

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.

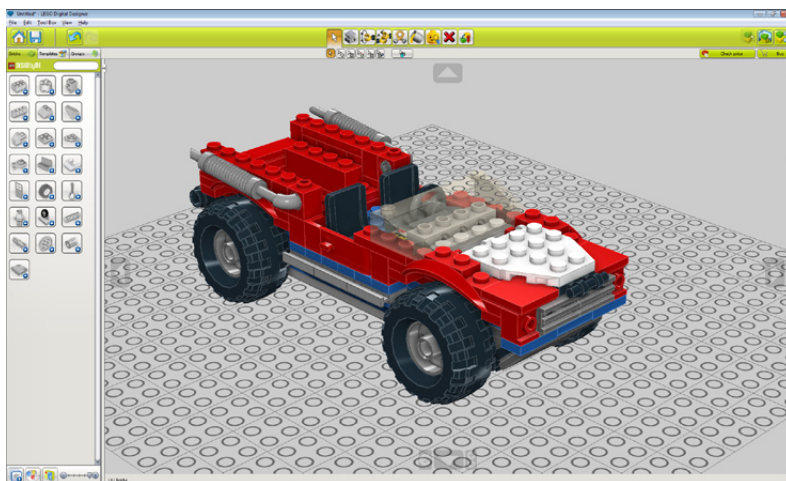
Claus – No problem, I'm glad to be of help

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.

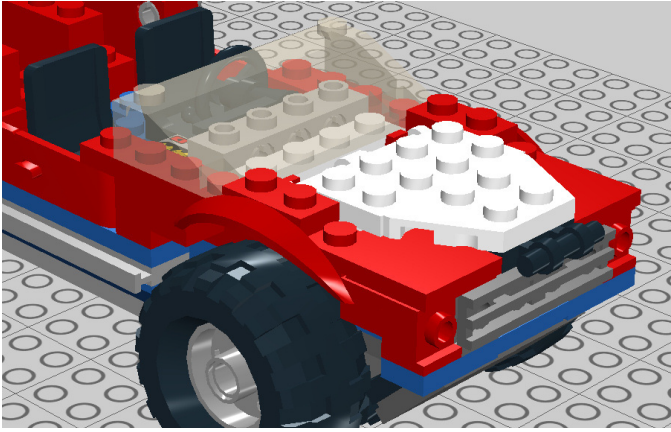
Johan - I notice that also the building guides now have outlines.

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

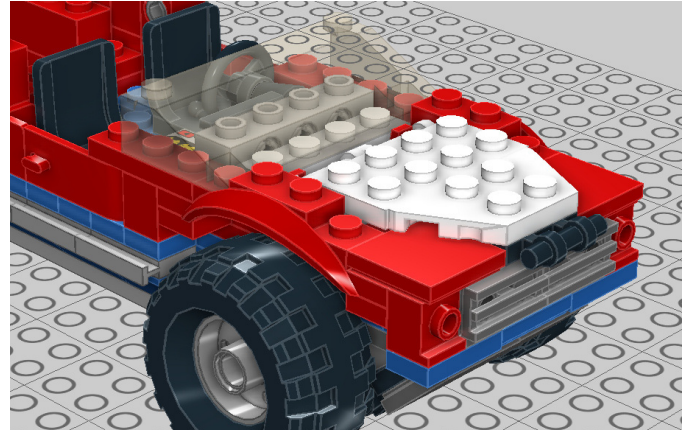
Johan - How is the brick outlines done technically? Did you need to re-model all bricks and add bevels on the edges?

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.



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?

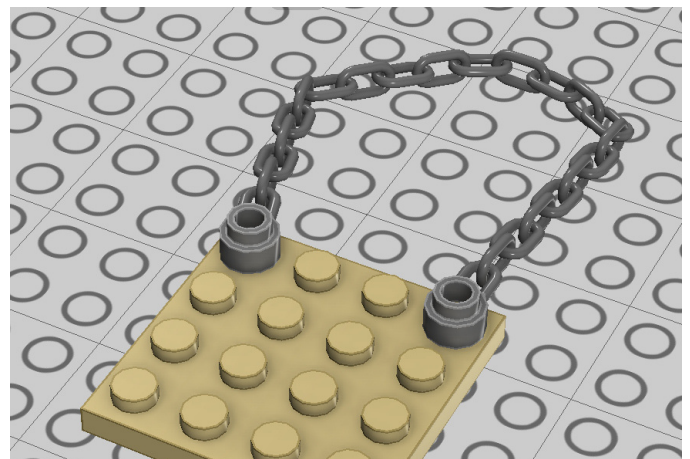
Claus – We started with the DbM elements, because DbM is our main “customer” for LDD, but basically we’re going to make any element that’s in LDD and bendable in real life flexible. We’re looking into how quickly we can do this.

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

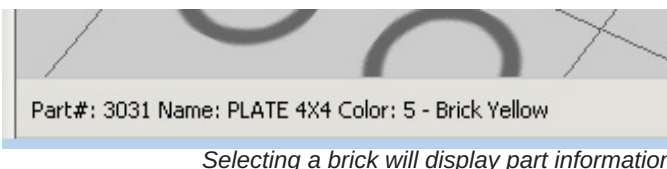
Johan – So that means if the brick wanted by fans are not in LDD 4, then they could be added later on?

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 its beta-like status, and making it releasable is an ongoing process.

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 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.

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.

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 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.

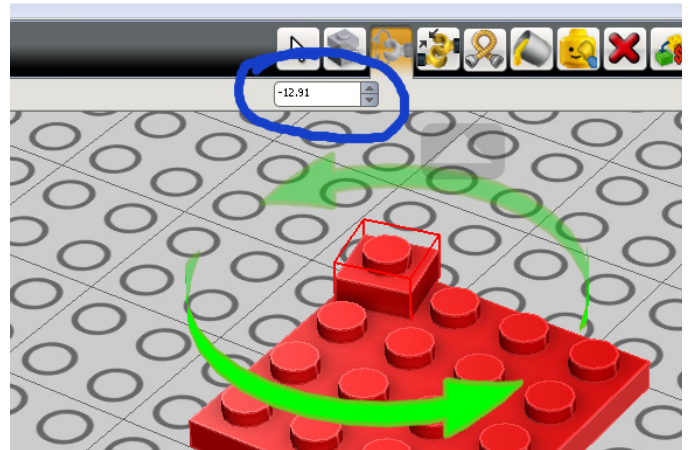
Johan - LEGO Universe has a building experience that is fairly similar to LDD with bricks that snap into position. I know many are wondering if there will there be an import/export from LDD to Universe and vice versa.

Claus – It isn't planned, but under consideration

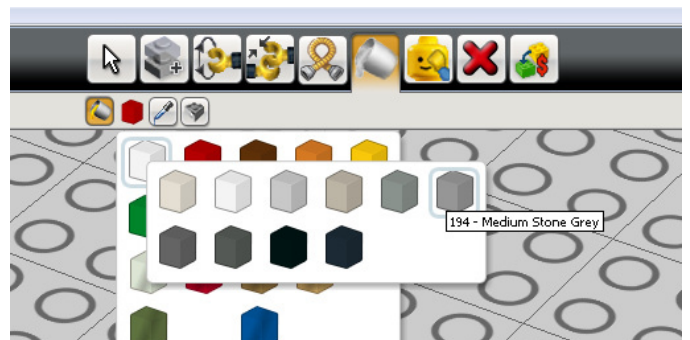
Johan – OK, thanks Claus once again for taking the time.

Claus – You're welcome. It was nice talking to you.

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



Extended color palette

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>