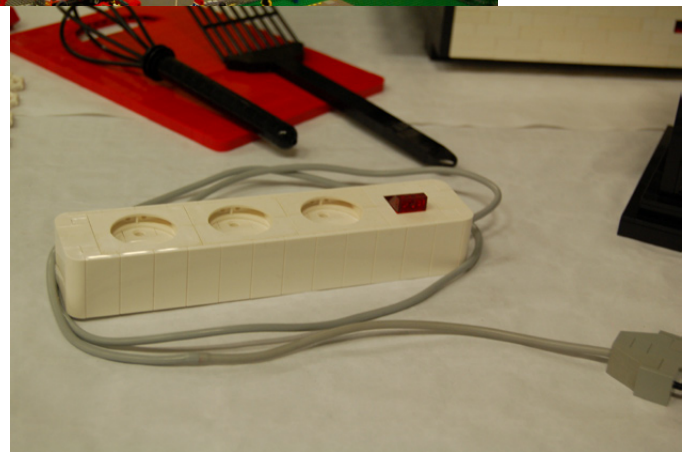
located, a small scale model of the Legoland park and of a milk factory of local fame, followed by the Star Wars™ display I mentioned earlier. This was followed by a small sample of MOCs from our Brazilian friends (yes, Brazil was represented also!!) which depicted a minifig scale car cinema including a

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real film. After that a train diorama with a spectacular statue and tramways.

Right next to the LEGO® shop there was an Octan truck at three times the size of the set, as well as a collection of household tools that could almost have been made by the Arvo brothers – we even thought the extension lead was real and someone had left it on the table by mistake. There were also a number of maxifigs of City characters, some of which were motorized, and a Vader. At their feet there was another collection of trains and tramways together with some scale reproductions of cars.

A large MOC represented a bowling alley with lots of activity, then a house on a cliff top. After that one of the, in my opinion, most spectacular dioramas: "the parade". It consisted of a street of modular houses and between the houses a parade in the street. The number of minifigs that were used for it was quite incredible. And now we get to what HispaLUG contributed to the exhibition. We were located right next to our Norwegian colleagues, who brought some modular houses. We displayed the abducting UFO in a corn field together with the characteristic Osborne bull and the "castellers" by Lluis, as well as number 8 of Hispabrick Magazine, with the interview of Kjeld Kirk Kristiansen. On the other side was the EuroLug table where vignettes for the EuroLug contest were displayed.

Opposite HispaLUG there was one of the big displays of the event: a mosaic of Europe full of miniature representations of typical and famous places, like Big Ben in London, the Brandenburg gate in Berlin or the Kio towers in Madrid (by Carlos Mendez, car-mp, one of our own). Next to that there was a small diorama set in Arabia, where parts from the Prince of Persia sets were very well used. Finally there were was a rural diorama, full of trees, with a race and a cyclist who had suffered an accident. The last diorama was in the City theme again, and represented a city with buildings under construction and a mountain/island.

And that was only the first pavilion! In the second there were large tables, containing about 15,000 (again, no mistake, 15,000!!) red 2x4 bricks so visiting children could participate in contest to show what they were able to build in a given time with only those bricks. To be completely honest some of us would feel ashamed to show their MOCs after seeing what those Danish children were capable of building!!

After accepting our defeat as expert LEGO® builders, we had a look at the diorama that represented an amusement park and a zoo. There was movement and lights. Words can hardly describe how marvellous it was. To relax the eyes there was an

incredibly funny medieval diorama full of gags right after that, followed by a city in Legoland scale, showing a collection of MOCs of cars from the films: Ecto I, Herbie, a Delorean, to just mention a few. Finally, the display that included the hanging bridge. This was a train display with 9V trains controlled by MINDSTORMS®, with a small pirate scene on the coast. Next to a house that looked like it was haunted. I almost forget the last diorama, small, but full of details, completely snowed under and reproducing a scene from the Chronicles of Narnia.

On Saturday night there were more surprises: the attendants received a free minifig from the 2nd collectible series, which was waiting on their plate at dinner time. During dinner there were several games and afterwards an auction (or should I say battle xD). Bidding was very aggressive which was hardly surprising taking into account what was being auctioned: an autographed Tower Bridge, three special edition airplanes from different airline companies or a Plexiglass box, limited edition (100 units) that contained a Han Solo minifig on one side and a Indiana Jones minifig on the other.

The night ended with a party for all participants in one of the bungalows, including (of course) Danish biscuits.

Unfortunately for us, the next morning we had to leave for the airport after breakfast, but we received a great example of Danish hospitality: a six hour delay at the airport in Copenhagen. J

To finish off I'd like to say we had a great time and learned a lot. That is what you get when you visit events. Two things stand out especially: the way the brick unites the community, no matter where you come from and the squirrels, the real stars of Skaerbaek.
#

Storage System with LEGO® bricks by Plast-Team

By Hispabrick Magazine

Plast-Team, a company located in Denmark, has launched a new line of storage products shaped like LEGO® bricks. Storing our LEGO bricks is one of the most important concerns of AFOLs. This product will solve two problems at the same time.

The first one: storage. The bricks don't only look like LEGO bricks, but they have been designed to fit just like conventional bricks. In this way, the storage system allows you to safely stack the bricks in columns because, although the bricks don't fit as tightly as conventional LEGO bricks (the fit is looser) it is sufficient to be able to build a tower of blocks that will not come down easily.

The second: ¡IT'S LEGO! Yes, as fans of the LEGO brand we like everything that's related to the brick. As a consequence, these boxes are the perfect excuse to convert our homes into a LEGO paradise with the excuse that we need to store our bricks in an organized way and so mothers, wives, husbands etc. won't have any arguments to refuse them.

In this first stage, 4 types of bricks have been launched in 12 different colours:

- A 1x1 Brick
- A 1x2 Brick
- A 2x2 Brick
- A 2x4 Brick

The outside dimensions of the 1x1 brick are 12.5x12.5x15cm (not counting the stud, which corresponds to the proportions of the LEGO brick (5x5x6). The stud, in the lid of the box, carries the LEGO name in relief. The inside of the box, the storage area, is slightly smaller as Plast-Team has decided to reinforce the structure, sacrificing some of the storage capacity. This reinforcement is done with ribs that run along the outside of the container. Another characteristic that slightly reduces the capacity is the fact that the base of the container has been somewhat elevated to allow the stud of any piece we place below it to fit. The effective storage capacity of the 1x1 brick is 10.5x10.5x11.5cm which is an effective use of 54%. In larger bricks this percentage is considerably higher. In the 2x4 brick for example it is 67%.

Man must live, not on bricks alone, and Plast-Team has kept this in mind and launched minifig heads, also for storage. This piece comes in two sizes: S, which is compatible in scale with the bricks and fits on the studs, and XL. This "bighead" make you doubt whether to use it for storage or to decorate your dining room (in my case I have chosen the second option). The effective space is considerably larger in this piece as it doesn't have the reinforcement ribs of the bricks. On the other hand if you apply some pressure you can notice the walls of the head flexing. In any case, the closed head is quite robust and does not feel fragile at all.

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In addition these bricks allow you to make gigantic constructions. There are some limitations like the grip between the pieces which does not allow for 'hanging' bricks in the design. But with a bit of imagination we'll end up with a storage system that doubles as a MOC to show off to our friends.

It looks like there may be more types of pieces available in the future. One of the pieces I believe Plast-Team should launch in the future, and that will be a hit with both children and AFOLs is a box that can contain 32x32 baseplates. The 2x2 brick has an outside size of 25x25 (23x23 inside). I would need to be about 2.5cm bigger to house a baseplate. I don't know if they didn't think about this possibility but I believe it should be on the agenda for future models.

To sum up, this new storage system will help us to keep our parts well organized and at the same time create huge constructions. ¿Will they kick us out of the house in the end? Maybe…

Thanks to: Plast-Team and Luis Félix García for providing samples to write this article.
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Review 4842: Harry Potter Hogwart´s Castle

Harry Potter presentation

Text by lluisgib

Pictures by lluisgib and LEGO® Systems A/S

Set: Hogwart's Castle
Set Number: 4842
Parts: 1290
Minifigures: 10
Recommended price in Spain: € 129.95

Presentation of the line.

Coinciding with the launch of the first part of the film corresponding to the seventh Harry Potter book, called The Deathly Hallows, a new batch of Harry Potter´s sets has been released in the autumn of 2010.

Six sets have been released (plus a seventh announced as an exclusive of Shop@Home next January 2011) that will give one more turn of the screw in this license. There are 5 sets that are reissues of earlier sets, and a new one (4840 - The Burrow). In this case, we will take a look briefly at the fourth edition of Hogwart's Castle.

I dare say this is the most elaborate edition of the castle, at least at first sight. It has been reproduced the exterior of the castle in considerable detail, and have added modularity, as it consists of 4 modules that fit through small buildings with hinges and Brick Modified 1 x 2 with 2 Pins. The interiors have enough elements to allow the set looks very complete.

Four environments are represented, the most notable in their details are the dining room and Harry Potter´s room. All have many small decorations which makes me think that this is a rather elaborate reproduction. The set comes with 10 minifigures (there is a medieval statue, which for some reason doesn´t count as minifigure ...). Many of them are what one expects to find in a Harry Potter set, like Harry himself, Lord Voldemort, Professor Dumbledore, Professor Snape, Professor McGonagall, Professor Flitwick, Argus Filch and his cat. I stop at the cat because, for the first time you can find a yellow cat with a decorated face in a LEGO® set (previously there have only been black or white cats). Also, there are three owls of different colors, with decorated face and feathers, and you can also find some tiles decorated specifically for this serie. In contrast, although this is a licensed set, we did not get rid of the stickers to decorate the exterior walls and interior elements. There are many accessories such as books, food and many kinds of animals (other than those mentioned). Maybe I skipped the top of the dining room windows. They are made with 1 x 2 x 2 Flat Front windows, but without glass. In contrast, with some trans colors 1x1 bricks, they have made two very curious windows.

The 1290 pieces will not disappoint anyone. Neither the hardcore fans who will obtain a revised and improved version of the castle, nor new arrivals (myself included) who will learn a little about this saga enjoyed by millions of children (and adults) throughout the world.

Acknowledgements: to LEGO Iberia for making this set available.
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Review 10216: Winter Village Bakery

Preparing for Christmas

Text by lluisgib

Pictures by lluisgib and LEGO® Systems A/S

Set: WINTER VILLAGE BAKERY
Set Number: 10216
Parts: 687
Contains: 7 Minifigs, pastry, tree store, ice rink, light brick.
Recommended price in Spain: € 54.99

It looks like the LEGO® boys want us to get used to regular purchases. They began years ago with modular buildings and the result appears to be satisfactory, since this year has the fifth building has been launched. Based (I assume) on this precedent, last year they surprised us with a fascinating set, Winter Toy Shop. A Christmas store / toy shop, with a wonderful Christmas tree and a few accessories. When I first saw this set and later when I had it in my hands, I thought it would not be the only one, because from that set you could build a nice winter diorama. I have had to wait a year to see if I was wrong and (thankfully) I wasn't.

Construction

The set has 4 parts. We will go from the easiest to the most elaborate.

The tree store is a simple construction of a few dozen parts. It reminds me of the typical stands of the Christmas markets of Central Europe. The reproduction of the sheet in two colors

is the touch of color that makes it stand out in the set. The 2x4 tile with a sticker to indicate the price of trees is a curious detail and it's funny that there are prices for two sizes, when the representation of the set only shows just a tree of one size near the store.

The carriage for transporting the trees is the romantic touch of the set. It's nice to see how they thought about this detail, instead of a delivery van, which is what we would see nowadays. The construction is not very complicated. In the carriage there is only room for one tree and the lumberjack, and it has a festive crown decorating the back. It also has a Plate 1 x 1 with Clip for the axe with which the lumberjack cuts trees. A warmly clothed child gives the horse an apple to eat.

And so we come to one of the strong parts of the set. The ice rink is a beautiful recreation of a small frozen lake. The construction starts with two 8 x 8 trans-clear blue plates, surrounded by white plates. The latter serve as a representation of the snow surrounding the lake, while allowing the entire lake to remain as one piece. To give the final touch to "the feeling of snow", some white 1 x 1 round plates represent snowballs. There are two skaters and a half! The two skaters (a man and a woman) are on the lake skating and taking photos, "without noticing" a third skater who fell head first into a mound of snow. It's not really a minifig, it´s only the legs with the skates, embedded in the mound of snow. It's a funny twist

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that designers wanted to add. The question that arises is if I must consider it a minifig of the set or not...

The lake is decorated with a bench, and two poles from which Christmas lights hang, which gives the set a festive touch. Finally, on top of one of the poles there is an owl watching the whole scene.

And we come to "the jewel in the crown." The floor of the bakery is a mosaic of Medium Stone Gray, Medium Blue and Brick Yellow. The mosaic design is tailored to what will later be placed over it (the counter, the window ....). The building is made of Dark Light Red with hints of Light Nougat. The front door is medieval house style. This door leads to the counter, where the cash register is, and at the back, a showcase where you find some boxes of cakes. On the left is a basket with loaves of bread that have come out of the oven that is located right behind. Further to the left, there is a window showing the different types of candy the shop has to offer, muffins, croissants, meringues ... The showcase becomes important when the window receives light from light brick that accompanies the set. This is placed on top of the window, when building the roof of the bakery. Its amber light is very nice and has enough intesity to be able to be seen under any room ambient light.

The roof is made of two parts. Each part is made with a square of white plates (snow effect) with a hole in the middle, where two small windows are placed, and are topped with small ledges. Behind one of the windows there is a small loft that serves as a pastry store with a brown storage box. Behind the other window the light brick that illuminates the window is mounted. Above the windows there are two white awnings with a mound of snow on top of each one. Just below the canopies, there are decorative Christmas lights, the same as those of the frozen lake. And right in the middle of the building, we can find the chimney for the oven of the bakery.

On both sides, there are windows behind Nougat Light arches, just like the front window. Above each of the arches there's a bit of mistletoe. A lamp with a sign for the bakery is the last element that is part of the construction.

Two minifigures complete the building. The baker, who carries a tray of pastries in one hand, and a customer with a box of pastries she just bought. The client wears a red skirt, instead

of the typical minifig legs. It is a nice touch, although I miss some drawing on the skirt. Being smooth, it seems a bit poor compared to other details of the set.

The complete set

After finishing setting up the various parts that make up the set, I can see how well designed it is. A bakery and a Christmas tree stand, beside a frozen lake with some skaters. A festive picture that reminds many of the images we have of the Christmas story. 7 minifigures "and half" for a set of this size is noteworthy. They are also minifigures with beautiful and funny details. The whole set is remarkable. The bakery, with the oven, cakes, light and snow-covered roofs. The lake, with the skaters, the bench and, above all, the skater that is trapped in the mound of snow. And the carriage, which is complemented by the stand for selling trees, the romantic touch of the set.

It´s hard to find a fault in the set. The price (€ 54.99) justifies the use of stickers (few) instead of silk prints. The price per piece is 8cts, which is quite restrained, and taking into account that it doesn´t abuse of the smaller pieces.

It is a perfect complement to the Winter Toy Shop. We start to have material to make a Christmas diorama, and it can give us many ideas. Now I can only begin to imagine what can be in the works for the fall of next year. I have many ideas in mind, but I will not venture a guess. I'll wait to be surprised (and fascinated) again.
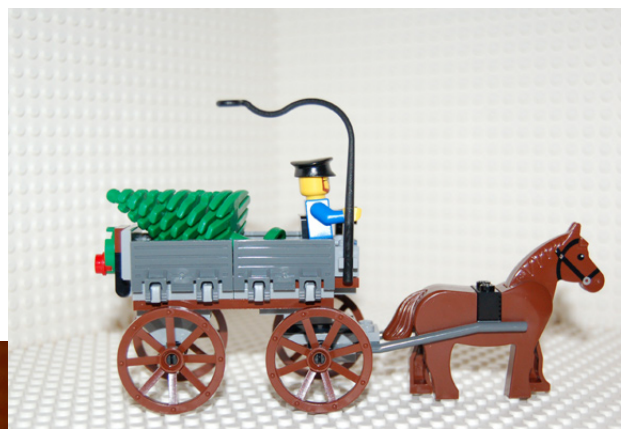
Review 8053: Mobile Crane

Text by Jetro

Pictures by LEGO® Systems A/S

Set: Mobile Crane
Set number: 8053
Parts: 1289
Recommended Price in Spain: €100

This year LEGO® presents another mobile crane. Although it is not the first time we see one in LEGO Technic, it not in any way a remake as the design presents notable differences with respect to earlier models. Especially noteworthy in this model (designed by Markuss Kossman, as reflected in the license plate: MK8053) are the stabilizers and the act that it comes prepared for Power Functions. The set has an interesting inventory and a good selection of functions. It does not include PF but does provide instructions for motorizing the crane with the #8293 add-on set.

Just like we have seen in other models that include a turntable, the building process is divided into two clearly separate parts: the vehicle and the crane.

Of special interest in the vehicle are the stabilizers in X configuration, which, just like the steering, are controlled from the back of the model. Although the stabilizers don't add any real stability to the model, they can be individually adjusted in

height to adapt to the terrain the crane is on and this allows them to be firmly placed on the ground and not suspended in the air. When the stabilizers are retracted they rest on supports in the chassis and the opening mechanism is hidden from view. In this way the stabilizers act as mudguards and give the model an attractive look.

The vehicle has steering on all axles and the steering mechanism is constructed so that the central axles turn less than the front and back ones. They also turn symmetrically so despite the length of the model it is very easy to steer either on the road or at a construction site.

The front of the driver's cabin – with blue seats, a decorative steering wheel and opening doors – is designed to easily allow the hook to be attached there.

The crane is made up of an interesting mix of liftarms and Technic bricks and has an arm in two segments which is elevated by means of a Linear Actuator (LA) and a cable with a hook built out of liftarms.

It is highly recommendable to motorise the crane as turning the knob to extend the LA can become quite tedious. The remaining functions are prepared to work at similar speeds so it takes a considerable number of turns to extend the arm or lower the hook. The two function selectors give access to extending the arm on the one side and to lifting it or lowering the hook on the other. There is a difference in speed between the extension of the arm and the lowering of the hook (also in the opposite direction), so it is not altogether comfortable to use both functions at the same time, although the fact that you can access more than one function at the same time is interesting.

The cabin of the crane sports another blue seat, but stands out in that it can tilt backwards to allow the crane driver a better view of the load.

B-model

Probably the most surprising and at the same time recommendable aspect of the set is the secondary model, instructions for which are available on the official LEGO website. The model represents a harbour crane which is very realistic and includes a good number of functions. The base
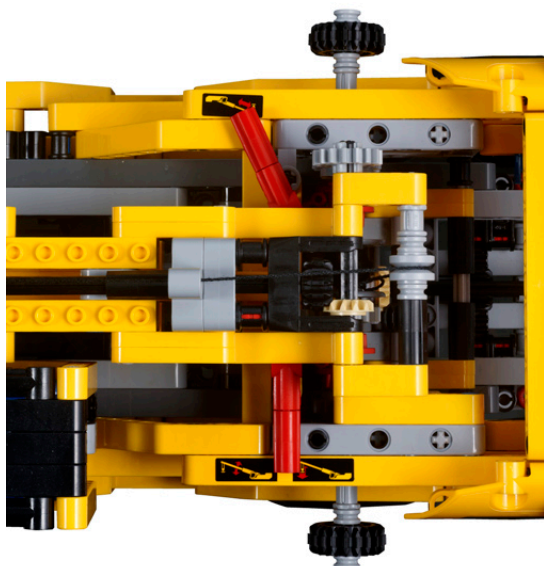
of this harbor crane rests on 8 wheels, allow for the crane to move along the quay. The body of the crane is set on the traversing beam of this moving base to allow it to move closer to and further away from the water. This movement is controlled by a rack and pinion assembly. Just like the mobile crane, the rotation of the crane is controlled manually as there is no mechanism connected to the turntable. From the body of the crane, using the function selector you can either extend or enroll the cable or modify the inclination of the crane.

The cabin of the crane holds a little surprise: the operator's chair is red!

The hook for this crane is identical to the one from the main model, but a new element is attached to allow it to elevate special loads. The mechanism is similar to what is used to lift containers of trucks or the quay and onto a ship. This adds playability to the set, especially since the inventory allows for not one but two frames with tires that can be lifted with this mechanism.

Despite its size, the size of the harbor crane is quite stable, although it cannot lift much weight. The frames with tires that are part of this model are close to the maximum weight

it can support. This is due to the fact that the crane has no counterweight. It would be possible to use the battery box of the PF add-on set as a counterweight but there are no instructions for using PF elements with the harbour crane: a nice challenge to make the most of your PF elements! #

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HispaLUG Contests

We present you a short interview with Hoexbroe, the winner of the best MOC of the second semester in our community

by Gobernador

Pictures by Hoexbroe

This is the second edition of the interview with the creators of the marvels built by fellow HispaLUG members. In this case the winner is Hoexbroe with the famous hanging bridge of Portugalete (Vizcaya)


GB: First of all, congratulations for having been chosen and for the fine model you built. It is simply brilliant. To get a better idea of what we are talking about, what are the dimensions of your MOC? And talking of figures, how many pieces do you calculate you used on it?

HX: Thank you all vey much for your votes and for letting me tell my story here. I am really thrilled to be able to participate in this still young, but already great community of Spanish speaking LEGO® fans!

This MOC is relatively small. It is about 53cm in long (66 studs) and 25cm tall. The size was determined by the "Boat Mast Rigging Long 28 x 4" of the pirate ship of which I have four. It is not a very large format (actually, people who have seen it in my house were rather disappointed with the small size as the hanging bridge in Portugalete, Bilbao (at about 25km from where I live) in real life is quite impressive.

At this reduced scale I have come close to the LEGO Architecture series which commercializes reproductions of famous and iconic buildings around the world. Despite the small size I have tried to capture the most important aspects of the construction; the feeling of an open structure/exo-skeleton, like the Eiffel Tower

The scale of the model is 1:300. (If I were to build it at minifig scale it would have to be 350cm long!)
As for the number of pieces, not too many. Probably around 500.
I spent about a week building this MOC.
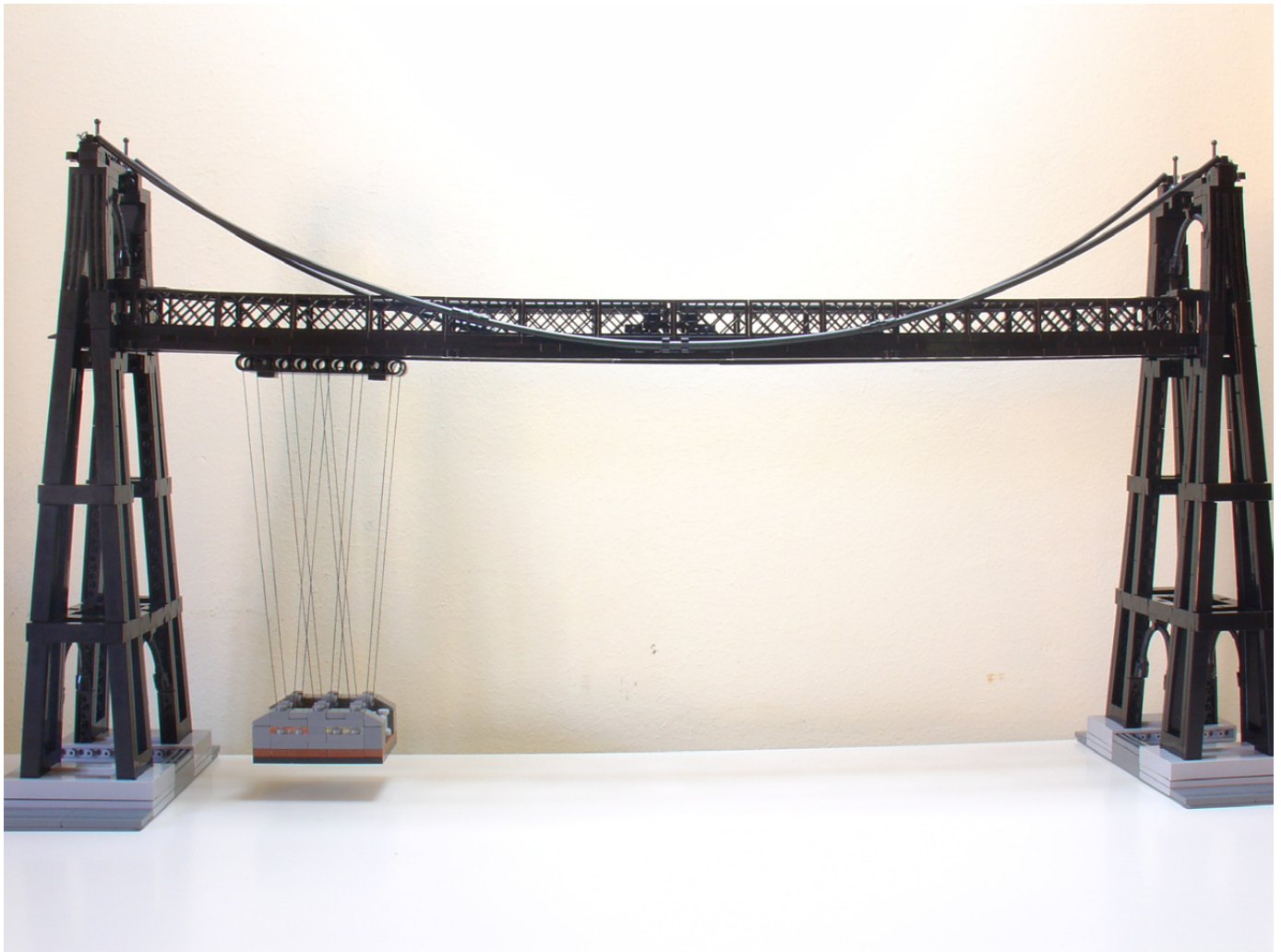
GB: In order to get a glimpse of the thought process of a genius, can you describe the process that takes you from a good idea to a brilliant MOC like this one? Do you have any rules or do you improvise?

HX: I wish I were a genius – that way I could make a living with LEGO® ;-) Unfortunately that isn't the case. I have an inner NEED to build, create and do something constructive with my hands. It's as strong as the need to sleep or eat.

I prefer to make reproductions at an exact scale instead of original designs lie space crafts, steam punk or other fantasies. I am very impressed by history and I like looking for information about a specific subject in order to make the best possible copy in LEGO. I spend a lot of time investigating possible projects, reading and learning about them. If I don't find enough information about a subject I am likely to abandon it.

Before I start a new project I usually investigate several (totally different) subjects. In the end I decide to build the one I believe I can reproduce best or the one I am most excited about (because of its history

However, the hanging bridge did not come bout in the usual way. It was more "Arvo" style: you see a specific part and suddenly you see the whole creating around it. I'm referring to the "Boat Mast Rigging Long 28 x 4" of the pirate ship I mentioned earlier. It's people like the Arvo bothers who make me want to excel and learn more about building with LEGO. But this method is an exception in my case. I normally build like I described before...

GB: Did you have any special difficulty while building this MOC or did it more or less come naturally?

HX: The towers! It's liek four legs of an open construction which are very delicate work (again, like the Eiffel Tower). I made

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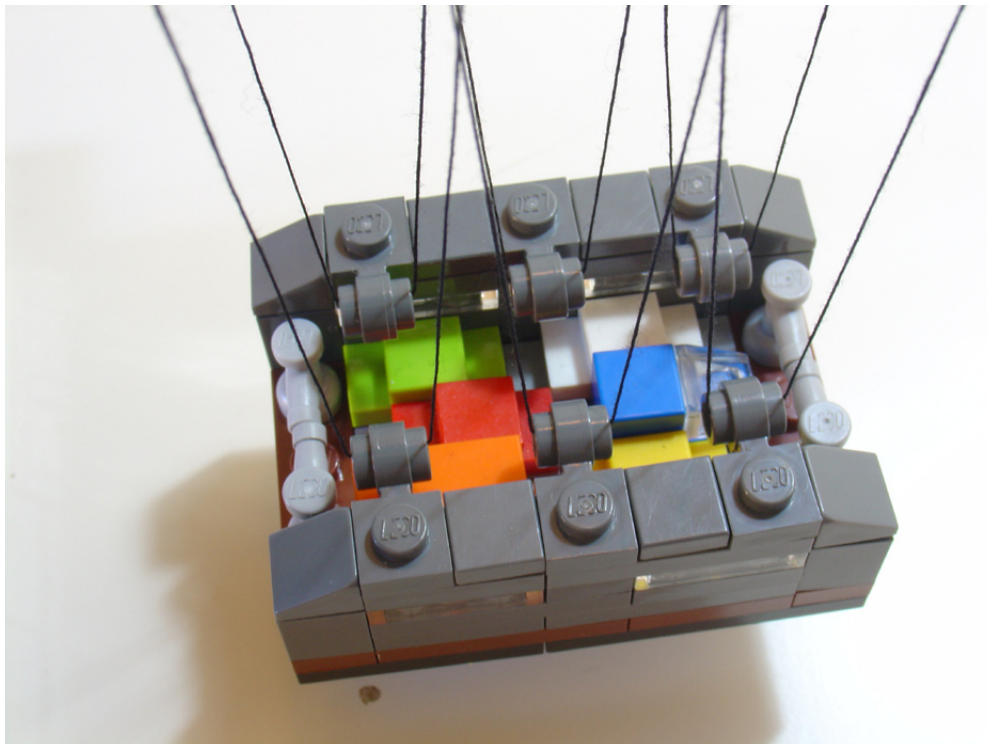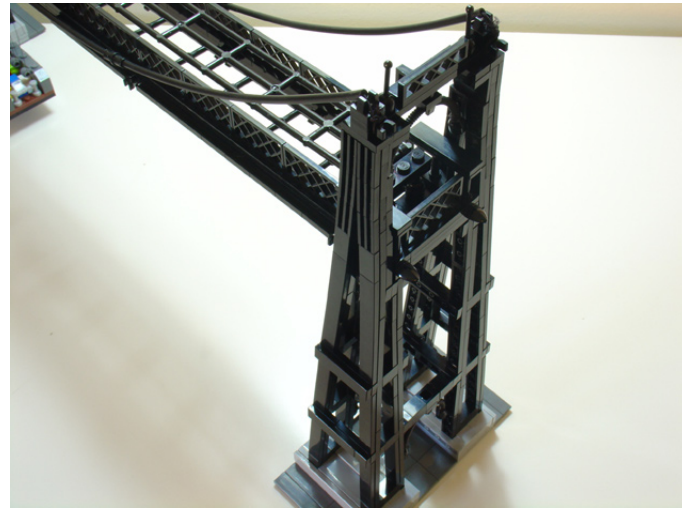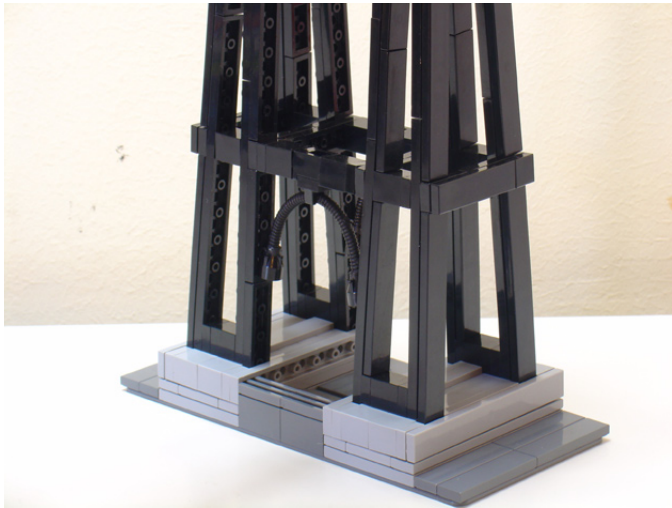
several attempts to build horizontal beams with Technic parts, but the result was too thick and clumsy. After a long struggle I finally found the right style. The diagonal lines have disappeared completely, but the result is more faithful to the prototype.

Using my experience in bending (actually forcing) a series of small parts, I built the curved legs of the towers moving from a vertical to a diagonal structure. What is new in this case is that I forced the parts into two directions in order to obtain volume in each leg of the tower. As there is a large succession of parts, the stresses on each one of them are really small and they don't damage any parts.

In real life, the bridge is anchored with several metallic cables, but in this case it is rather the bridge that supports the cables, although within the 'cables' of this MOC there is an elastic wire that prevents the MOC from collapsing.

GB: Of course we need to ask if this MOC will survive or will shortly be returned to the parts bin and in case it survives, if we will be able to see it at an AFOL event.

HX: Unfortunately, the MOC no longer exists. Just like none of my MOCs make it beyond a couple of weeks. I really need the parts. There are always key parts I need to finish build another MOC. For me, the fun with LEGO is in the building process. Not so much in the finished model. What can I do with a finished MOC? Look at it? For how long? In the end I will only see my mistakes and limitations etc. Enjoying the well built parts has its limitations.

To me it's the TRIP, not the DESTINATION.

With digital fotos, the internet and forum, any MOC is immortalized and visible to the whole world, which is a big advantage, so I

don't feel any pain when I disassemble a MOC. That way I can build another better one!

GB: We are used to seeing your great MOCs, some of considerable size, and we are proud to have you on our forum. You have shown us a marvellous steam boat in the previous issue and you have also built some great tanks to rival with the ones built by Legotron and many other things I cannot now mention. What will be the next thing you'll surprise us with? And what would you really like to build but have not yet been able to?

**HX**: Many thanks for the compliments! ;-)

Size always impresses. I like building big. A large construction gives you more to talk about and see. It can (more easily) include many details. That is not to say that smaller constructions are worse. Probably it's the other way round. It is much harder to get to a high level of detail with a small construction. You need more special parts and/or to be more creative with them. In a large construction even small details can often be built with simple bricks..

I love Legotron's German tanks, but for the moment I don't want to build at that scale. First of all because there are MANY people who do, even commercially, like for example Daniel Siskind of Brickmania Models. Secondly, because builders like Legotron have a very specialized LEGO® collection specifically for this kind of construction, whereas mine is very much unfocussed; I try to always be ready for any MOC at any scale!

At the moment I am preparing a rather large MOC: 150cm long, 100cm high, minifig scale... for HispaBrick 2010.
All right, it's another boat. That's all I will say for now ;-)

And yes, I do have a dream project. I gave it a try at the end of 2009 but had to give up. I have not given up on the dream though. One day I'll build it, but I will probably need an NXT for it. That will be another story, for another day...
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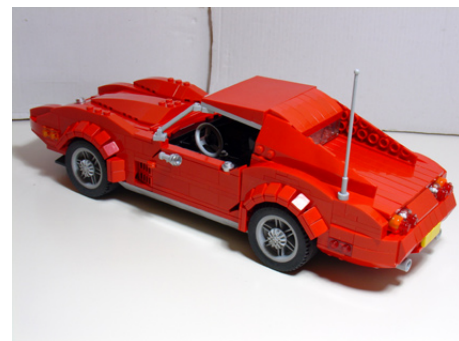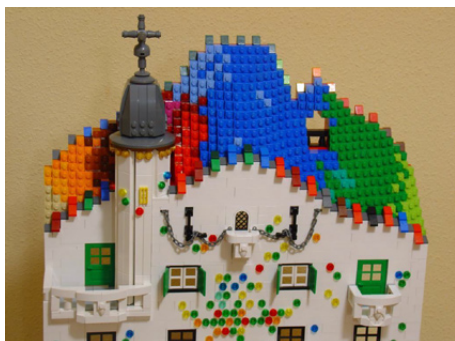
Great creators of the world: Tyler Clites

A fantastic creator known for his quality in details and his talent in all official and unofficial LEGO® themes.

By Hispabrick Magazine

Pictures by Tyler Clites

Hispabrick Magazine: Name?

Tyler Clites (a.k.a. Legohaulic)

HM: Age?

TC: 23

HM: Nationality?

TC: American

HM: What do you do normally?

TC: Normally I would go to school but since I just graduated college I'm searching for a job.

HM: When did you first start building with LEGO®?

TC: When I was in my mother's womb, okay, not really. I was two when I got my first System LEGO set.

HM: Your first set?

TC: My first set was a small race car (1517)

HM: And your last set?

TC: 5982 Smash 'n' Grab

HM: ¿Your favorite commercial LEGO building theme?

TC: My favorite theme would probably be Star Wars™. I mostly enjoy it for the parts.

HM: ¿And your favorite non-official building theme?

TC: Steampunk is definitely my favorite non-official theme.

HM: What is your favorite LEGO® element and why?

TC: It would probably be the 4773 (travis brick) just because of the versatility in how it can be used and attached.

HM: Which part would you like LEGO to produce?

TC: There are hundreds of pieces I wish LEGO would make but right off the top of my head I can think of one in particular. I would love if LEGO would produce a part which is essentially a "travis brick" but with studs two perpendicular faces and the top. Essentially this would give the ability to put a "travis brick" in a corner.

HM: How many hours do you spend building with LEGO?

TC: On average I spend anywhere from 5 to 20 hours a week depending on how busy I am.

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

TC: Everyone is very supportive and encouraging. Friends sometimes tease me about still playing with toys but I don't mind. I know that they really are impressed by what I do.

HM: You have built MOCS from almost all unofficial lines, Steampunk, Space, Mecha, Postapoc ,..., Is it difficult to change the theme so frequently? How do you choose the theme of your next creation?

TC: I have built in pretty much every major unofficial theme. I like change. I don't see how some builders can keep building in the same theme time after time. If I'm really inspired I might do several space ships or sci-fi mocs in a row but I really enjoy changing it up on a regular basis. When choosing a theme, I try not to think of a theme to build in but rather I start building something and it ends up falling into a theme. For example, I

may want to build a small mech, I start building the legs, there happens to be some pearl gold piece that catches my eye, I use it and it begins to take on a steampunk look.

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

TC: Sometimes I do and sometimes I don't. Sometimes I'll know the 'look' I want to go for but still need to flesh it out in my head by drawing or sketching ideas. Other times, I just sit down and start doodling with parts and something evolves from there. Still other times, I have an idea so clear in my head that I don't need to draw anything, I just build it.

HM: How long does take you to get from the idea to the finished model?

TC: It ultimately depends on the size of the model. However, I have built large models in a short amount of time and some small models have taken a very long time. On average there is probably about 5 to 10 hours of work put into each model.

HM: One of the most famous dioramas in the past months

ELEMENT
COMMUNE

IR RECEIVER

POWER BUTTON

RECHARGABLE BATTERY

PF M-MOTOR
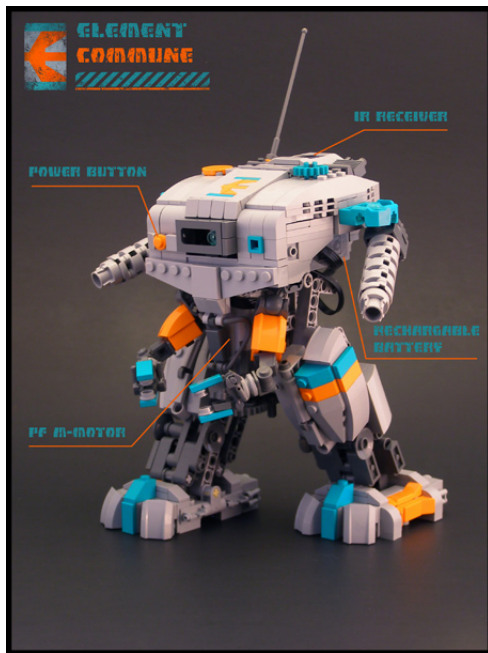
has been your collaboration with Nannan. How did this project come about? What was the biggest difficulty you found during your collaboration with another genius of the bricks?

TC: Nannan approached me in January 2010 with the idea of doing a collaboration project for Brickworld since neither of us had anything planned for the event. The biggest difficulty was probably the planning stage and trying to figure out what the other person's vision for the display and how we could blend those visions into a single cohesive display.

HM: You have posted instructions of some of your MOCS on the net. What has prompted you to put in that extra work that means creating instructions for the models?

TC: I really want the instructions to be an inspiration to other

builders. Having built MOCs from other builders who have created instructions, I loved seeing how other people build and I learned a lot from building their model. Building someone elses' MOC is a chance to build in another artist's style. I equate it to being able to sit down with the instructions for Van Gogh's Starry Night and paint your own version of his painting. I hope that my instructions can be an inspiration to other builders, both experienced and inexperienced alike. I would love to see more people making instructions for their MOCs it may be time consuming, but in my opinion, the reward is worth it.

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

TC: My favorite would probably be my first apoc dio (http://www.flickr.com/photos/legohaulic/545314787/). It arguably is what started the Post Apoc theme as well as the irregular/freeform base plate idea. It is my favorite mainly because of the composition of it. I love how it almost looks like a different scene from every angle.

HM: The increase of AFOLs and lines like Star Wars™ create new possibilities not imagined before by LEGO®. What do you think about the old school LEGO and the new LEGO?

TC: The 'new' LEGO wouldn't be here without the 'old' LEGO. I'm all for whatever is new and different. I like to push the boundaries of what has been done before and progress to the next level. Some people complain about the 'new' LEGO with all the new parts they aren't needed. I however, embrace the new parts. They are just providing more possibility for me and other builders to push the envelope on what can be called LEGO.

On another note, I do feel like LEGO is focusing less on creativity. With the licensed themes such as Star Wars and Indiana Jones, kids are being told how to play with their toys rather than just inspiring them to be creative. That's why it is so important for AFOLs to reach out to kids and help inspire

HC 514

them to be creative. I miss the old inspirational models on the backs of LEGO® boxes. The tools/pieces are there, they just need the inspiration again.

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

TC: A few years ago I would have been totally against it. I use to be a hard core purist. I've become more lenient in my view of non-LEGO elements after seeing some of the amazing work of Will's Brickarms and the amazing models of the late Nate Neilson (nnenn). While I would never modify or paint a piece, I have used Brickarms and I've cut official stickers for a few models. I try to remain relatively pure in my use of LEGO just because I like the challenge of limiting myself to only LEGO elements. However, I don't object as strongly to non-LEGO elements as I once did.
#

5 questions to...

Jørgen Vig Knudstorp
Chief Executive Officer, LEGO® A/S

o What was the situation of The LEGO® Company when you arrived?

The LEGO Group was in actual fact a very creative and enthusiastic organisation. However, it was living insulated from the realities facing it. Users were mildly unhappy with the product offering, employees were concerned about the future and sceptical about the top management's intentions and strategies, and retailers were very mad at the LEGO Group, which they considered unable to deliver on their business needs.

I sometimes say that there was too much self confidence in LEGO Group, but not enough self-esteem. Self-esteem comes from knowing who you are and feeling good about yourself, and thus being very true to yourself – being authentic. Self confidence comes from the recognition of others, and when you become too concerned about what other think, you lose yourself. This, I think, was the psychological situation of the company. We wanted to be loved and be 'cool' as seen by the kids, - so much that we strayed away from our true identity, self and destiny.

From an economic point of view the company was weak due to 10 years of unprofitable growth, heavy debt burden and poor management. The company was not yet bankrupt, but it wasn't healthy either.
When in 2003, the US dollars sharply declined in value and LEGO Group lost sales in key product areas such as Star Wars™ and Harry Potter, the financial strength was too low to handle the situation, and the company nearly went bankrupt.

o At present TLC is in good health. Could you explain what the key is to this success?

Successful business outcomes are the results of many complex and complementary factors that come together in a carefully balanced optimization – that constantly shifts as the world the business operates in constantly changes. Thus there is no single key to LEGO Group's success. First and foremost, The LEGO Group is successful again because it has found its way back to where it all started, the core of the LEGO Idea, but it is as if we see that place for the first time. You could call it 'forever the same and yet constantly new', I believe LEGO City or LEGO Creator is a very good example of this.

Without this strong heritage there was nothing to build a successful business on.

Then on top of that we have built a very strong organisation, people, culture and capabilities that focus on making retailers successful when they sell LEGO Products (so they want to buy ever more, and give us ever more space in their stores, catalogues and web sites), while continue to be driven by the interest and excitement of our users, children of all ages, whether they are young children or adults.

Today, LEGO Group has a very strong identity but remains humble in listening to and interacting with its users and customers. It is also an incredibly strong company as seen from a financial point of view, so our future is very solid and positive.

o Please explain how you as CEO of LEGO view the AFOL community.

I am a LEGO Fan. I love LEGO System, and I think it is one of the greatest inventions of our time. I can take no credit for that; it was someone else's invention, and I am not involved on a daily basis in our product development, as the owning family of the LEGO Group traditionally has been. But I have the greatest admiration for the LEGO Experience and its potential to bring joy, pride and essential learning to children of all ages across the globe.

When we had to rediscover our soul and meaning, as per the description above, AFOLs were essential in helping me on that

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journey. I really enjoyed – and continue to enjoy – meeting with AFOLs because they show the way....they teach me so much, and I feel so at home with their passion for LEGO® Bricks. It's like loving football and then meeting players in FC Barcelona!

So I have great affinity for the adult community of LEGO Fans, and I am sincerely grateful for the guidance and support they have offered to me over the years.

o In your opinion, what makes the LEGO brick different from any other toy.

Toys are great. They stimulate learning, imagination and creativity. It is when we are playful and curious that we best learn and invent stuff. Unfortunately, as we go through school that curiosity and playfulness is killed, so much that the favourite kind of play "role play" is that far away that grown up people have to go to Acting School to learn to be role playing again.

I honestly believe that Play is up there with Food and Love when it comes to child development. It is essential, it is how children learn and develop – become mature grown up's capable of solving life's important problems.

So there are many great toys and kinds of play; football is but one great example. However, in this world of Play, I do believe that LEGO System is very unique and special.

It is special because it nurtures the ability to reason systematically and think creatively – at the same time – and it helps kids to learn to work collaboratively – and the best part of it, is that they are not even noticing that they are learning these important things. They play their way into this learning, without knowing it. So beautiful is nature's design of human learning that we learn best when we don't know it. We call it Playful Learning.

This combination of System and Creativity is unique, especially a system with so many shapes in such a uniquely and consistent high quality – there is nothing like it. Something that you can easily assemble and yet easily take apart, without using glue – there is nothing like.

o In general lines, what direction will the company take in the future?

Based on the above insights about the role LEGO Play has in society, I think we have moral imperative to stay in business! It is more than a business. It is a movement. It is an honor and duty to carry forward.

I think the duty of top management, myself in particular, is to always make sure the business survives – that it is capable of adapting to constantly shifting circumstances, in order to survive and be successful. This can very often involve very painful conflicts and the implementation of tough decisions. You cannot be everyone's best friend and you have to find your own path and speak with your own voice.

We focus first and foremost on building our core business around the core themes you know today; bricks, Creator, LEGO City and LEGO Star Wars™ as well as LEGO DUPLO and LEGO TECHNIC. We want to continue to evolve the business and we do that by focusing in on three mid term priorities for the business.

1) Our operations, which we want to continue to reinvent. We will never give up on being very creative in the ways we design, produce, distribute and sell our products.

2) Our People, Culture and Capabilities – we want to develop the LEGO People and our culture to be the best at supporting and delivering the LEGO Idea, and we want to build the global capabilities to be competitive in every country on the planet.

3) Growth Drivers need to be nurtured and we have found seven, one of which is LEGO Universe which has just been launched with great success.

Thank you very much for the opportunity to speak to you!
Jørgen vig.
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Iain Heath	http://www.flickr.com/photos/ochre_jelly
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Lluis Gibert (Lluisgib)	http://www.brickshelf.com/cgi-bin/gallery.cgi?m=lluisgib
Luis (Vrykolakas) y Ana (W3ird)	http://www.flickr.com/photos/23033004@N00/
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Tobias Reichling	http://www.t-reichling.de/en/index.shtml

Stupid Studs por Vrykolakas y W3ird

ANTI CRISIS MEASURES

THE GOVERNMENT HAS NAMED A NEW MINISTER OF FINANCES, WHOSE FIRST MOVEMENT HAS BEEN A SALARY FREEZE

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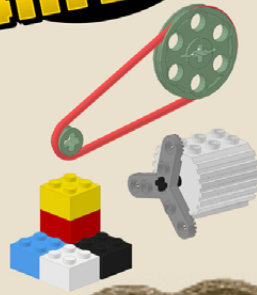magazine

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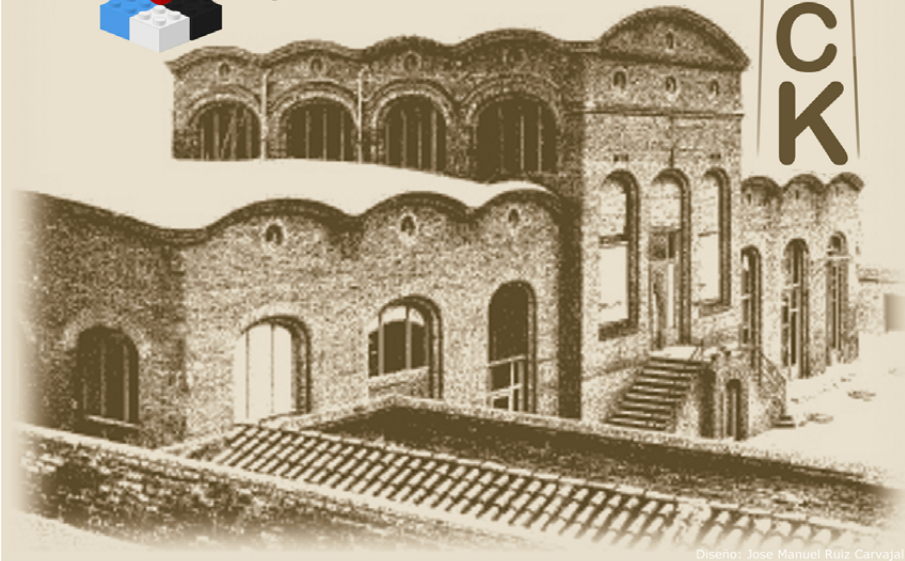
4 y 5 de Diciembre

IV HISPABRICK

Encuentro Nacional de Aficionados de LEGO® 2010 en Terrassa

Exposiciones, concursos y actividades infantiles en el Museu de la Ciència i de la Tècnica de Catalunya (mNACTEC)

Diseño: José Manuel Ruiz Carvajal

Organiza:

HISPALUG

Con la colaboración de:

LEGO   EuroLUG   plast team

Ajuntament de Terrassa
Joventut i Lleure

Generalitat de Catalunya
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MUSEU DE LA
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