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TWOMORROWS

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BrickJournal

Issue 28 • April 2014

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A *BRICKJOURNAL* SPECIAL FEATURE

Behind the Bricks of

Syd Mead's LEGO Spinner

The Brotherhood Workshop

MINDSTORMS Building Instructions AND MORE!

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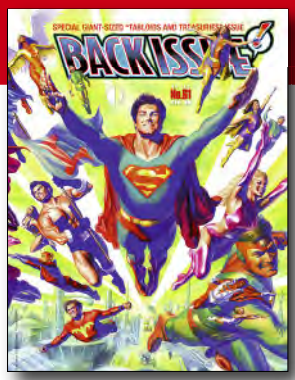
COMICS MAGAZINES FROM TWOMORROWS



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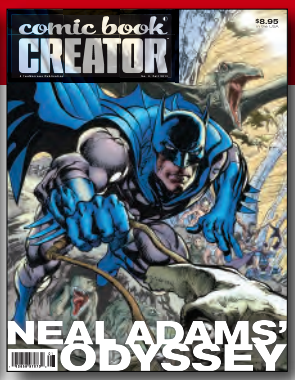

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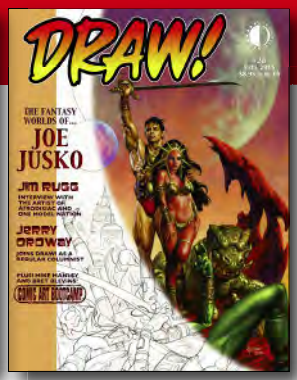

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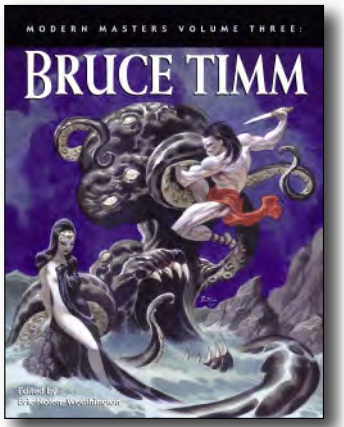

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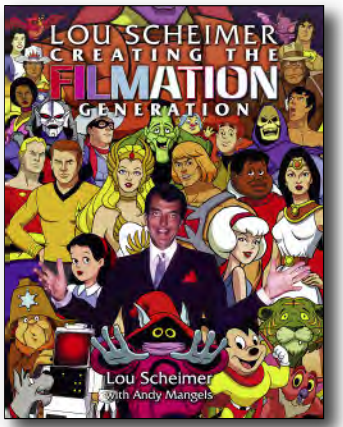

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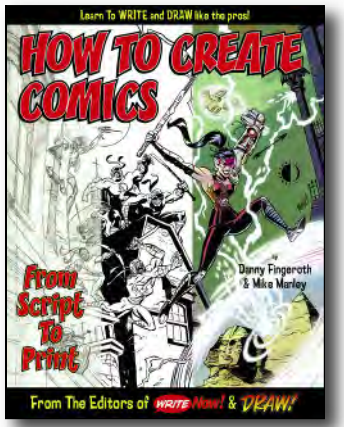

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Brick Journal

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Contents

From the Editor 2

People

Sneak Peek 3
Cities, Stadiums, and Castles 4
The Brotherhood Workshop 8
Spotting the Spinner 12
Building a Spinner 16

Building

Taj: Making a Movie Taj Mahal 20
Building *The LEGO Movie's* Coliseum 24
The Real LEGO Master Builders 28
Some of *The LEGO Movie's* Extras 38
Recreating *The LEGO Movie's* Bricksburg 42
BrickNerd's DIY Fan Art: Film Camera 46
Minifigure Customization 101: Reimagining *The LEGO Movie* Collectible Minifigures 49
You Can Build It: Micro Pirate Ship 52
Building Robots with MINDSTORMS EV3 60

Community

It's a Car! And... 68
Set Review: #42009 Mobile Crane Mark II 71
From the LEGO Idea House: Building a Name 76
Community Ads 78
Last Word 79
AFOLs 80

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About the Cover:
Well, it's the LEGO Movie! From the LEGO Group and Warner Brothers.

About the Contents:
Matthew Ashton with his character, Unikitty. Photo by Julien Vandon.

From the Editor:

Everything is awesome!

Yes, I saw *The LEGO Movie,* and yes I think it's a great movie for many reasons, including showing off some great LEGO building.

This issue has some articles about the movie and some of the things in it, but also some other films that you may have seen online. It was a fun adventure to find the people behind the Brotherhood Workshop and also the guys that built a LEGO model for another movie before *The LEGO Movie.* There's also some other fun stuff and instructions.

This issue also begins a series of articles on the MINDSTORMS EV3. For the longest time I have been wanting to have something for those just starting out on the robotics system (especially those starting in First® LEGO League). It finally begins here, with help from Damien Kee.

There's a lot in here, so have fun... and look for a certain minifigure hiding. I'll tell you what to do when you find him in the Last Word!

Joe Meno, Editor

P.S. Have ideas or comments? Drop me a line at admin@brickjournal.com. I'm open to suggestions and comments and will do my best to reply.

P.P.S... Yes, *BrickJournal* has a website — www.brickjournal.com! Twitter? Yep, there too — http://twitter.com/brickjournal. Facebook? Yup — http://www.facebook.com/group.php?gid=58728699914&ref=mf. Or you can scan the bottom codes with a QR reader!

P.P.P.S. If you want info on a subscription, you can go to: http://twomorrows.com/index.php?main_page=product_info&cPath=78&products_id=616 or scan below!

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Glossary

AFOL (Adult Fan of LEGO)
NLSO (Non-LEGO Significant Other)
MOC (My Own Creation)
TLG (The LEGO Group)
BURP (Big Ugly Rock Piece)
LURP (Little Ugly Rock Piece)
POOP (Pieces—that can be or should be made—Of Other Pieces)
SNOT (Studs Not on Top)
LUG (LEGO Users Group)
LTC (LEGO Train Club)

BrickJournal *and its staff would like to thank the LDraw community for the software it makes available to the community, which we use for making all of the instructions and renderings in this magazine. We would especially like to thank Kevin Clague for his continued upgrades of the LPub tool that is a part of the LDraw suite. For more information, please visit http://www.ldraw.org.*

Sneak Peek

Next issue, *BrickJournal* will be talking to the director of an upcoming LEGO documentary featuring many of the builders seen in this magazine. Here's a shot of their camera at work!

Cities, Stadiums, and Castles

Article by Joe Meno
Photos by Adam Reed Tucker

Adam Reed Tucker is a busy man. As a LEGO Certified Professional, he is doing building projects constantly, and as a builder, he has been involved with the design and launch of the Rollercoaster Factory with Coaster Dynamix. He stepped back from Brickworld, the convention he started, to focus on building. In that time, he has done a number of projects.

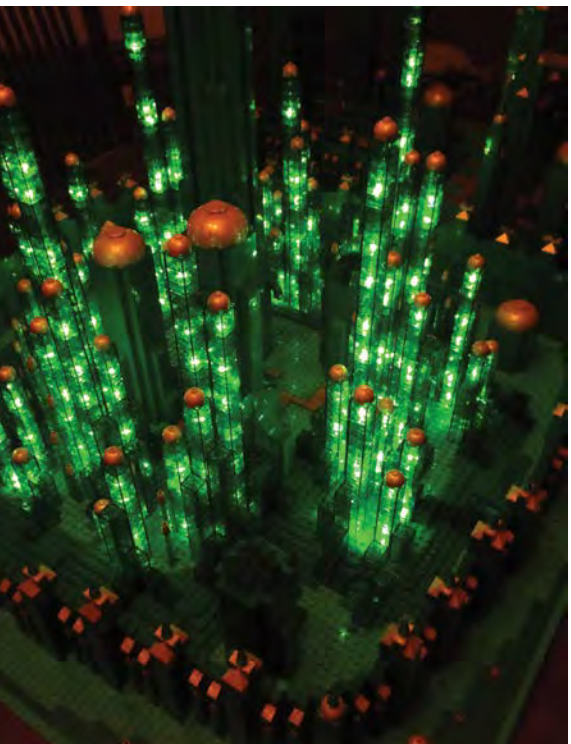
Emerald City

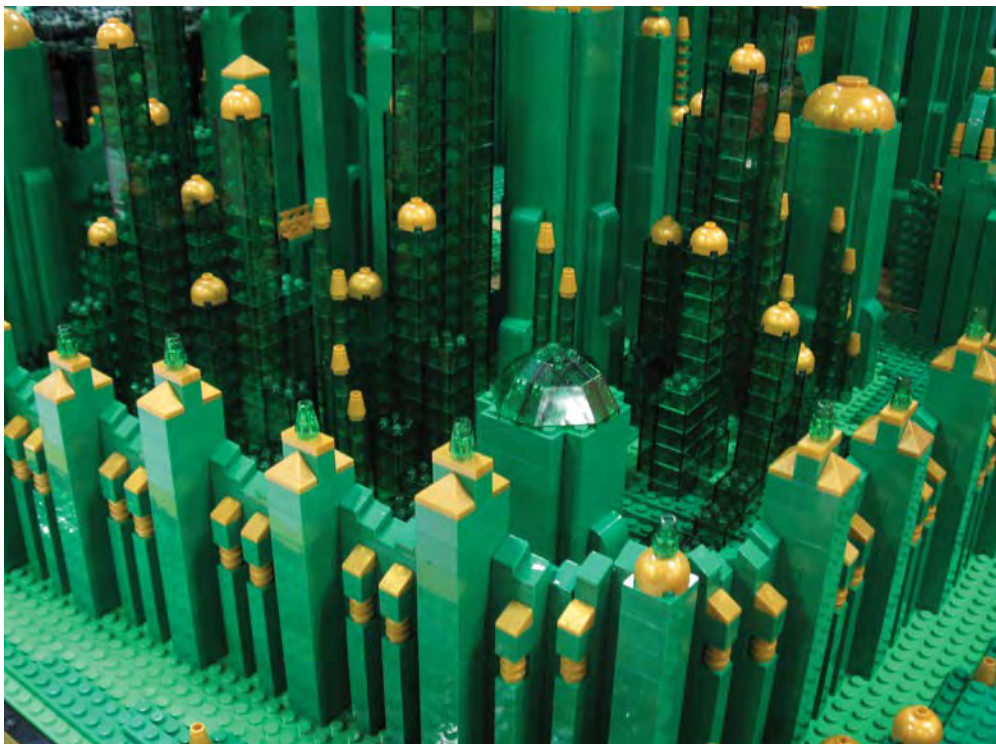
Adam built the Emerald City as a part of a collaborative build for Brickworld 2013 themed around the *Wizard of Oz*. Organized by VirtuaLUG, a group of builders in the US and Canada, the build featured scenes from the movie built with LEGO, and was displayed at the Renaissance Convention Center in Schaumburg, IL.

To construct the Emerald City, Adam designed using a minimal approach. Using green bricks and gold accents to create art deco-styled towers and connecting bridges, he created a model that evoked the forms of the Emerald City. Custom lighting was created to provide depth and detail to the model and give the illusion that the "Emerald City" was in fact a working, living city as portrayed in the *Wizard of Oz*.

The goal was to provide a seamless integration into the group collab while leaving no question that the segment was the Emerald City that all had imagined while watching or reading *The Wizard of Oz*. Adam simply tries to capture the essence in his builds, rather than literal recreations.

This piece was completed in only 6 days and barely reached completion, but if you ask Adam, it's far from complete and plans on a 2.0 are already underway!





Ford Field

Adam's model of Ford Field was completed as a commission project from the Henry Ford Museum in Dearborn, Michigan.

The model showcases the playing field and stadium interior including the huge roof trusses illustrating the engineering achievement in the stadium. The stadium was intentionally designed using a cutaway / cross-section technique to show the pieces and techniques used in building. Cutaways like this one allow viewers to see that the entire model is indeed constructed using LEGO bricks and not any other materials for internal structure or detail.

The model was first installed and displayed at the Henry Ford Museum as a special piece featured in the "Towering Ambition" exhibit. The model has also traveled to be on public display at Ford Field and was featured on FOX coverage of Thanksgiving weekend football games televised in 2012.

Cinderella Castle

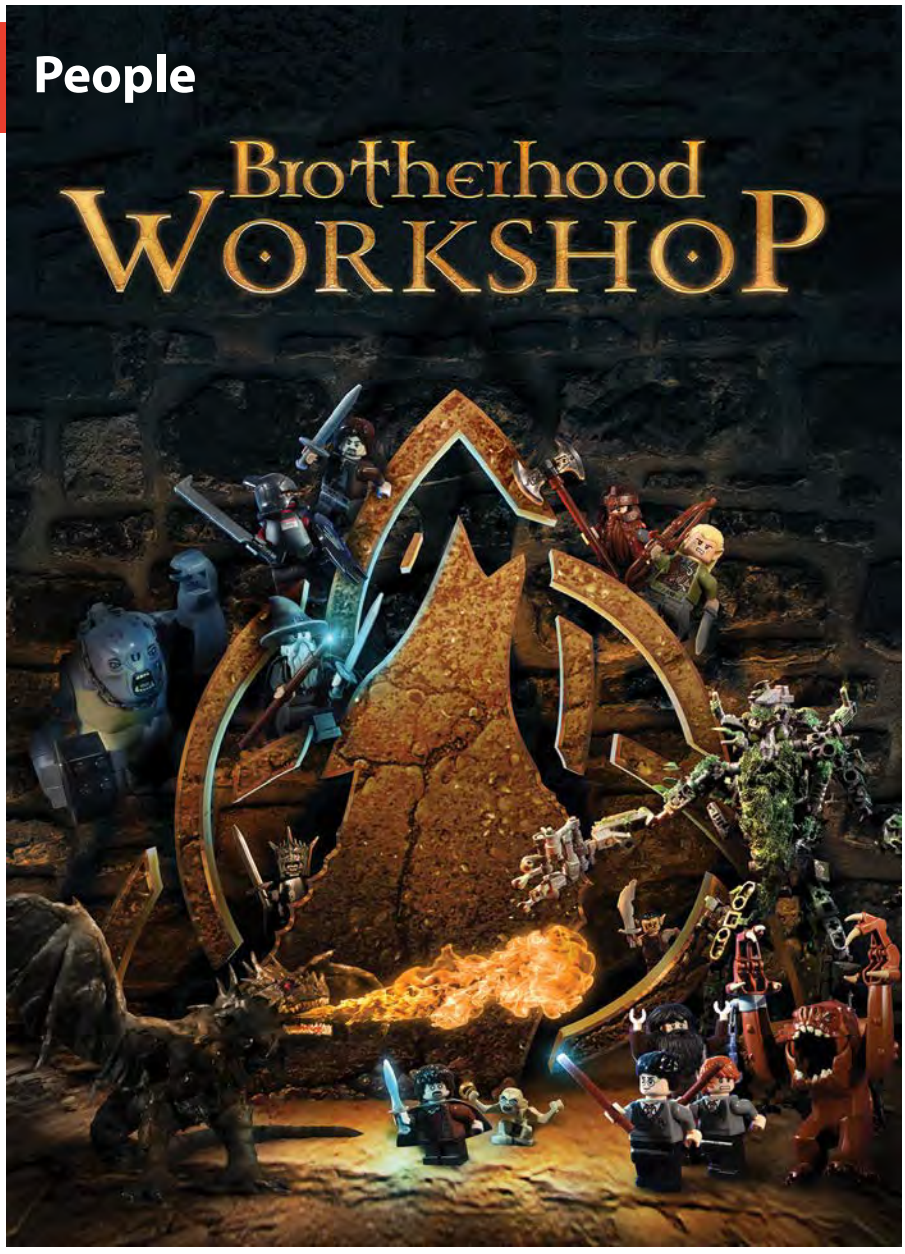
Adam's latest build was installed and featured in the "Treasures of the Walt Disney Archives" exhibit which debuted on October 16, 2013 at the Museum of Science and Industry in Chicago.

The model uses white, light grey and medium blue to accurately depict the Cinderella Castle that stands at the Walt Disney World resort in Orlando, FL.

To complete this model, Adam studied images of the castle from personal photos and books on Walt Disney World. He also studied a small-scale model of Cinderella Castle to discern design structure and details not well represented in photographs.

Adam noted that by far this was the most challenging aesthetic model he has made to date, with the forms, textures and details being some of the most complex he has encountered. Perhaps this is the reason why only a few builders have attempted it?

Brotherhood WORKSHOP



Article by Joe Meno
Photography provided by the Brotherhood Workshop

In mid-2012, some brickfilms began appearing on Youtube that were different than many others. Having high production values and a wicked sense of humor, the films by the Brotherhood Workshop quickly went viral and led to a Youtube channel with thirty films and over 50,000 followers. One of the films was also seen briefly in the LEGO Movie. Kevin Ulrich, one of the members of the Brotherhood Workshop, spoke to BrickJournal *about their films.*

Kevin and Brian Ulrich

BrickJournal: ***Who are the people behind the Brotherhood Workshop?***
Kevin Ulrich: My brother Brian Ulrich and myself. Julianna Ulrich (Brian's wife) helps with building at times. Rick Cortez (a friend from work) and Christopher Ulrich (another brother) help with the visual effects.

When did you start the BW? What was the inspiration?
I started Brotherhood Workshop in the summer of 2012. I had been doing stop-motion animation since I was 11 years old, and had continued doing animated projects all through college. After graduating, I got a job at a video production company as an editor. It was a great place to work, but it didn't really give me the opportunity to flex my creative muscles as much as I would like. After 2 years, I was very restless, and needed some sort of creative outlet. This was around the same time that LEGO had released its *Lord of the Rings* line, and I happen to be a die-hard *Lord of the Rings* fan. So one day I had an epiphany: why don't I start my own Youtube channel and make LEGO parodies? Kind of like the "How It Should Have Ended" channel. So I dropped by the LEGO store on my way home from work, bought some sets, and made my first video *Orcs, Not Evil* over the weekend. I had no idea how successful the video would be, but when it reached nearly 100,000 hits in a week I realized I had hit on a winning strategy for not only scratching my creative itch, but for finally getting exposure for my work.

From the LEGO The Cranky Cavetroll: *The Fellowship explores the Caves of Moria...*

...while below, there is a celebration!

From An Elvish Valentine: *Aragorn and Arwen...*

...and an orc with a valentine.

From LEGO Lord of the Rings: Orcs: *A group of orcs encounter Aragorn (offscreen)*

How did you choose the name Brotherhood Workshop?
As most of the people working on these videos are related, or act like they are related, we wanted a title that had a very familial feel. For a long time before starting the youtube channel we called ourselves "Brotherhood Studios." But when we chose to do LEGO videos, we decided "Studios" sounded too grandiose and pretentious. So we scaled back from a studio to a workshop.

How long does it take you to do a film, from inspiration to final film?
I average about an hour of work for every second of animation. Obviously this can vary shot to shot and video to video, but it's a pretty good estimate. So, a one-minute video will generally take between 50 and 60 hours to create.

Behind the Scenes

The camera used for the stop-motion is a Canon T2I, seen here setting up for a shot from *LEGO The Battle of Helm's Deep*. Below is a shot from the same film after processing and effects are added.

From LEGO Lord of the Rings: Orcs: *Orcs use the internet, too!*

Behind the Scenes

Here's another set-up for a shot from *LEGO The Battle of at the Black Gate*. Below is the final shot, using a tight depth of field to give depth.

Who came up with Jerry the Orc and was he planned to become a running joke?
It was my idea to have the orcs actually be good guys who are just misunderstood. When I originally shot the video, the captions for the orcs read "He killed 3 of my friends." My brother Brian watched it and said, "No, there needs to be a personal connection. There needs to be a name. A very ordinary, average sounding name. Jerry. How about Jerry?" And it stuck. We didn't even think about it being a running joke until the *Helm's Deep* video, when I thought "Hey! When the orc tells them to charge, we should have him say 'For Jerry!'" And it stuck.

What's the hardest part of the filming?
The hardest part of filming is when you have multiple characters in a shot. I think my record is around 300 characters in frame at the same time (this was for a high school project that isn't available in my youtube channel). When you have to move 300 characters every frame, *and* keep track of what all of them are doing, things get really overwhelming. A single shot can take days.

What is usually your stage set-up?
My work space is just a normal desk, 3 feet by 4.5 feet. I have lights positioned around the desk, and sometimes I will use greenscreen to make the set look bigger than it really is.

What do you guys do in real life?
Just about everyone who works on BW projects works at the same company for their day job (Contexture International). We primarily shoot and edit corporate and promotional videos, and we use the gear from our day job for creating our videos.

What do you want to do in the future with the BW?
Our goal is to eventually have a big enough fan base that we can secure funding for bigger, more awesome projects. Creating feature-length stop-motion films is our ultimate dream.

The Brotherhood Workshop's Filmography

Pre-BrickFilms

Film	Time
The Clumsy Lizard Warrior (claymation)	:24
Dragon Slayer Stop Motion (claymation)	:25

Brick Films

LEGO Lord of the Rings: Orcs	1:03
LEGO Gollum's "Baby"	1:44
LEGO Gollum's Karaoke (alternate version)	1:26
LEGO Frodo's Birthday Surprise	:40
LEGO The Cranky Cavetroll	1:17
LEGO A Hobbit Halloween	1:35
LEGO Stop-Motion: Tips and Tricks	4:04
LEGO The Battle of Helm's Deep	2:36
LEGO Treebeard's Holiday Special	1:16
LEGO Stop-Motion: A Custom-Built Treebeard	2:35
A Legless LEGO Legolas	:22
LEGO An Elvish Valentine	1:52
LEGO Harlem Shake (Goblin Style!)	:33
EPIC Battles: Cavetroll vs. Goblin King *Goblin King Wins?* *Troll Wins!*	1:22 :37 :36
One Man's Trash is Another Man's Six-Legged Plunger Mech (seen in the LEGO Movie)	:31
Gorgy Wants a Horse (seen in the LEGO Movie)	:31
LEGO Voldemort Goes Wand Shopping	1:58
LEGO Stop-Motion: How to Make Things Fly	2:25
LEGO Battle at the Black Gate	1:22
Brotherhood Workshop at ComicCon	1:57
LEGO Tom Bombadil (Why was he cut?)	1:05
LEGO The Hobbit: The Desolation of Smaug - Teaser Trailer (HD)	2:09
LEGO The Hobbit Trailer (Side by Side Version)	2:07
Legolas Gets Friendzoned	1:02
LEGO Kili Gets Left Behind	:40
LEGO The Truth About Ewoks	:49
LEGO Non-Stop Official Trailer	2:31
LEGO Non-Stop Trailer (Split Screen Edition)	2:31
LEGO Non-Stop Trailer RAW Footage (no cropping, no color...)	:49

From LEGO Voldemort Goes Shopping: *Visiting Ollivander's shop.*

From LEGO A Hobbit Halloween: *Frodo and Samwise.*

You can see all these videos at the Brotherhood Workshop's Youtube channel at: *http://www.youtube.com/user/BrotherhoodWorkshop/videos?view=0&flow=grid*, or you can scan the QR code.

The following films are not in the Brotherhood Workshop's Youtube channel:

Middle Earth Motors (commissioned by LEGO) *https://www.youtube.com/watch?v=cN63AvoE_IY*	2:27
Lego Hands Only CPR with Lego Vinnie (commissioned by the British Heart Foundation) *https://www.youtube.com/watch?v=KQ2xNS0Sg48*	:58
LEGO Harry Potter Meets a Rancor (commissioned by The Brick Show) *https://www.youtube.com/watch?v=z4OARND31d0*	1:11
LEGO Dinner at Weathertop (commissioned by The Brick Show) *https://www.youtube.com/watch?v=V96_qNaVz2w*	1:30
Chaisson: Rise of the Zerad (Senior Thesis project in college for Kevin Ulrich) *http://www.youtube.com/watch?v=nvnqKcMzYhQ&list=UUv1w_ArXwvOhS659El_nw4w&feature=share&index=5*	1:25

Spotting the Spinner

Article by Joe Meno

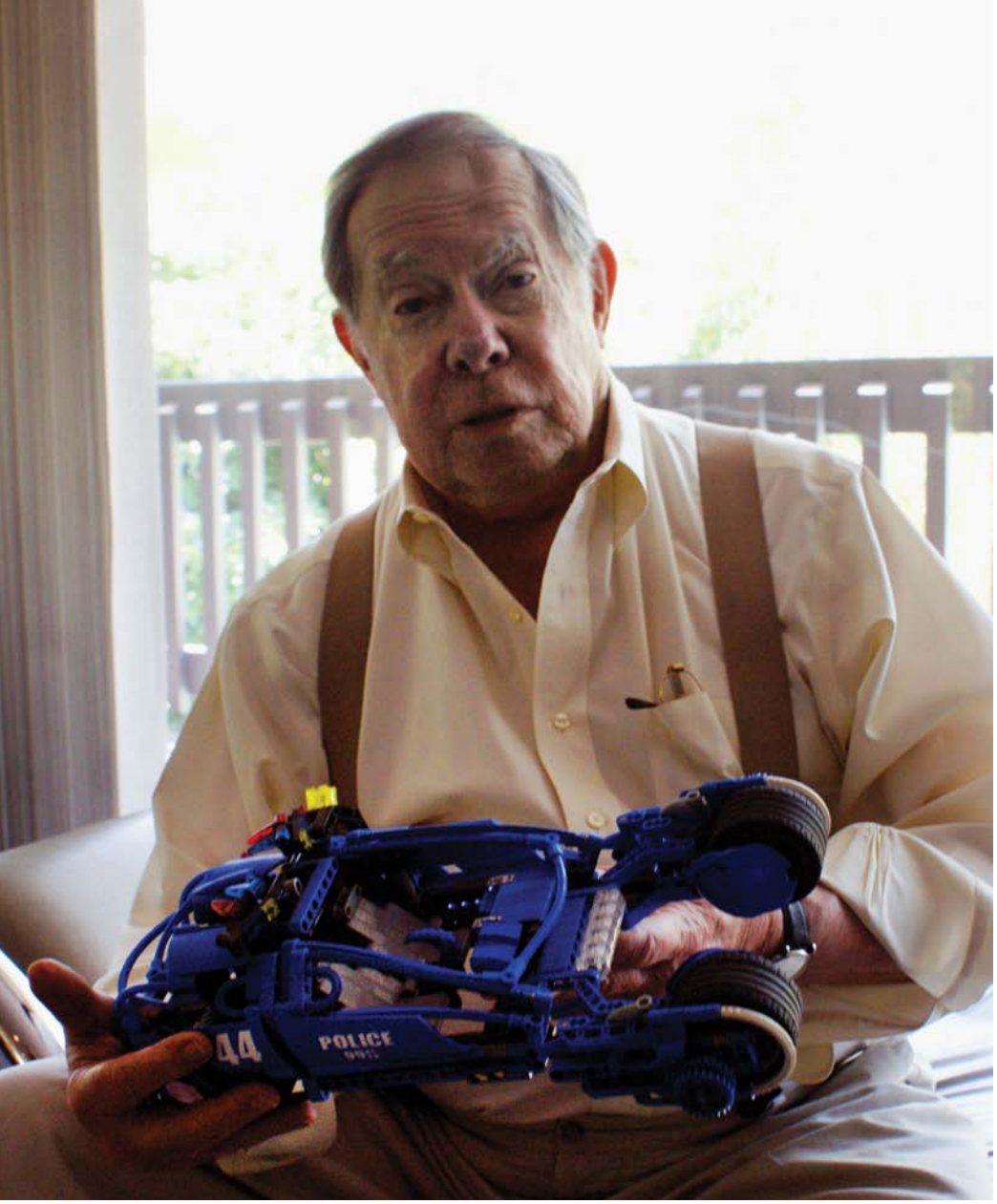
In 2012, I had the good fortune of meeting futurist Syd Mead at Comic-Con International: San Diego. He was signing posters for the *Colonial Marines* video game that was being released later that year, and was a delight to talk to. In the short time that we chatted, I inquired about a LEGO model that he had.

Ten years prior, he was presented with a model of one of his most famous designs, the Spinner from the movie *Blade Runner*. Photos of this model have turned up online (most notably through the website Boing-Boing) and I wanted to know the story behind it. Syd was more than happy to let me visit his studio and examine the model up close.

The story behind the model was a little harder to find.

Syd Mead with a Spinner model.

The Spinner LEGO model, rendered by Pixel Fox.



Syd talking about the LEGO Spinner.

Other views of the LEGO Spinner.

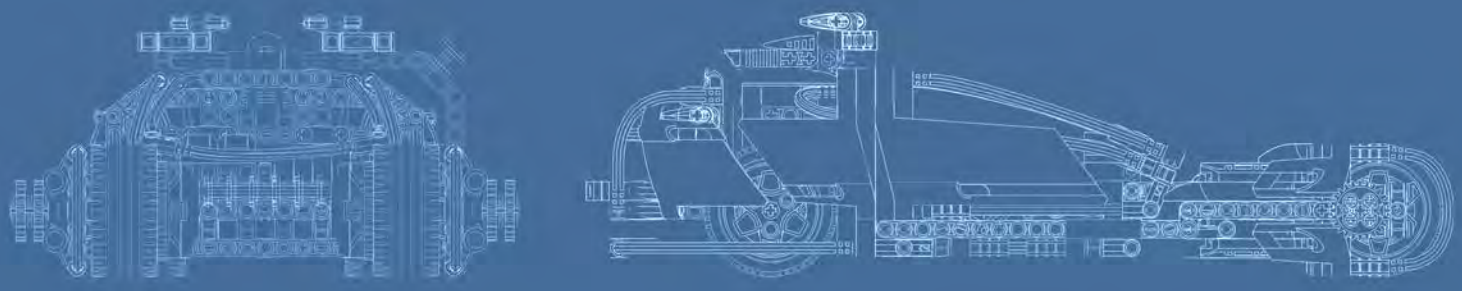
To find out how the model came about I had to do some research both online and offline. While Syd Mead's website mentions a visit to the LEGO Group in 2002 as "VIEW BEYOND 2005" Guest Speaker and Presenter, there is no information from the LEGO archives of this event. I had to dig a little deeper.

Thanks to a couple of e-mails from some retired LEGO designers, I was introduced to Ole Vestergaard Poulsen, Former Vice President of LEGO Innovation. Now a CEO and External Board Member for Product Concept and Marketing - Business Development for Genius Toy Taiwan Co. Ltd, Ole managed the entire creative staff of the LEGO group in the early 2000s. As he recollected, the department was composed of approximately 200 people.

View Beyond 2005

Ole recalls the event: We were conducting a big innovative event where marketing, engineers, designers, and all who participated in the daily work of the LEGO design was present. The big idea was to get inspiration from the outside - so famous people from around the world were invited to come to the LEGO offices in Billund, Denmark to participate in this event.

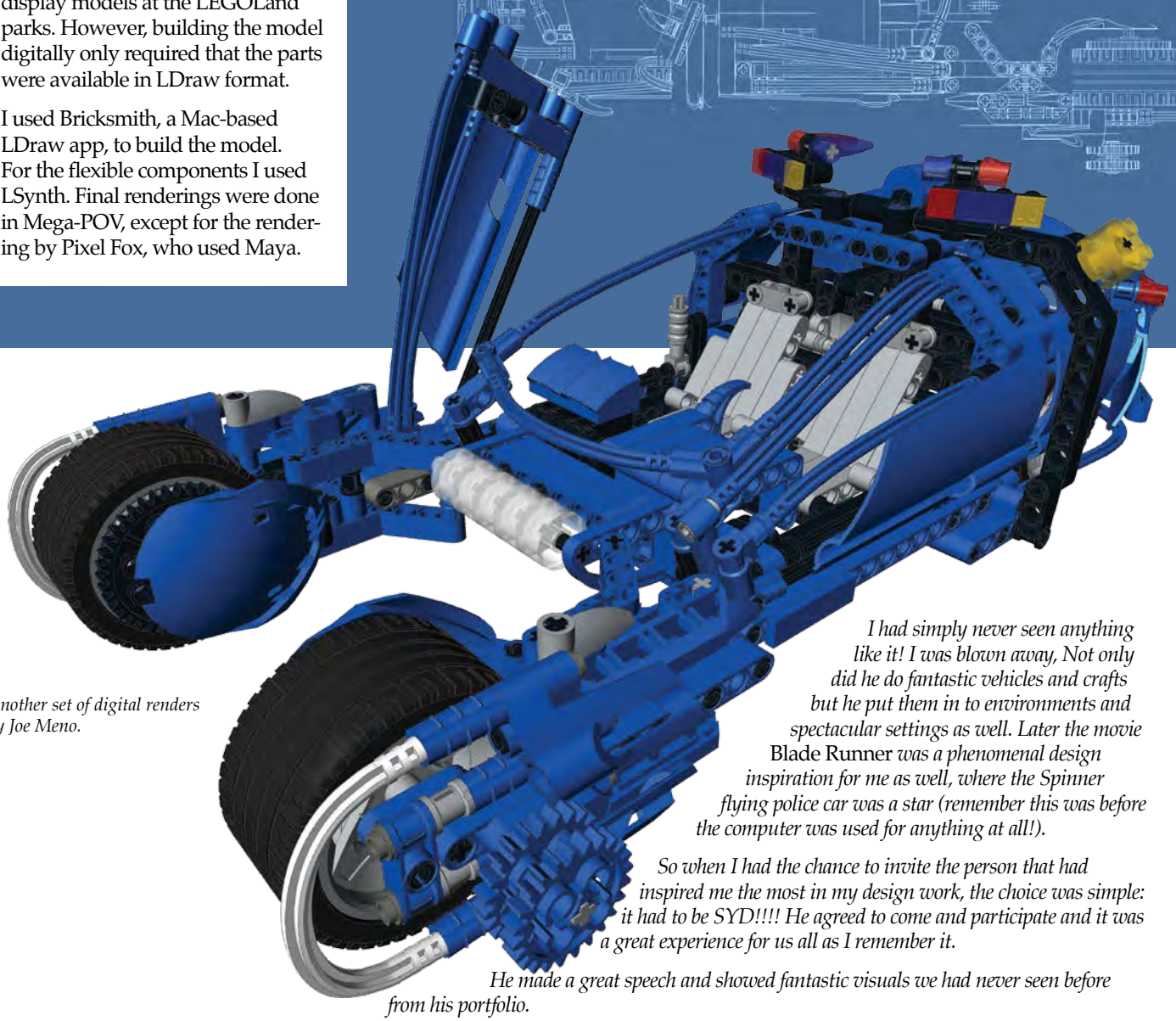
Ole Vestergaard Poulsen: *Being a designer myself and being part of the LEGO development for 23 years, I had always been a big fan of Syd Mead. I started when as a very young designer I visited IDEO, Stanford and design schools including Pasadena Art Center. There I got to view of some of his great futuristic design illustrations.*



Building the Spinner Digitally

The Spinner as seen in the photos has parts that were never produced for sets. Model Designers and Master Builders have access to such parts in developing models or for building display models at the LEGOLand parks. However, building the model digitally only required that the parts were available in LDraw format.

I used Bricksmith, a Mac-based LDraw app, to build the model. For the flexible components I used LSynth. Final renderings were done in Mega-POV, except for the rendering by Pixel Fox, who used Maya.



Another set of digital renders by Joe Meno.

I had simply never seen anything like it! I was blown away, Not only did he do fantastic vehicles and crafts but he put them in to environments and spectacular settings as well. Later the movie Blade Runner *was a phenomenal design inspiration for me as well, where the Spinner flying police car was a star (remember this was before the computer was used for anything at all!).*

So when I had the chance to invite the person that had inspired me the most in my design work, the choice was simple: it had to be SYD!!!! He agreed to come and participate and it was a great experience for us all as I remember it.

He made a great speech and showed fantastic visuals we had never seen before from his portfolio.

On stage, he was given the Spinner as a token of thanks from the LEGO Design Team. James Knight (Now Head of Spin Masters design) actually handed over the model to him as

I remember it, but I am not sure that he actually built the model. I believe it was Jorgen Thomsen, who also built many of the official MINDSTORMS models.

It took probably 3 hours to build the model since it was a quick idea that was built in a hurry.

Receiving the Model

When asked about the Spinner, Syd Mead is appreciative and speaks with pride about it: "I was blown away when the designers at LEGO presented me with the model. All of the significant shapes and relationships of various signature design elements were created with the various stock LEGO modular parts."

He continues: "My partner, Roger and I had a great time after the presentation at the party. I met some really cool guys and the entire visit was exemplary. We were taken care of by LEGO in fine fashion. Afterward, the model was shipped to our house."

It turns out that Ole and James Knight returned to visit, along with Ole's son, Jonas. As Ole describes, "Fantastic experience again and can you believe it? My son Jonas has now graduated as a designer and is still a great fan of Syd's work—so he has inspired for generations!"

Just like LEGO bricks.

A surprise at Syd's studio: a LEGO mosaic of a Gundam sketch.

The Spinner on display with some of Syd's other works.

Another smaller LEGO Spinner is parked alongside the main model. To the right is some of Syd's artwork printed on LEGO bricks...another puzzle series in the works?

Jordan Schwartz' Spinner.

Building A Spinner

Article by Jordan R. Schwartz

The year 2019 is fast approaching, and even though we enjoy many wonderful technologies today—and despite the fact that these technologies are perpetually improving—the world of *Blade Runner* is still far off. Dare I speculate: centuries off. For fans of the film, the most discouraging implication of this fact is the fact that we won't be seeing any Spinners patrolling our skies and streets anytime soon. That's a shame.

This vehicle, designed by perhaps the greatest and most innovative futurist of our times—Syd Mead—is one of the most iconic of the science-fiction genre. Police blue paint, futuristic decals, retractable wheels, a comfortable two-seat interior: this flying car's got it all.

Because of the iconicity of the Spinner, it's no surprise that it's a popular subject to build out of LEGO elements. It's been done before in every system and scale, from TECHNIC to micro. And one of the most interesting facts about the vehicle, especially when comparing models of the same scale or system, is that every one is different. The Spinner is so dynamic that there's no one way to build it, and that offers an inherently fun and engaging model building process for builders who endeavor to tackle it.

For me, I really wanted to build the vehicle in a way that differentiated it from the others that had been built, especially in functionality. There were several options I had during the planning phase to accomplish this. When we consider the Spinner's functionality, there are several features to choose from. Its opening doors, its retractable/spinning wheels, and its police lights are among the most prominent of its features. After weighing these options, the last

A view of the Spinner's underside.

Side view.

Other views of the model.

Also made by Jordan: the characters of Blade Runner. Above, from left to right: Gaff, Eldon Tyrell, Rachel, and Rick Deckard.

Below, from left to right: Leon Kowalski, Pris, Roy Batty, and Zhora.

one seemed like the most fun, especially because 1) other builders have built their own Spinners with functioning doors and 2) building retracting wheels at minifigure scale would've been nearly impossible. So lights it was!

This decision would create two equally important design goals, which essentially created twice the work: build the Spinner accurately and build it with room enough to fit the lights, wires and battery box.

As most LEGO fans know, there is a severe lack of versatile and compact LEGO lights (there are several superb aftermarket lighting solutions, but I wanted to use only official LEGO elements in my model). I ended up settling on the 9V system for my lights, and choose two 1 x 4 9V light bricks (for a total of four lights). Along with the light bricks come the wire and the battery box to power the lights. The battery box was obviously going to take up the most space, and since there was no way to embed it into the model itself, I saved that problem for last.

Because the functionality was as important as the model's accuracy, and since I settled on 9V light bricks, which could not be altered or changed, but rather only built in studs-up, they were my starting point. The rest of the model was built around the light bricks.

More views of the Spinner, showing its lighting.

The Spinner is a vehicle of subtle shapes (certainly, subtle when looking at the spectrum of LEGO elements available.) That's what makes Syd Mead's designs—Spinner included—so beautiful: so often they often exhibit that sleek, clean, geometric brand of futurism we can only hope will come to fruition some day. Therefore, it was important for me to gather blue LEGO elements that also had those very specific shapes in order to build the model as accurately as possible. When looking at the actual vehicle, it could be dissected into three major "sections": the forward wheel prongs, the cockpit and the rear. So I ended up paying special attention to each of these sections of my model, making sure each used the most accurate elements possible so that their shapes were just right.

For the forward wheel prongs, I chose to use TECHNIC figure helmets; they're sleek, round and just the right size for the minifigure scale I was working in. Facing inward, each have an assembly consisting of a blue triangular flag and blue Belville plate facing outwards. These helped to create the correct shape for these prongs, as they expand the further outward they go (since the front wheels are housed in these prongs.)

Moving back, you can see I used triangular black wedge panels for the cockpit. The Spinner's cockpit has a very distinctive and low-lying shape, and there were not many element options available, especially in transparent black. Therefore, many of the minifigure scale Spinners out there use these same elements. However, for an extra level of detail, I stretched a blue rubber band around the windscreen, to look like the window's structural supports. The rubber band helps mask the transparent black windscreen elements from looking too LEGO-like.

The rear area was the hardest to design, not because of its shape, but because this is where I needed to hide the light bricks' wire. I had to create the correct

The Spinner over its base.

shape, but still keep the back hollow in order to snake the wire around; I ended up choosing some blue TECHNIC panels that have a wonderfully subtle curve to them. They created the perfect shape while still allowing me to fit the wire.

From there came one of the more annoying challenges: hiding the battery box. It was frustrating to spend so much time building a movie-accurate model only to have a giant bulky element plopped next to in order to actually power its lights. In the end, I decided to go with building the battery box into a base for the Spinner to levitate over, and I tried to make it look something like a futuristic Los Angeles rooftop. There was one great benefit in keeping the battery box close to the vehicle itself, though: I was able to add an old 9V sound brick on the base! This element, which is essentially a 2 x 2 round brick with vertical grooves all around, added a police siren sound effect to blare whenever the lights flash!

The finishing touches to the model were its decals and stickers—all official—which I added in several key places on the model, one of the most important being the yellow and black striped hazard pattern along the base of the vehicle's doors.

All in all, this may have ended up as one of my most accurate models, primarily because of its realistic functionality. It was a terrifically fun build, and my desire to differentiate mine from the others that had been built provided me with an extra-fun challenge! As LEGO fans, we know that eventually, we may have to dismantle our models to save space or because we need their elements. But *Blade Runner* is such a phenomenal film and Syd Mead's Spinner is such a fantastic vehicle, this is one model I will never disassemble.

Arlene (Natalie O'Donnell), Vjay's ex-wife and mother to Priyanthi.

Taj: Making a Movie Taj Mahal

Article by Joe Meno, Arthur Gugick and Shannon Sproule

Photography provided by Arthur Gugick, Shannon Sproule and Oziinda Films Pty Ltd.

Priyanthi (Coco-Jacinta Cherian) and Vjay (Mahesh Jadu) share a moment by the model.

Before the release of *The LEGO Movie,* there was a movie that had a LEGO model as a central element. The Australian movie *Taj,* released in 2011, revolved around a father (Vjay) reconciling his relationship with his estranged daughter (Priyanthi) by building with her a LEGO model of the Taj Mahal. However, the model wasn't built by the movie crew; it was built by an AFOL, Arthur Gugick.

Arthur has been featured in *BrickJournal* before in issue 4, showing his architectural builds. Among those models was his rendition of the Taj Mahal, which can be also seen online. The online gallery was where Arthur was discovered. Arthur remembers, "When Winston Furlong (director of *Taj*) first contacted me in February 2008, I thought I was being punked. I couldn't believe that somebody was actually making a movie with a central theme of a LEGO model. He had asked one of the set builders to make a LEGO model of the Taj Mahal and the guy told Winston that he couldn't do this. So he got online and he googled "LEGO Taj Mahal." Because I built two models previously he saw them and called me up! I guess I realized he was serious after he started sending me money to my Paypal account in order to pay for the pieces for the LEGO model."

Making the Taj Mahal model for the movie posed other challenges. When Arthur built it, they asked him to build it very sophisticated, but very delicate looking and yet look like it could have been built by a precocious 12-year-old. Winston also had creative control over the model, which is atypical. As Arthur notes, "I would send pictures to him and Winston would say, 'Make this bigger, make this bigger, make this smaller.' I would reply, 'Yeah, but that's not what the Taj Mahal looks like...' And he'd answer, 'You don't understand, I want it to look good on film.' So he knew the way it was going to be filmed and how it was going to look. He also knew that when most of the people look at the Taj Mahal, they look at it from the ground, looking at like a 30 degree angle up at it. Most people don't look at it at eye level. As a result, the model I built was not architecturally sound in some ways, but it does look architecturally sound when it gets filmed."

Another challenge was getting the materials needed to build the model. Winston was trying to get in contact with the LEGO Group and after some effort, finally managed to speak with some people and worked out a deal with LEGO Australia to give him the parts to build a second LEGO Taj Mahal. For this, Arthur had to do an inventory of

every single piece needed and used in the first model. The end result was Excel spreadsheets that were probably 20 sheets long, of every substructure and every piece in these substructures.

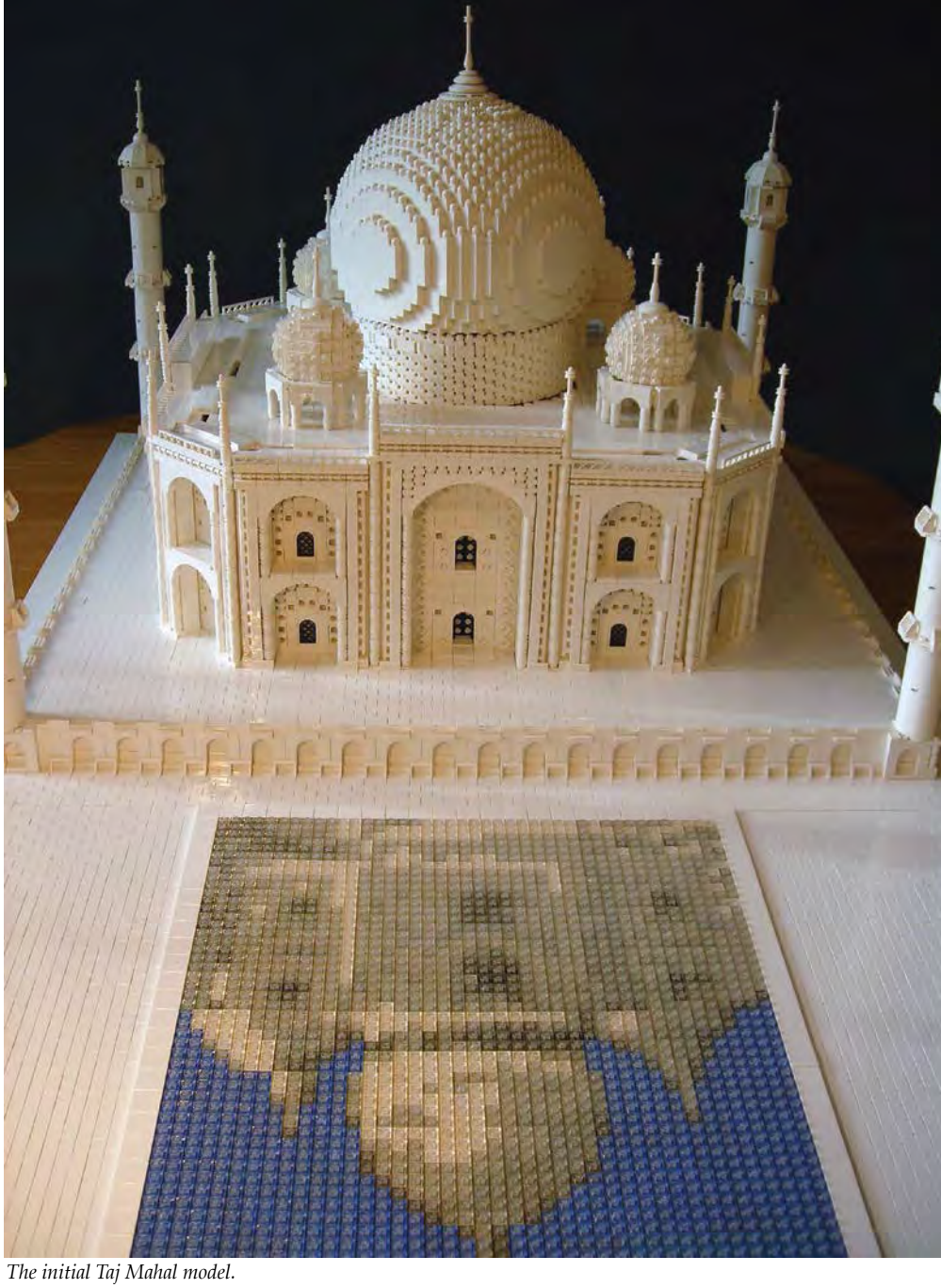
"The lists were all sent to Winston, who sent it all to LEGO Australia, who said they were getting all the pieces together. The idea was when I arrived in Australia, these 25,000 pieces would be there so I could build the second model." However, about a week or two before he was supposed to go to Australia, Winston called Arthur with bad news: LEGO Australia backed out of the deal.

With about a week-and-a-half before going to Australia, Arthur ordered about 50,000 pieces from 10 different Bricklink dealers. Everything was ordered on special order or next day delivery, so when Arthur arrived in Australia, he had the one trunk with the finished model and then a big suitcase with another 25,000 pieces in it that he had collected in a week-and-a-half.

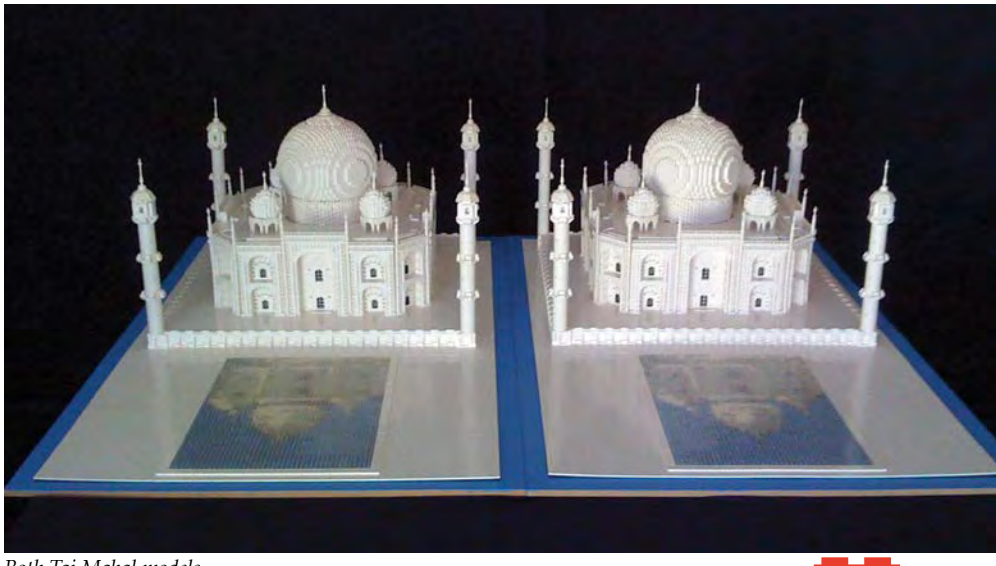
Arthur spent about 10 days in Melbourne building the second model. Shannon Sproule, another AFOL, was there to help and that was pretty wild too. Shannon was the LEGO continuity person. It was Shannon's responsibility to say, "Here's where we are on the timeline, I've got to take it apart this much or build it up this much using the components I gave him." They needed the two models for the movie, because the movie is not filmed chronologically. They might need the model built at one stage in one scene and need it built at another stage, so they needed two different models at all times.

When asked about the *Taj* shoot, Shannon recalls, "It was awesome to meet Arthur, he's such a funny guy and a really clever builder. I was really intimidated at the sheer size of the model initially (I'd never built anything that large before) but after an afternoon of Arthur showing me how the model was built in modular sections I began to breathe once more. I practiced taking it apart and rebuilding it again under his watchful gaze."

About the models, Shannon is pretty explicit:"Thank goodness Arthur built two complete Taj MOCs for the movie; having two replicas enabled me to keep one "finished" model which we only slightly modified for some "in progress" shots while the other one we disassembled quite a fair bit for the scenes where the characters are only just starting to construct the Taj Mahal. Having two saved a lot of time and headaches!"



The initial Taj Mahal model.

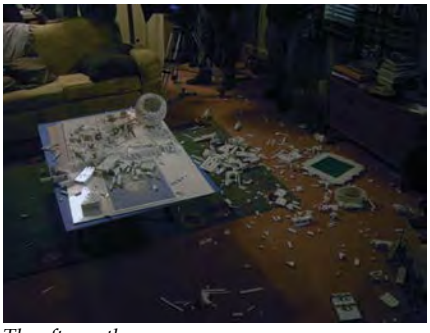


Both Taj Mahal models.

Taj Mahal sections.

"I was singing Arthur's praises particularly loudly towards the end of filming as one scene called for the main character in the story to smash the whole model in a fit of rage. With only a solitary Taj Mahal it would've taken me a long time to rebuild it, but with a spare one safely aside, the actor could let loose on the poor 'stunt' Taj... and let loose he certainly did!! Before shooting this one-take scene, I loosened all of the reinforcing parts of Arthur's MOC so that it was quite flimsy and (hopefully) the actor wouldn't tear open his arm when he swiped at it. (LEGO can draw blood as I'm sure many have already found out!)"


The stunt model gets destroyed in a fit of anger from VJay.


The aftermath.

One last surprise happened at the filming. Shannon tells the story: "At the end of the movie, the crew were trying to get the model out of the two-story apartment and they found it was too big to go through the door, so they lowered it through a window. What they found was the turrets kept blowing in the wind, so what they had to do was glue a good deal of the turrets and any other parts that swayed to the wind." Arthur notes, "I do know that a large part of my model was glued."

For Arthur and Shannon, this was a once-in-a-life experience, and Shannon states it best: "Helping out on the *Taj* movie set was exciting, stressful, exhausting, educational, hilarious, at times boring, silly, amazing and *fun*! There were long periods of standing around doing nothing, waiting for when I was needed, and also long nights rebuilding Taj sub-assemblies on my lounge room floor, and very early weekend morning starts during winter. But what an incredible experience! I would do it all again in a heartbeat. I feel very lucky to have been a part of this movie and am indebted to so many people, both Winston Furlong, the director ,and the film crew for putting up with me and my many inane questions; Scott Armstrong for helping out heaps and being my fellow "Lego-nerd" on set, but also Chris Phipson, Mark Kelso and Brian Kescenovitz for hooking me up with Arthur, without which I wouldn't have been a part of this experience."


From left: Arthur Gugick and Shannon Sproule.

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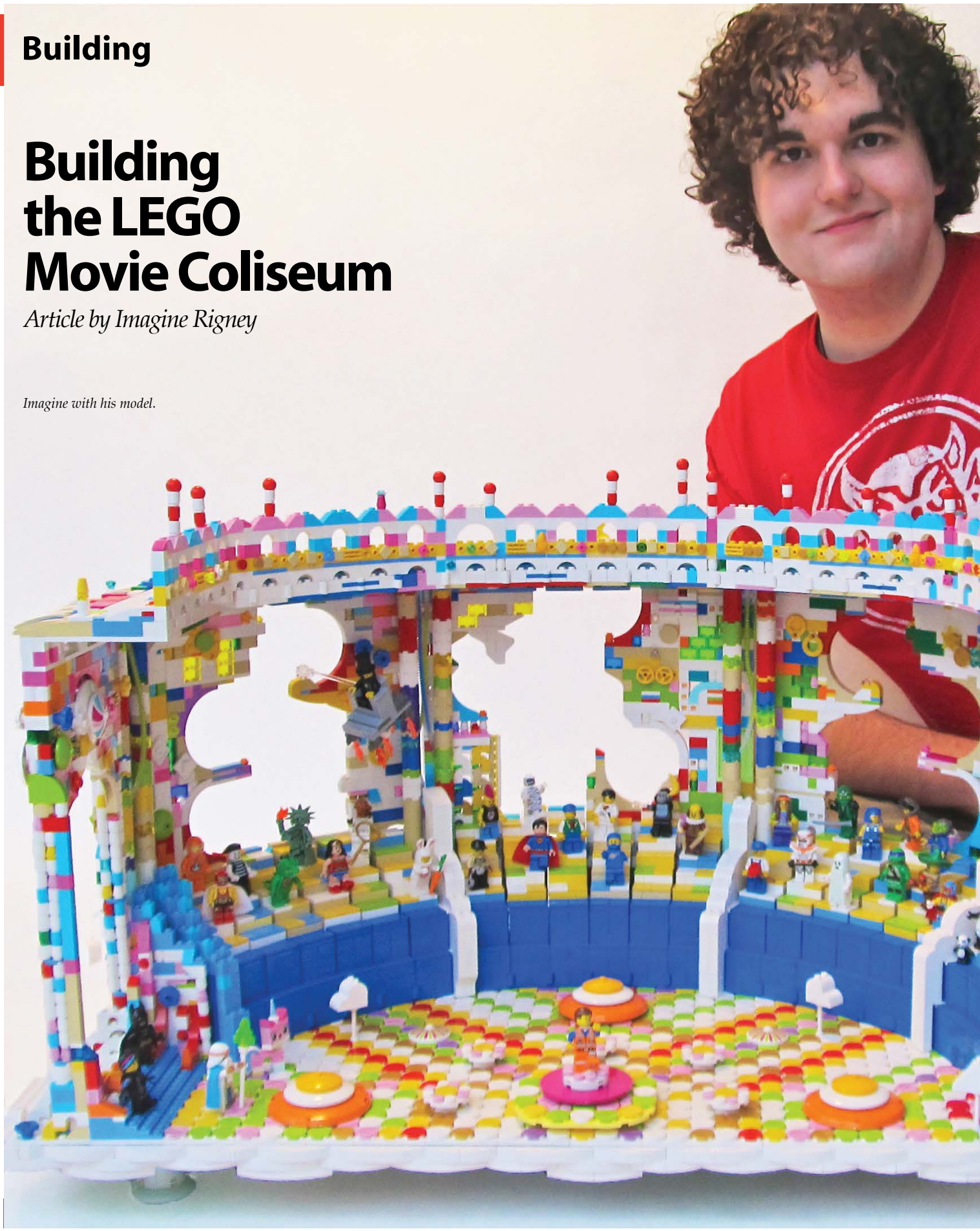
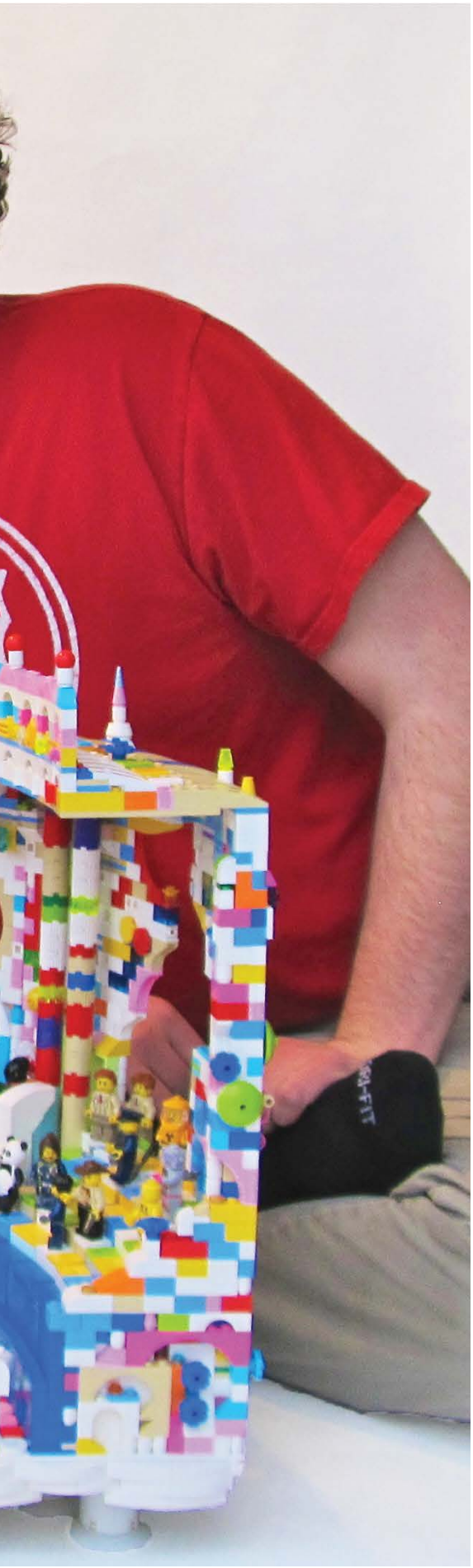
Building the LEGO Movie Coliseum

Article by Imagine Rigney



Imagine with his model.



Building something from a movie is almost always a daunting project. Building from a movie that hasn't been released is an even bigger challenge. Imagine Rigney takes this in stride:

I like a challenge. The LEGO® Movie premiere you say? Build something and get to see the advance screening? Why yes. Yes I can. And I like to build big, so the coliseum scene from the movie trailers was the only way to go—and finally a chance to utilize all the colored bricks and greebly bits in my collection. To be honest, I had no idea that much color in one MOC could actually make me dizzy while building. It's definitely a *High Definition* build.

Since there were only a few interior glimpses of the structure in the movie trailers, I kept playing those over and over, pausing and taking screen shots so I could piece together what I thought it might actually look like. When I got to the point where my Mom was singing "Everything is Awesome!" around the house all day I knew I'd played them enough. While attending the premiere screening of the movie I think I said out loud, "Oh! It's a dog!" when finally getting to see the exterior. So I guess the lower section I built is essentially the collar around the dog's neck—or something like that. The build took five days and a couple of parts orders; I needed more of the round tiles for the coliseum floor and some hinges to get the curve of the walls.

LEGO® Movie Coliseum was built by Imagine Rigney for The LEGO® Movie premiere screening display by CoWLUG (www.cowlug.net) at United Artists Colorado Mills Stadium 16 IMAX Movie Theater in Lakewood, Colorado on February 1st, 2014. See more of Imagine's work on Flickr at http://www.flickr.com/photos/imaginebrickzone/ or scanning the following QR code:

BrickJournal *will have more of Imagine's work in a future issue!*

A look at the outside of the coliseum behind Abraham Lincoln.

Looking down on the coliseum.

Looking into the coliseum, with Master Builders looking on.

A higher view shows off the colors of the coliseum..

The Real LEGO® Master Builders!

Article by Joe Meno
Photography and art provided by LEGO System A/S.
Big Figure session photos by Julien Vandon.

The LEGO® Movie *was released with great fanfare and great reviews in February 2014. Only a few years before, though, the movie was only a script. While the story was being sketched out, the look of the movie was being developed. Naturally, the filmmakers teamed up with the LEGO Group's design team to co-create the models for the movie.*

Matthew Ashton, Vice President of Design at the LEGO Group, was an important part of the movie design and eventually became one of the Executive Producers of the LEGO Movie. BrickJournal *spoke to him about some of the designs that became sets for the movie.*

BrickJournal: ***When was the decision to go with a stop-motion animation look made?***
Matthew Ashton: This was made pretty early on in the process. Phil Lord and Christopher Miller, the directors, wanted the look to be as true to 'real' LEGO® bricks, figures and components as possible. They were also really inspired by the charm and simplicity of the fan-made stop-motion videos you can see on-line. They wanted to create that look on a much grander cinematic scale. Of course, we were in full support of this direction as we agreed it made a lot of sense, and was a really true representation of our brand and toys. It was also really important that the animation style looked new, fresh and different from the style of animation we use in our TV shows and video games.

How was the animation studio chosen?
Animal Logic was chosen because they deliver extremely high-quality 3D animation. Their previous work includes animating *Happy Feet,* which won an Academy Award for Best Animated Feature as well as the BAFTA Award for Best Animated Film. Animal Logic also had previous experience working with The LEGO Group, as they produced and animated our 30-minute TV special and DVD/Blue-ray release of *LEGO® Star Wars™: The Padawan Menace.*

Chris McKay was also brought on board as animation co-director. McKay has directed many episodes of the extremely funny stop-motion show *Robot Chicken,* so his background, style and humor were a perfect match for overseeing the stop motion look of *The LEGO Movie*.

How was set design handled in the LEGO setting of the movie?
All the locations in the movie were pretty much developed between the directors and the team at Animal Logic. We assisted in an advisory role, offering advice here and there on building techniques and providing inspirational models and images. We agreed pretty early on in the process that our main focus from a LEGO Group perspective was to concentrate our collaboration efforts on designing the hero characters, supporting cast and lead vehicles.

How was vehicle design determined?
This was quite an organic process, working back and forth with the directors and the studio, as it was extremely important that the vehicles looked great and made sense in the movie, but could also work as toys, since the idea is that the film very much reflects what is possible with the actual toys and figures.

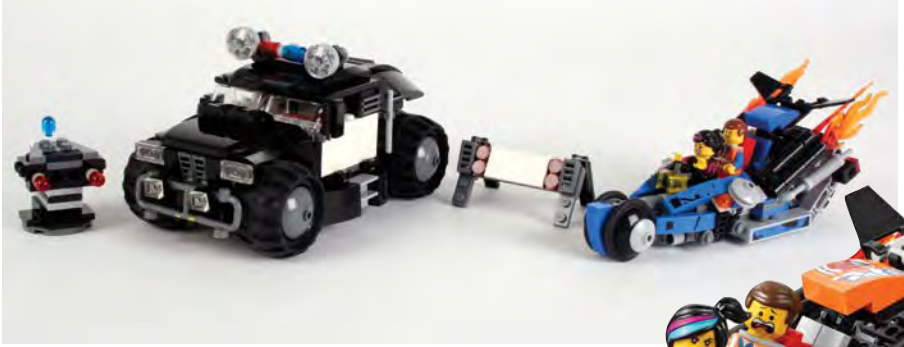
Different vehicles were designed in very different ways. Very early on in the process we arranged what we call a 'Design Boost' to kick the process off. We gathered a large group of designers from multiple projects together to flesh out all the ideas they had for each of the models featured in the script. I had read through the script multiple times, identifying the key vehicles and components that we would need to create. I wrote briefs for the designers explaining how the model would be seen, the role it would play in the movie, and the features or functions it would need to incorporate, as well as basic info like how many characters it would need to seat. The designers then spent three solid days building like crazy to get all of our ideas out. Phil Lord (Director) and Dan Lin (Producer) had flown to Billund to attend the event. What we created within those few days was an awesome starting point for the rest of the movie.

From then on Michael Fuller, our Senior Designer on the project, worked on refining these ideas and creating new ones as the movie developed and script changes came in. It took about 6 months to get all the vehicles designed, approved and locked for the movie. As we were working in three different time zones, with the directors based in LA, Animal Logic based in Sydney, and us situated in Billund, Denmark, this required a lot of video conferences and late night phone calls discussing design tweaks until all the models were perfected.

Previous page and above: Michael Fuller (with hat) and Matthew Ashton strike poses with a few of the stars of the LEGO® Movie.

Above and left: Sketch models for Bad Cop's flying police car, which resulted in the final model seen below.

Above: Different colors of Wyldstyle's Super Cycle.



Above: Sketch models of the Super Cycle set (#70808), with the initial final color cycle.

Right: The final production model.

Some models flew through the process. Bad Cop's flying police car hit the nail on the head very quickly —the directors loved Michael's initial design. Vehicles like Wyldstyle's Super Cycle took a lot more work. This vehicle was particularly tricky to develop as you see it being built in the movie from components that Wyldstyle is tearing off buildings and dumpsters in a back alley. We were really down to the wire developing this one, and had to make a last-minute change. We had worked on several color schemes throughout the development, and the directors had decided on a blue version, but at the last minute we realized it wasn't visible enough on screen, as the sequence was set at night and the vehicle was too dark. So we switched it to orange.

Some vehicles were also created directly by the directors and Animal Logic. They built the Batwing™, Batmobile™ and the race car/pig wagon seen in the Old West chase sequence.

Metalbeard's ship *The Sea Cow* was one of the biggest challenges for both us and Animal Logic, mainly because of its size. The version in the movie is absolutely colossal. It was challenging to produce a building set that represented its true scale. First, Michael worked on initial sketch models and shared them with the directors. They wanted to push it in a more whimsical direction, with a large towering stern, so they sent us some concept ideas and Michael refined it from there. In the end, we decided that we simply had to work on two models based on the same silhouette: one for the movie, and one for the toy. Both were complex in their own right, and would never end up looking identical. We are extremely happy with how both versions have turned out. The movie version looks epic, and the LEGO set is jammed full of details and is the largest pirate ship we have ever produced!

How was character design determined? This was a similar process to how the vehicles were created. Sketches and ideas were sent back and forth, and sculpts and graphics were refined along the way. In some instances the directors had a very clear vision of what they wanted a specific character to look like. For others we drew up suggestions and worked with the studio until we were all happy.

There are 183 characters in the movie, so there was a lot to keep track of. We had a huge chart on the wall of our design studio to keep a record of who had been approved and who was still work in progress.

We designed many of the figures in the same way we do when we are creating them as actual toys. New wigs were sculpted and 3D-scanned, and accessories were created using digital 3D programs. As the whole movie was supposed to look like real LEGO minifigures had come to life, the surfacing team at Animal Logic wanted to know every detail of where split lines and molding patterns were likely to be, and what kind of textures would be used on the plastic surfaces, so they could recreate them to make the animated figures seem as real as possible.

Above: Michael Fuller works on the Sea Cow *model.*

Matthew Ashton and Michael tracking the many minifigures in the LEGO Movie.

Matthew Ashton and Gitte Thorsen work on a minifgure hairpiece.

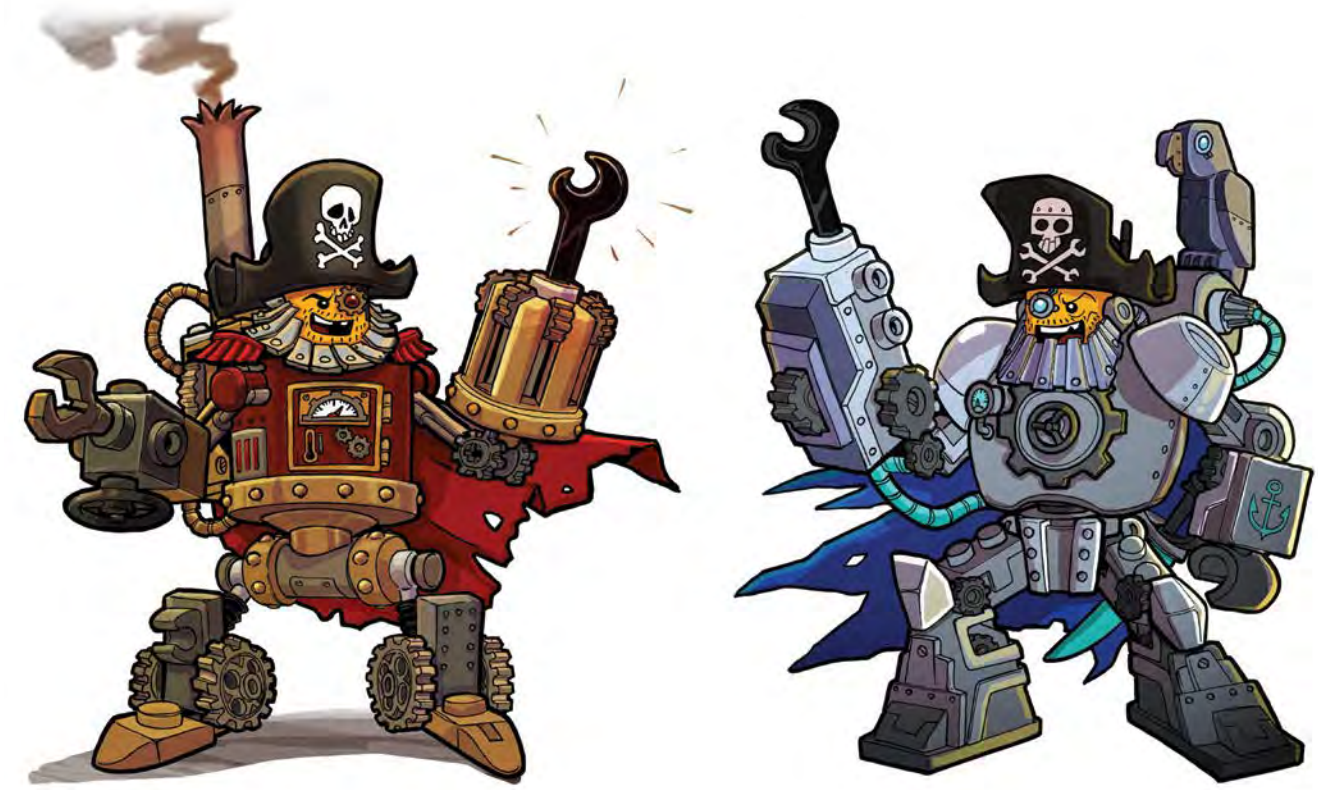
The regular minifigures were the easier characters to develop, as some were based on existing characters (like Benny the spaceman, as well as Bad Cop/Good Cop to a certain extent). All we had to do with them was to tweak the details and get their expressions right. Wyldstyle and Vitruvius took a while to lock down as direction for them was more open. We ended up working on many different versions of those. The brief for Vitruvius was pretty much: mystic/prophet/washed-up hippie with a disco cape and glowing eyes.

Below: Hair sculpts and their final figures.

Vitruvius

Wyldstyle

Emmet



Initial sketches of Metalbeard.

Of course the non-minifigure characters like Metalbeard and Unikitty required much more work, as we pretty much had a blank canvas on those guys. We were sent a lot of different concept art to develop Metalbeard from, and we drew up our own sketches too. The biggest issue with Metalbeard was getting his scale right. The directors wanted him to tower over the rest of the team, but we also had to take into consideration a lot of practicalities, like how he would fit in his ship, and how he would work in the different locations on screen. Michael Fuller collaborated with the film's production designer Grant Freckelton, of Animal Logic, to build multiple versions of Metalbeard, loading him with every pirate-y icon imaginable, until he emerged as a swaggering Swiss-Army knife type character—equipped to deal with any unfortunate circumstance.

Michael working on Metalbeard.

Scale studies of Metalbeard, from initial impressions below to more refined studies seen below right.

Above: Metalbeard, nearing completion.

Above: Another sketch model.

The final Metalbeard production model.

Unikitty was a completely different story. She wasn't even part of the story to begin with. Cloud Cuckoo Land had been imagined long before her, and was originally ruled over by another character. That character simply did not work at all, so it was back to the drawing board. We felt the team was missing someone who was emotional, sensitive—someone who could make you beam with joy and make your heart melt. We needed someone cute, innocent and utterly adorable! So we joined a conference call with the directors to thrash out some ideas and ended up having a brainstorm of what the cutest, cuddliest, fluffiest things in the universe were. Our top two picks were kittens and unicorns—to make our new character extra magical, we decided to combine the two!

Having established the concept, the directors had some concept art drawn up for the new "Unikitty," and it just didn't seem to work. They tried variations where she was the size of a horse with a cat's head, so the other characters could ride around on her back—but this made her lose all cuteness as she was so big (and in all honesty, she was slightly terrifying!). Other variations were either too complicated or just didn't look enough like a LEGO character. I was itching to get my paws on designing her! As the directors had worked with me for a while, they had become aware that the inside of my head resembles Cloud Cuckoo Land: I am slightly obsessed with anything uber-cute or with big eyes, so the directors basically said, "Matthew, this one is up to you!"

I took the initial designs for Unikitty and then switched her around quite a bit to make her more kitten and less unicorn, and scaled her down to enhance her cuteness. We worked on creating several brick-built solutions, and ended up picking the one that had the simplest form. Making her from bricks rather than as a pre-molded animal was really important to me, as I thought it would help express the creativity that she needed to represent. I then worked with one of our Concept Designers, Matteo Oliverio, to create different graphic looks and expressions for her face. We also developed a new simple tail piece. In a matter of weeks, we had given birth to our brick-built bundle of bubbliness—Unikitty! The directors loved her and approved her pretty much on the first pass.

Below: Unikitty's development sheets, including:
Top: Test builds and sketch models.
Center: Color model tests.
Bottom: An expression model sheet.

More color development is done for Unikitty.

Matteo Oliverio (left) and Matthew discuss color choices on Unikitty.

Unikitty as seen in the Cloud Cuckoo Palace (set 70803).

Unikitty's movement model sheet, with two versions of the character!

Unikitty and her designer, Matthew Ashton!

Unikitty's scale sheet.

Were any of the designs specifically meant to become LEGO sets from the beginning, or did LEGO set ideas come from designs afterward?
First and foremost, our main objective with this project was to create an awesome movie with a compelling story. That was and always has been our number-one goal. We were very aware that there may be some nay-sayers out there with the notion that The LEGO Group is just jumping on the Hollywood bandwagon to sell more toys. That was definitely not our objective. In many respects, LEGO bricks are a creative medium, like modeling clay is for a *Wallace and Gromit* Movie. We wanted a movie that demonstrated the endless possibilities of what can be created from our building system, and a story that celebrated our brand in general. LEGO toys have been used to tell stories and create role-play scenarios for decades now; the cinema screen is just another canvas on which to express this.

The writers were given complete free reign to pen a story that they thought would make a great movie and would be truly unique to LEGO, a story that no-one else could tell. Once we were happy with the overall synopsis and the script, that is when the collaboration began on creating the line of toys. I am sure many people would imagine it is the other way around, where we created our optimal toy line, then took it to some directors and said, "Please, can you make a movie about these things"! This was definitely not the case.

The toy line was created simultaneously with the development of the movie models. Some of them we instantly felt would make great toys. Others were more risky, and there were also a few no-goes that will remain on-screen only and didn't become toys. The great thing about *The LEGO Movie* is that it has given us the opportunity to develop products that we would have never risked doing in the past. At the outset there was a lot of skepticism regarding things like, for example, if an ice cream truck that turns into a flying attack vehicle could be a compelling thing for children to build and play with? Or would characters like Emmet and Unikitty, who are completely new and have no equity from comics or television, be appealing to the audience? We just had to trust our gut and take a few risks here and there. It is going to be really interesting to see how this line performs. We are confident that there are some slam-dunks in the line-up, but there may also be some items that just do not work. This has been a huge learning experience for us all along, and it has challenged us as a company to go to places we may not have otherwise gone. I am personally extremely happy that we have had this opportunity, and proud that we have been bold enough to take some of the steps we've taken.

Ice cream truck sketch model.

Ice cream truck sketch model transformed.

With all of the characters from various sources and from the LEGO catalog available, was it a challenge to combine them to one LEGO setting?
We have been very conscious to create a good balance of characters for the movie. The main team is all original LEGO characters with the exception of LEGO® Batman™ (who is absolutely hilarious, may I say!). Otherwise we have used a range of other IP characters and fan-favorites mainly as cameos throughout the movie where they made the most sense. We have been extremely fortunate that many of our other partners have given us permission to use their IP characters in the movie. I'm bursting to tell you who they are, but my lips are tightly sealed and you will have to go and see *The LEGO Movie* for yourself to find out! b

Ice cream truck as seen in the Ice Cream Machine (set 70804)

Some of *The LEGO Movie's* 'Extras'

This model was made by Chris Malloy for the category, "History Books."

Article by Joe Meno

Photography provided by Chris Malloy, James McConnell, Alatariel Elensar, Karf Oohlu, Ryan Howerter, Simon Liu, and Will Heron

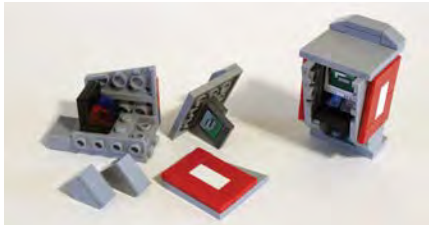
In late 2013, the LEGO photo site ReBrick held a MOC competition for its curators to place their work into *The LEGO Movie.* Models that were bookmarked by ReBrick members and curators were submitted for consideration for 'cameos' in the movie. Of the categories selected for consideration, seven models won.

While some of the models did not make it to the movie, all are great examples of building and creativity.

This model was made by James McConnell for the category, "Voting Machines."

Below is a breakdown of the voting machine.

Note that the voting console is a new inverse bracket with the studs inside, as opposed to the older brackets that have the studs facing out.



This model was made by Alatariel Elensar for the category, "Dairy Products."

This model was made by Karf Oohlu for the category, "Clown Town."

This model was made by Ryan Howerter for the category, "Music."

Below is a breakdown of one of the record shelves.

This model was made by Will Heron for the category, "A Gas Station."

This model was made by Simon Liu for the category, "Knight's Club."

The completed display.

Recreating *The LEGO Movie's* Bricksburg

Article by Ed Diment

Well, I don't think anyone can have escaped the fact that *The LEGO Movie* is upon us. There has been great publicity surrounding the fact and Warner Brothers have been thinking up as many ways to promote the movie as possible… which is where we come in. We are Bright-Bricks, a UK firm of professional LEGO artists headed up by me and my business partner Duncan Titmarsh, the UK's only LEGO Certified Professionals. In November last year, Warner Brothers and LEGO® UK contacted us with an interesting inquiry.

As part of the promotion of *The LEGO Movie* in Europe, Warner Brothers had decided to have a touring *LEGO Movie* venue. This would involve a huge truck whose trailer would fold out to create a large internal space where lots of activities would be available for visiting children to get involved in. The crown jewel of this mobile fun palace was to be a copy of part of the set from *The LEGO Movie*, i.e. Will Farrell's Bricksburg LEGO town layout. This was to be no ordinary static model; the design was to incorporate a snaking road between the buildings that would allow a LEGO car to travel through the set. Cameras strategically placed in the buildings would then film this drive from different angles before the footage became edited into a mini movie. Best of all, children would get to design and build their own vehicles to allow Emmet, *The LEGO Movie* lead character, to ride in them along the street.

So, our brief was to build the set, incorporate a snaking road, and create a channel in this so that a custom track could run underneath moving a mini platform on which each vehicle would be placed to make its run. We were to simulate the buildings as closely as possible, populate the scene, make skyscrapers nice and tall, fit all of this into a tight, predefined space, and all in a little over three weeks, including design and delivery… oh and Christmas fell in the middle of all this—a piece of cake, then!

What followed was a frantic but enjoyable build, surrounded by construction workers adding steelwork for a new mezzanine floor to our studio/workshop, leaving us with a feeling that a theme of the movie was being echoed right there in our midst.

The layout was set at 2.4m (8ft) x 0.75m (30 inches) and as with many of the dioramas we build, this started out with a thick sheet of plywood on which to base the model—this is typically how we introduce rigidity and ease of transport. We were provided with stills from the film, posters and as much other reference material as possible from which to work. Then came a call from Warner Brothers asking if we'd like to come to a private screening of the movie at the company's headquarters in London for research purposes. Would we? Did they just ask if we want to see *The LEGO Movie* two months ahead of its official release? Does a LEGO brick hurt when you step on it? Of course! So a couple of days later, there we were watching it. This proved very helpful, especially seeing the set towards the end of the film in quite a lot of detail.

We soon realized that the street where Emmet lives is based largely on buildings in the style of the LEGO Café-Corner compatible range of sets. This was a style that a number of us were familiar with, so it became a good starting point for a build. We had deliberately designed the curve of the road to maximize the number of 32x32 stud and 16x16 stud areas we could in order that the buildings could be modular and interchangeable in case Warner Brothers wanted to move them around. Next we had to ensure that each building utilized the 1x4x3 window elements somewhere on their floors and facets. This was due to the fact that these turned out to be just the right size to allow a Go Pro® camera to sit behind one and get an unimpeded shot. Finally, we made all the storeys separate and left out much of the floor to allow cables to be run into the buildings and for the cameras to be set up in a variety of ways.

A look at the skyline.

Some roof details.

The aircraft warning lights.

The next trick was making the skyscrapers work. For these we only had a strip 16 studs deep available at the back of the set. In addition, we needed to allow for a sidewalk in front of these to adjoin the narrow back street behind the main street, so we left as narrow a strip as we dared: a mere 4 stud deep sidewalk. The result was skyscrapers as much as 1.4m (over 5ft) tall that were only 12 studs deep front-to-back! Visually this worked as the buildings were up against a backdrop that created the illusion of depth. Structurally, however, this necessitated building skyscrapers with strong cores and robust build methods. We simulated the skyscrapers as closely as possible from the movie and included street level detail as well as roof-top detail, in addition to varying the design as much as possible. Finally, we ran cabling up the inside of the tallest skyscraper to power two flashing red LED warning lights for low-flying aircraft.

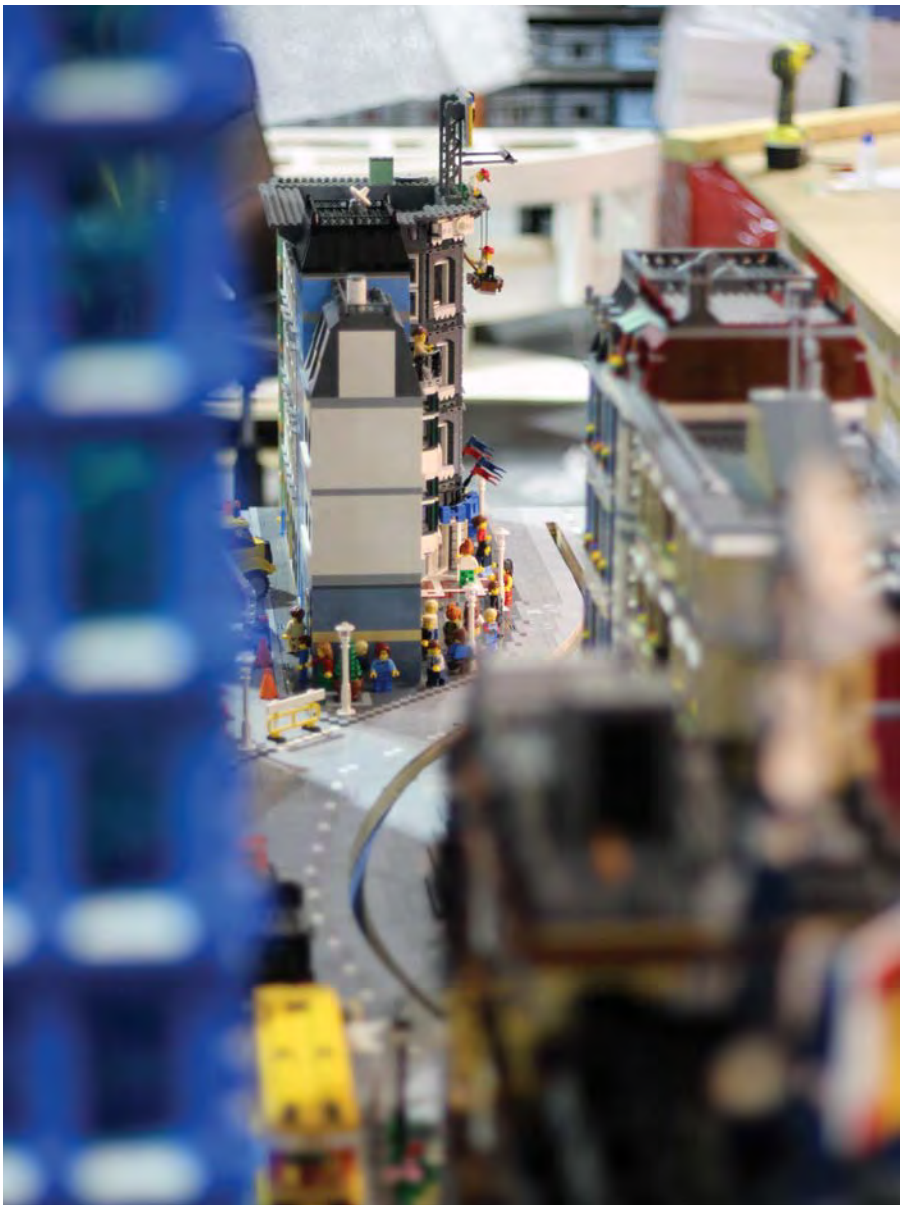
The front block of the display.

When it came to test fitting up the model, everything went together perfectly. Our only snag was actually the corners of sidewalks at a couple of junctions that could have fouled the progress of the car models running down the street, so we peeled off some tiles and stepped some more rounded corners. All that was then left was to dress the set with vehicles, minifigs and animals. We tried to inject as much interaction, activity and humour as we could into the finished piece and I think we managed to get in some great little touches.

No sooner had the finished touches been placed on the model than a courier arrived to whisk it off to the North of England for it to be installed on the newly created mega-truck, which promptly left on its European roadshow. The tour began with the release of *The LEGO Movie* starting in Madrid before heading to Rome, and will tour Europe over five weeks from mid-February.

All that remains now is to say that if you haven't been to see the movie, get on and do so; we certainly enjoyed it and very much enjoyed working on this special project.

One of the street sides.



A glance at the road and track for the children's cars.

The display ready for filming!

BrickNerd DO IT YOURSELF FAN ART!

Film Camera

Design and Instructions by Tommy Williamson

About this issue's model:

When I was nine years old, two very influential things happened to me. One was a trip to Universal Studios Hollywood and the other was the release of a little space movie you've probably never heard of, *Star Wars*. There is no other way to describe it, I was rocked to my core. I didn't know how, I didn't know why (and I still don't) but I knew from way back then, I was going to work on movies. And this month two of my passions are colliding with the release of *The LEGO Movie*. So what better DIY Fan Art model could you have when you're thinking LEGO and thinking movies than a classic movie camera? I hope you enjoy building it as much as I enjoyed designing it.

Tommy Williamson is no stranger to *BrickJournal*, having been featured previously for his Jack Sparrow miniland scale figure. Since then, he has gone farther into building, making some remarkable *Star Trek* props and other models. He's now doing a column for *BrickJournal:* DIY Fan Art. Here, Tommy takes a little time out from his busy schedule at BrickNerd.com to make a model of his choosing for the magazine.

Parts List *(Parts can be ordered through Bricklink.com by searching by part number and color)*

Qty	Part	Color	Description
1	50746.dat	Black	Slope Brick 31 1 x 1 x 0.667
4	50746.dat	Dark Bluish Gray	Slope Brick 31 1 x 1 x 0.667
1	30039.dat	Light Bluish Gray	Tile 1 x 1 with Groove
1	30374.dat	Light Bluish Gray	Bar 4L Light Sabre Blade
2	30374.dat	Black	Bar 4L Light Sabre Blade
1	3062b.dat	Black	Brick 1 x 1 Round with Hollow Stud
4	4070.dat	Light Bluish Gray	Brick 1 x 1 with Headlight
1	47905.dat	Black	Brick 1 x 1 with Studs on Two Opposite Sides
1	52107.dat	Black	Brick 1 x 2 with Studs on Sides
1	4595.dat	Black	Brick 1 x 2 x 0.667 with Studs on Sides
4	6091.dat	Light Bluish Gray	Brick 2 x 1 x 1 & 1/3 with Curved Top
1	2654.dat	Light Bluish Gray	Dish 2 x 2
1	577b.dat	Black	Minifig Lightsaber Hilt with Bottom Ring
2	3024.dat	Black	Plate 1 x 1
1	4073.dat	Metallic Dark Gray	Plate 1 x 1 Round
1	85861.dat	White	Plate 1 x 1 Round with Open Stud
5	4081b.dat	Black	Plate 1 x 1 with Clip Light Type 2
3	49668.dat	Light Bluish Gray	Plate 1 x 1 with Tooth
1	3023.dat	Black	Plate 1 x 2
2	3023.dat	Dark Bluish Gray	Plate 1 x 2
3	63868.dat	Black	Plate 1 x 2 with Clip Horizontal on End (Thick C-Clip)
1	60478.dat	Dark Bluish Gray	Plate 1 x 2 with Handle on End
1	3794a.dat	Black	Plate 1 x 2 without Groove with 1 Centre Stud
3	3460.dat	Black	Plate 1 x 8
2	85984.dat	Black	Slope Brick 31 1 x 2 x 0.667
1	2819.dat	Black	Technic Steering Wheel Small
1	98138.dat	Light Bluish Gray	Tile 1 x 1 Round with Groove
1	2555.dat	Black	Tile 1 x 1 with Clip
1	2555.dat	Light Bluish Gray	Tile 1 x 1 with Clip
1	3070b.dat	Black	Tile 1 x 1 with Groove
1	3069b.dat	Light Bluish Gray	Tile 1 x 2 with Groove
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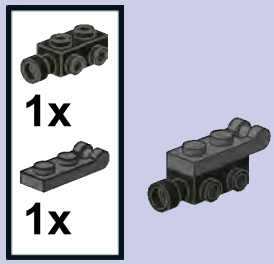
1	4150.dat	Light Bluish Gray	Tile 2 x 2 Round
1	30028.dat	Black	Tyre 8/40 x 8 Slick Smooth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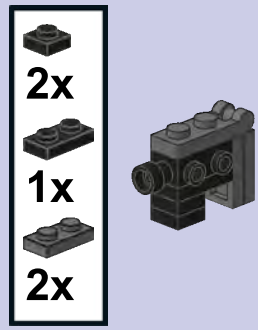
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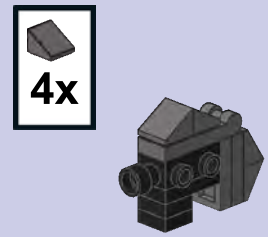
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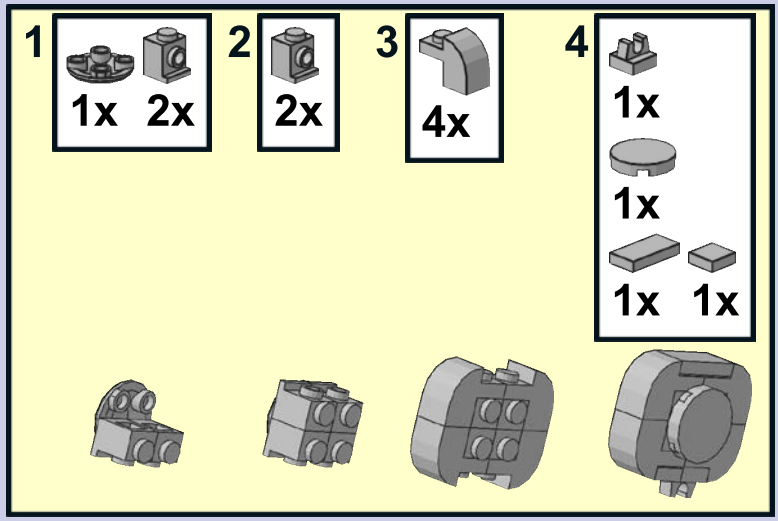
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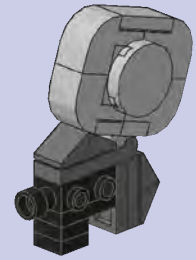


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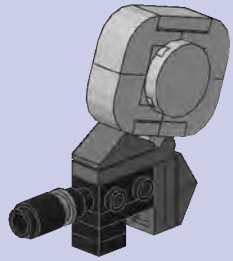


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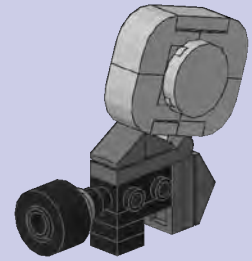


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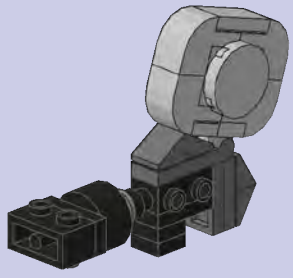


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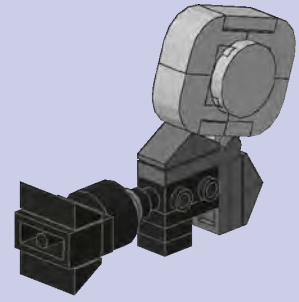

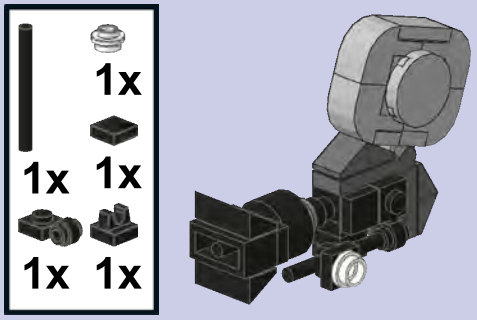
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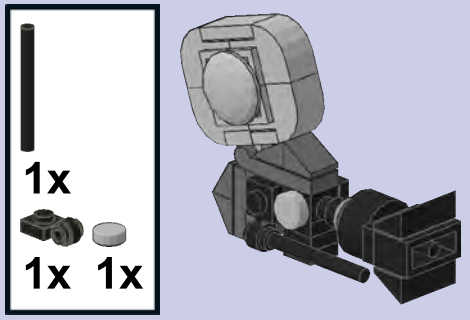
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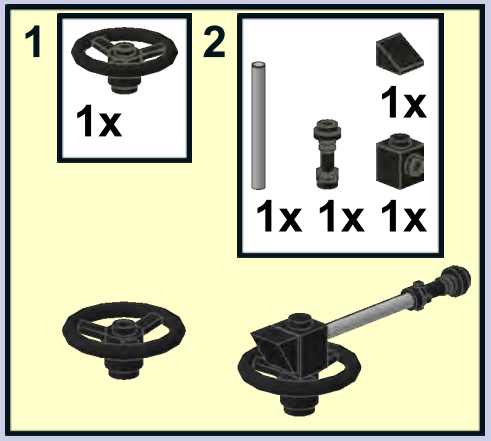
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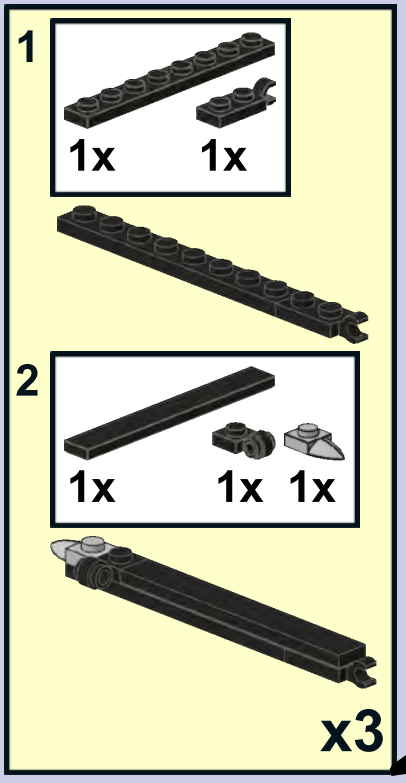
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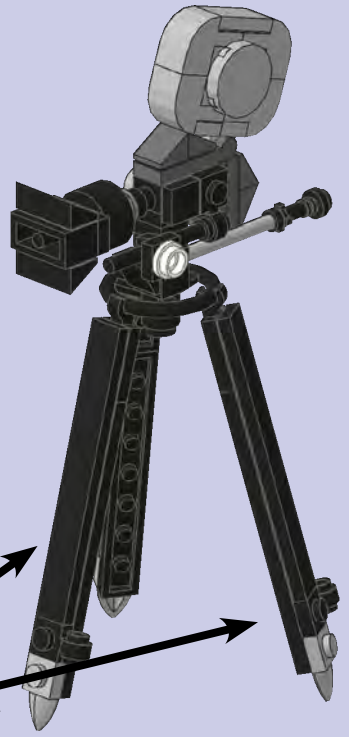


Minifig Customization 101: Reimagining the LEGO Movie Collectible Minifigures!

by Jared K. Burks

In the spirit of *The LEGO Movie* and the themes of this *BrickJournal*, this article will be about reimagining *The LEGO Movie's* Collectible Minifigure Series parts to create characters from various Video sources (Commercials, TV, and Film). The goal is a twist on the thoughts from the last article about further developing the ability to think outside the box from the inside this time. Let that single element speak to you and help create a unique custom figure. In this article I will primarily use a purist or minimalist's approach to customization; however a few examples will be completely custom-modified creations. Many of the ideas jump out at me from the videos I watched growing up, so this article will reference several older shows; look them up, they were quite funny.

To begin any project such as the one for this article, all parts must be examined for what they are and what they can be. Some custom figures simply need a small tweak, and others need a complete reimagining from the smallest part up.

Selina Kyle

The bad girl everyone, including the Dark Knight, loves, Catwoman. Behind every costume is a person hiding from their costumed persona. Their street clothes have to be polar opposite of their hero attire; as such, Ms. Kyle, the wild Catwoman, is a mousey old maid in appearance. Mrs. Scratchen-Post's face and hair are nearly perfect for Ms. Kyle. The rest of the figure isn't bad for the character either; however several outfits might also suit the character including Series 11 Grandma or my favorite, the Series 10 Librarian. With Batman in the film I hope they make some Selina Kyle reference about Mrs. Scratchen-Post.

Max Headroom: *Collaborative concept with Michael "Xero" Marzilli*

MmmmmmmmmaaaXxxxxx Headroom. Don't know how many people remember a show called *Max Headroom*. He was an artificial intelligence that sputtered when he talked. He is pretty simply to make; take the body from the series 8 Businessman, Emmet's head, and then top it off with President Business' hair. While this isn't a perfect translation, it is a pretty good purist approach. Pres. Business' hair could be modified slightly (paint and sanding in on the edges), but again, this article is to get you thinking about what can be made, so we are speaking to vision here. In the photo the figure's hair color has been digitally altered and the background was digitally added as well.

Magnum PI

There are many great characters that wear Hawaiian shirts. The two that immediately come to mind are Chuckles from classic GI Joe and Magnum PI. When I saw "Where are my Pants?" Guy, I knew he could be used to create either of these characters. First, GIVE HIM SOME PANTS!!! Second, find a minifigure head with a great moustache. As I only had a flesh version readily available I digitally altered the neck color to flesh; this could have easily been done with paint. Add some stylin' hair or hat and a Ferrari; bam, you have Magnum PI. Where is Higgins?

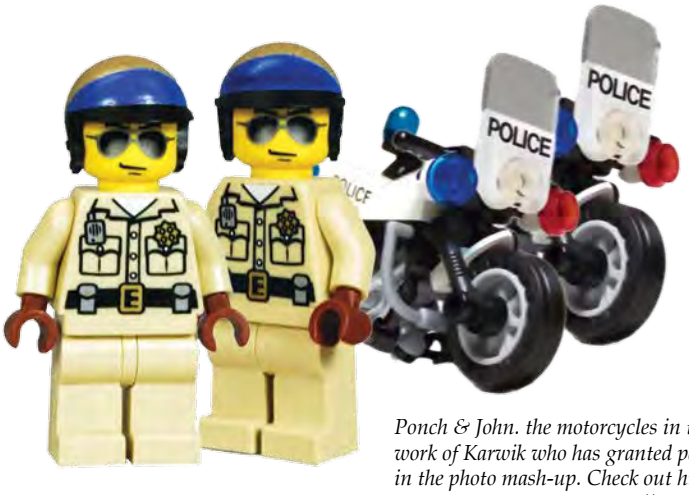
Abe Lincoln, Vampire Hunter

This is a simple customish figure to create, Abe Lincoln, Vampire Hunter. This figure needs a heavy coat and a very sharp axe. The best axe for this figure to carry is Lumberjack's axe from series 5. The Coat is from MMCB's Capes (http://www.mmcbcapes.com.au/). Add a vampire to the mix and you have a great little vignette.

Photo by Michael "Xero Fett" Marzilli

Ponch & John – CHIPS

To create the cast from CHIPs takes a bit more work and some of the techniques from the article on painting. We are going to use the new motorcycle cop helmet from "Scribble-Face Bad Cop" and the torso and head from the Traffic Cop in Collectible Minifigure series 2. Add tan legs and you have the start of your CHIPs figure. Start by taping out the front of the helmet to protect it from the gold spray paint for the back of the helmet. Once the gold paint is dry, tape out the visor and the newly painted back of the helmet to spray the middle panel blue. By painting the helmet to match the CHIPs style we achieve a figure resembling either Ponch or John from that classic show. Add a great LEGO motorcycle using the same painting trick and some decals and you have a great little vignette.



Ponch & John. the motorcycles in the background are the work of Karwik who has granted permission for their use in the photo mash-up. Check out his other work, he has some amazing vehicles (http://www.flickr.com/photos/karwik/4188602135/in/photostream/).

ROAR Katy.

Red Carpet Katy.

Katy Perry

When I spotted the Marsha Queen of the Mermaids figure, specifically the blue hair, it got me thinking of Katy Perry. Not sure why. However, recently I designed a face that I also thought looked like Ms. Perry so I combine the two of these and a swanky outfit, and you have Katy Perry. That swanky outfit could be Wild West Wyldstyle, Series 10 Warrior Woman, Series 5 Eqyptian Queen, Series 2 Pop Star, Series 4 Kimono Girl, Series 3 Hula Dancer, or my personal favorite, the Series 9 Hollywood Starlet. A close second is the Series 3 Hula Skirt with the Series 5 Cave Woman mimicking her outfit from her ROAR video (this doesn't use the movie series of figures). Katy wears so many crazy things, mix anything with that blue hair and you have a believable Katy Perry Minifigure.

Flo

Flo from the Progressive Insurance ads is a great marketing campaign. We likely all see Flo somewhere almost every day. When I first saw the Velma Staplebot I knew that she was Flo. Maybe Flo becomes a robot or something in the future? No, what I meant is that her hair piece was perfect for Flo. To create Flo took a bit more work, the hair has to be painted, a hair band added, and decals created and applied. So I quickly grabbed some spray primer for the hair piece. Once the primer dried I sprayed it with Brown paint. Then I found these odd very flat rubber bands for hair. Because these are so flat, they work perfectly for the hair band in her hair. I cut it to length and glued it onto the hair piece. After that I went to work in Corel Draw designing her outfit. Luckily the Progressive website has tips and some images to help people to make Flo Costumes. This made the creation of the decals a bit faster. I printed these out and applied to a plain white figure. Put it all together and I had a Flo figure. Progressive liked it so much they featured it on their social media pages!

Kung Fu Panda Concept

The major difference between the Panda Guy and Kung Fu Panda is facial expression and pants. The facial expression can be modified slightly with a black Sharpie marker. The next biggest issue is his pants. Simply create a decal for his pants and add it to the figure and you have a simple Kung Fu Panda. If you wanted to get really creative you could sculpt the belly portion of the character and add this in a clamshell fashion like an armor piece. Due to time constraints I was unable to create this figure; however, let's see how you guys do! If anyone makes a Kung Fu Panda, send me a photo.

These are merely a few ideas off the top of my head; what can you re-imagine from the film? Look at all the parts, consider them a canvas for your use. Just because they are the wrong color or slightly the wrong shape, all of this can be fixed with a bit of work. Get creative: sometimes all it takes is a simple mix and matching of parts.

You can go to Jared's webpage by going to http://www.fineclonier.com/ *or scanning this QR code!*

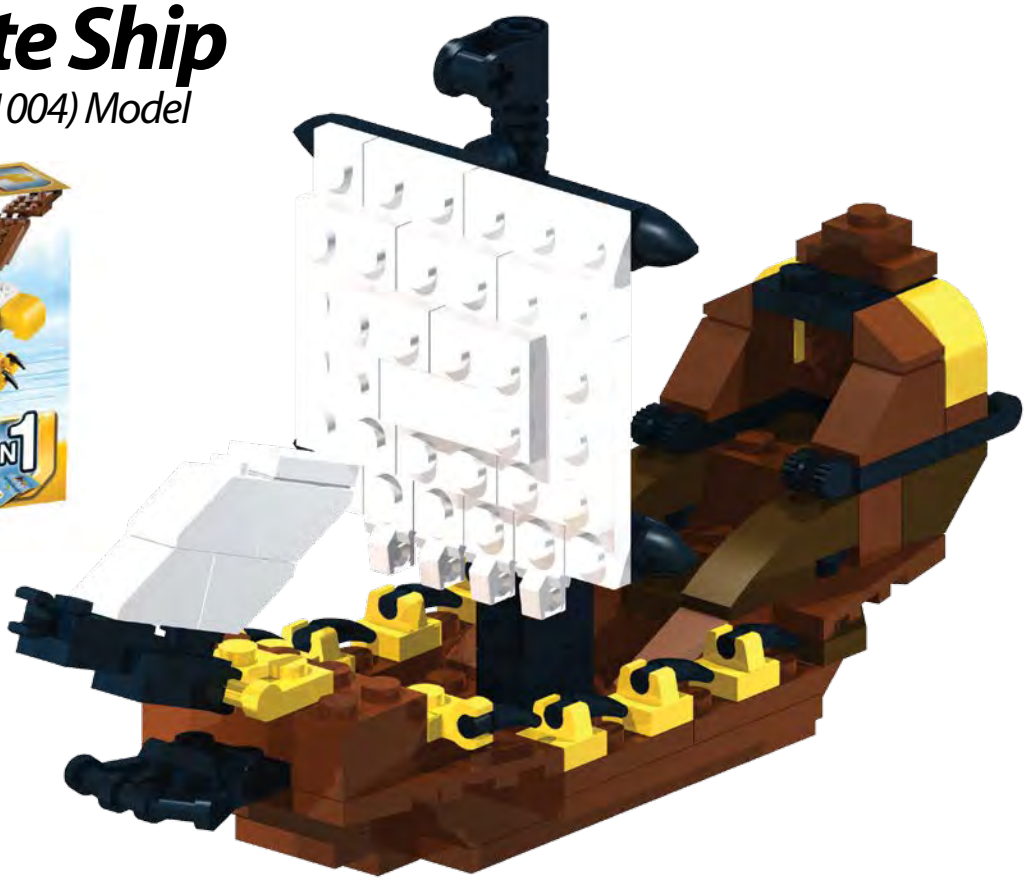
Come back next issue for more Minifigure Customization 101!

You Can Build It

MINI Model

Micro Pirate Ship

Additional Creator (#31004) Model



Design and Instructions by Christopher Deck

Hello everybody, I am glad to join you in *BrickJournal!* With *The LEGO® Movie* theme of this issue, alternate models celebrate another revival after the introduction of the Creator 3-in-1 building sets. In my eyes, both series are most welcome after the alternate model ideas disappeared from the back sides of LEGO set boxes. As a little tribute to this alternate building creativity, we want to build a special micro model in this issue for which you will only need the pieces from 3-in-1 creator set 31004 "Fierce Flyer". With this limited parts choice we will expand this set into a 4 in 1 building kit.

Most pieces of the set are brown, with only few differently colored pieces, like yellow, black and white. These are, however, also perfect colors to build a pirate ship! A rather unexpected alternate model for a set focusing on creatures, but it works out reasonably well! The ship features a bowsprit with sail and forepeak beneath. Besides the main mast and sail, a yellow highlighted railing leads to the quarter deck with the captain's cabin. With 130 pieces in this little ship, there are almost no leftover parts.

I hope you will enjoy building this, and keep your inspiration coming for even more alternate models! Many sets have a great potential for alternate models which only wait to be discovered!

See you next time!

You can visit Christopher's web-page by going to www.deckdesigns.de or scanning this QR code!

Parts List

(Parts can be ordered through Bricklink.com by searching by part number and color)

Boat Hull

Qty	Color	Part	Description
2	Reddish-Brown	4070.dat	Brick 1 x 1 with Headlight
3	Reddish-Brown	3004.dat	Brick 1 x 2
2	Yellow	6091.dat	Brick 2 x 1 x 1 & 1/3 with Curved Top
1	Reddish-Brown	3001.dat	Brick 2 x 4
2	Black	44302.dat	Hinge Plate 1 x 2 Locking with Dual Finger on End Vertical
8	Black	53451.dat	Minifig Helmet Viking Horn
3	Reddish-Brown	3024.dat	Plate 1 x 1
2	Black	4073.dat	Plate 1 x 1 Round
2	Yellow	61252.dat	Plate 1 x 1 with Clip Horizontal (Thick C-Clip)
5	Reddish-Brown	3023.dat	Plate 1 x 2
1	Black	92692.dat	Plate 1 x 2 with Angled Handles on Side
2	Reddish-Brown	3794b.dat	Plate 1 x 2 with Groove with 1 Centre Stud
2	Black	48336.dat	Plate 1 x 2 with Handle Type 2
1	Yellow	48336.dat	Plate 1 x 2 with Handle Type 2
4	Reddish-Brown	3623.dat	Plate 1 x 3
4	Reddish-Brown	3710.dat	Plate 1 x 4
1	Black	3022.dat	Plate 2 x 2
6	Reddish-Brown	3021.dat	Plate 2 x 3
3	Reddish-Brown	3020.dat	Plate 2 x 4
1	Reddish-Brown	3795.dat	Plate 2 x 6
2	Dark-Brown	2450.dat	Plate 3 x 3 without Corner
4	Reddish-Brown	54200.dat	Slope Brick 31 1 x 1 x 0.667
2	Reddish-Brown	4286.dat	Slope Brick 33 3 x 1
2	Reddish-Brown	3747a.dat	Slope Brick 33 3 x 2 Inverted
2	Reddish-Brown	3040b.dat	Slope Brick 45 2 x 1
4	Reddish-Brown	3665.dat	Slope Brick 45 2 x 1 Inverted
2	Dark-Brown	3660.dat	Slope Brick 45 2 x 2 Inverted
2	Dark-Brown	50950.dat	Slope Brick Curved 3 x 1
6	Yellow	12825.dat	Tile 1 x 1 with Clip with Rounded Tips
2	Reddish-Brown	41770.dat	Wing 2 x 4 Left
2	Reddish-Brown	41769.dat	Wing 2 x 4 Right

Main Mast

Qty	Color	Part	Description
2	Black	41532.dat	Hinge Arm Locking with Single Finger and Friction Pin
2	Black	44302.dat	Hinge Plate 1 x 2 Locking with Dual Finger on End Vertical
1	Black	2429.dat	Hinge Plate 1 x 4 Base
1	Black	2430.dat	Hinge Plate 1 x 4 Top
1	White	3023.dat	Plate 1 x 2
1	Black	63868.dat	Plate 1 x 2 with Clip Horizontal on End (Thick C-Clip)
1	Reddish-Brown	3794b.dat	Plate 1 x 2 with Groove with 1 Centre Stud
2	Black	6541.dat	Technic Brick 1 x 1 with Hole
1	Black	6536.dat	Technic Cross Block 1 x 2 (Axle/Pin)

Main Sail

Qty	Color	Part	Description
4	White	44301.dat	Hinge Plate 1 x 2 Locking with Single Finger on End Vertical
2	Black	2429.dat	Hinge Plate 1 x 4 Base
2	Black	2430.dat	Hinge Plate 1 x 4 Top
4	Black	49668.dat	Plate 1 x 1 with Tooth
1	White	3023.dat	Plate 1 x 2
2	White	3710.dat	Plate 1 x 4
1	White	3022.dat	Plate 2 x 2
2	White	2420.dat	Plate 2 x 2 Corner
1	White	3021.dat	Plate 2 x 3
3	White	3020.dat	Plate 2 x 4
1	White	3069b.dat	Tile 1 x 2 with Groove

Head Mast and Sail

Qty	Color	Part	Description
1	Black	2429.dat	Hinge Plate 1 x 4 Base
1	Black	2430.dat	Hinge Plate 1 x 4 Top
1	Black	4073.dat	Plate 1 x 1 Round
2	Black	63868.dat	Plate 1 x 2 with Clip Horizontal on End (Thick C-Clip)
1	White	3040b.dat	Slope Brick 45 2 x 1
2	White	3665.dat	Slope Brick 45 2 x 1 Inverted
1	White	3040a.dat	Slope Brick 45 2 x 1 without Centre Stud
1	White	3069b.dat	Tile 1 x 2 with Groove

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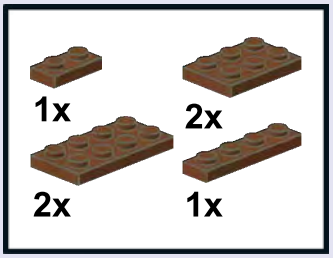
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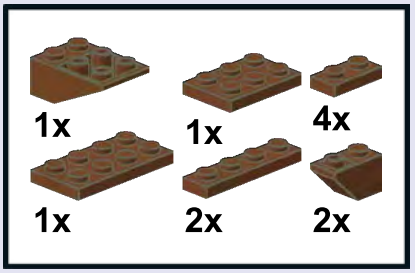
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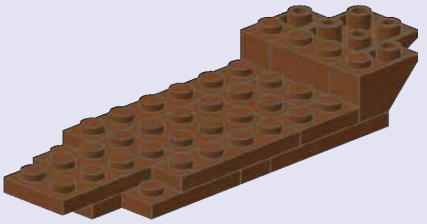

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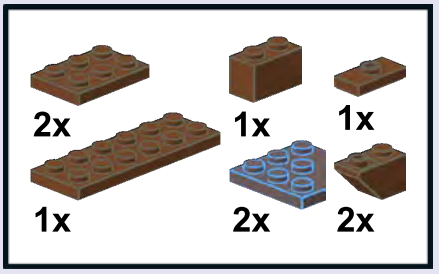
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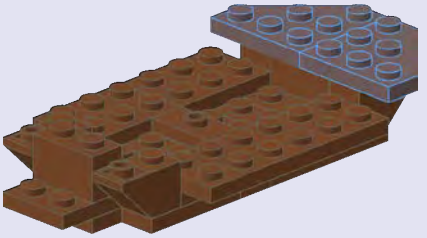

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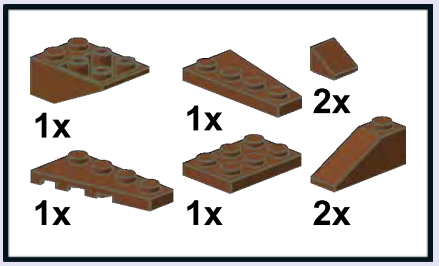
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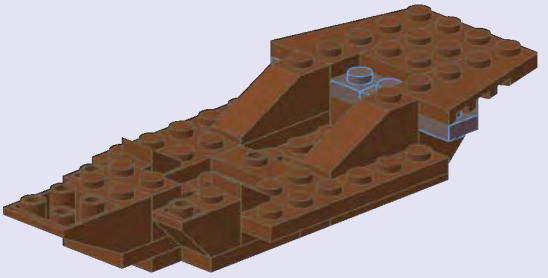

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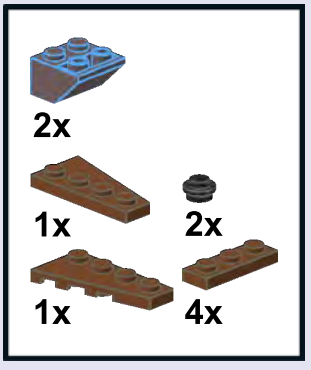
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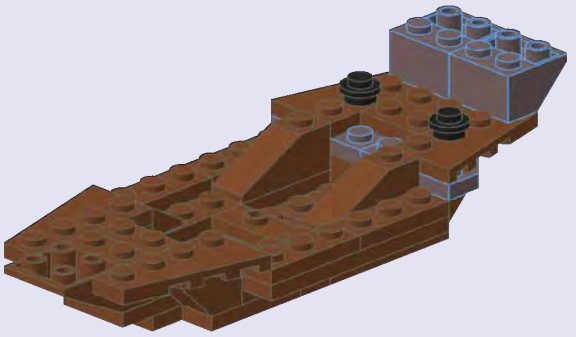

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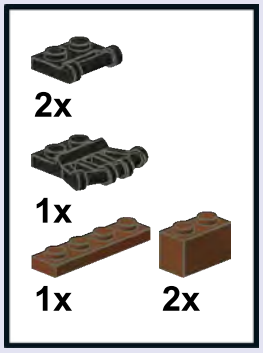
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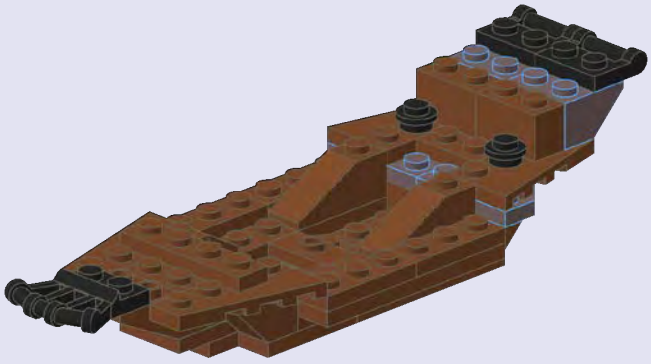

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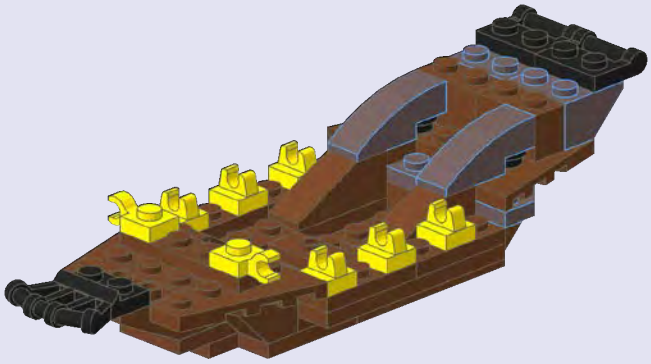

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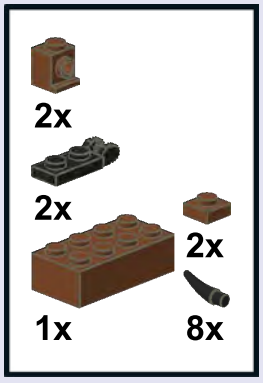
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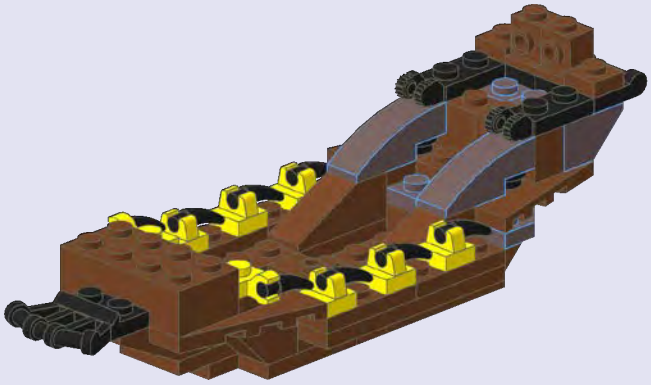
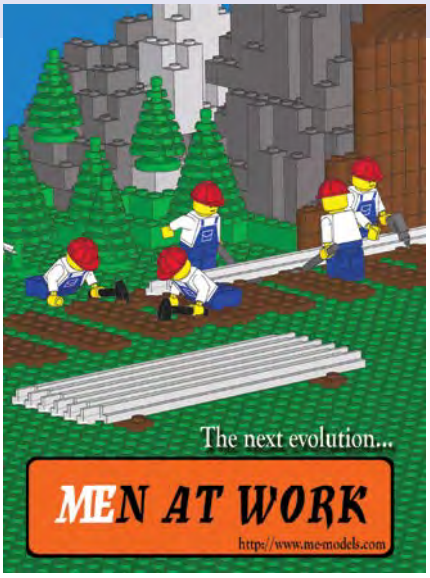



Holding Our Own:
a sitcom.
Episode 3 Coming Soon
vimeo.com/channels/holdingourown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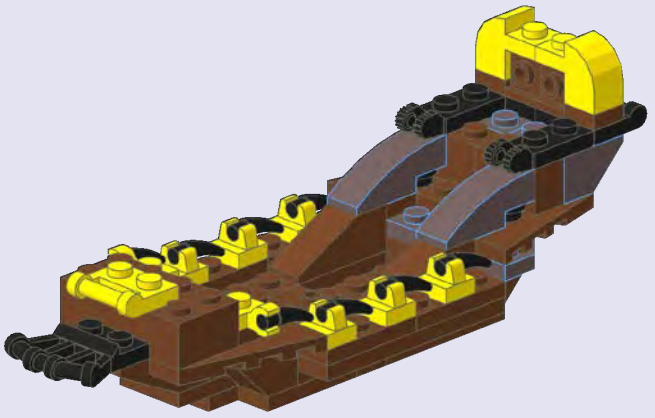

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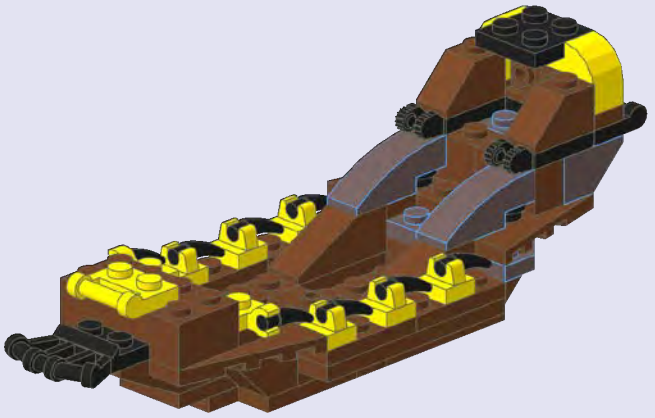

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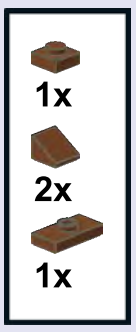

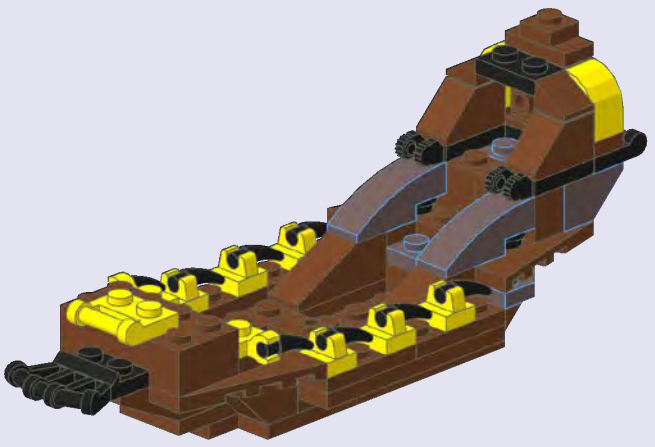

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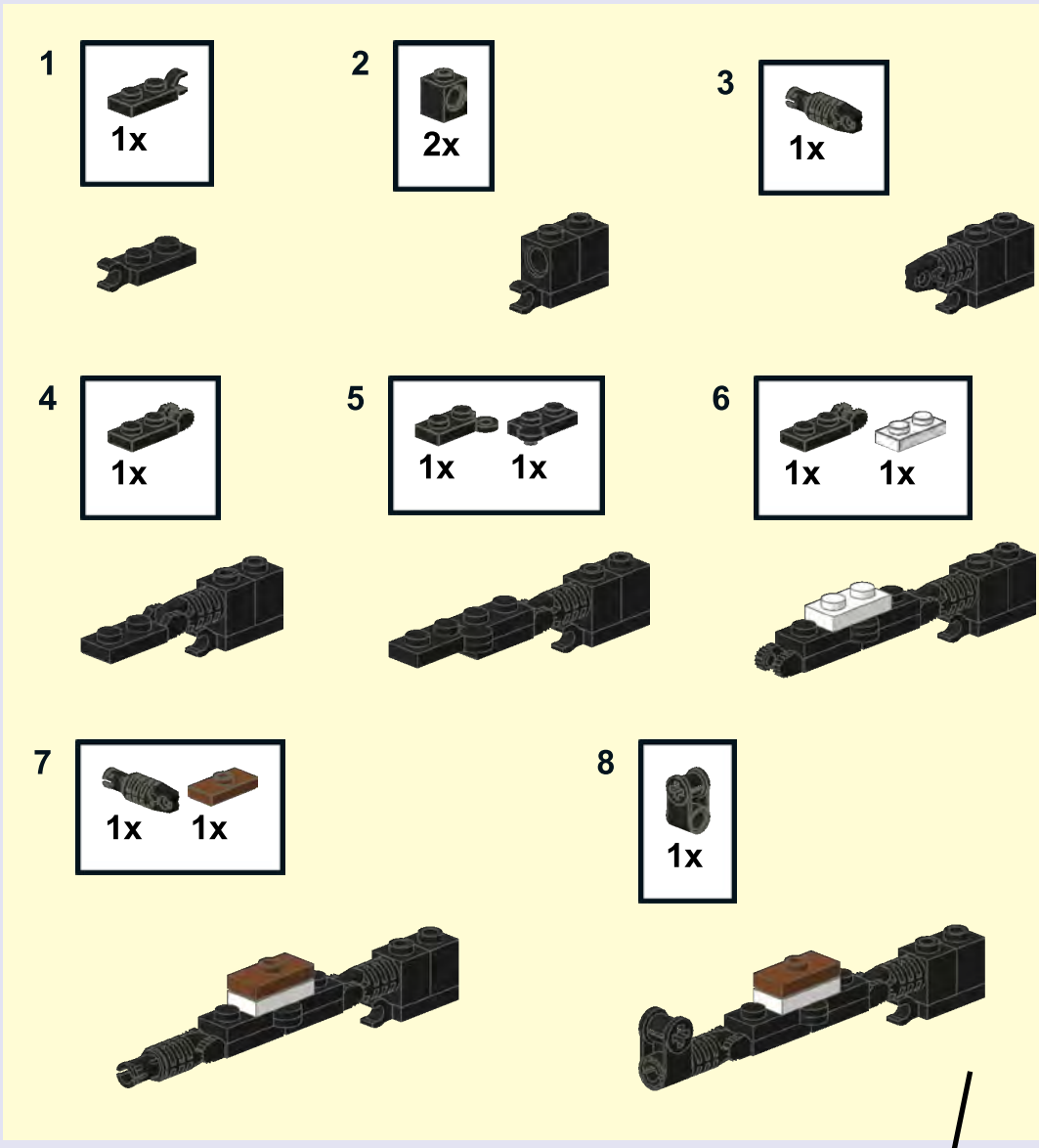

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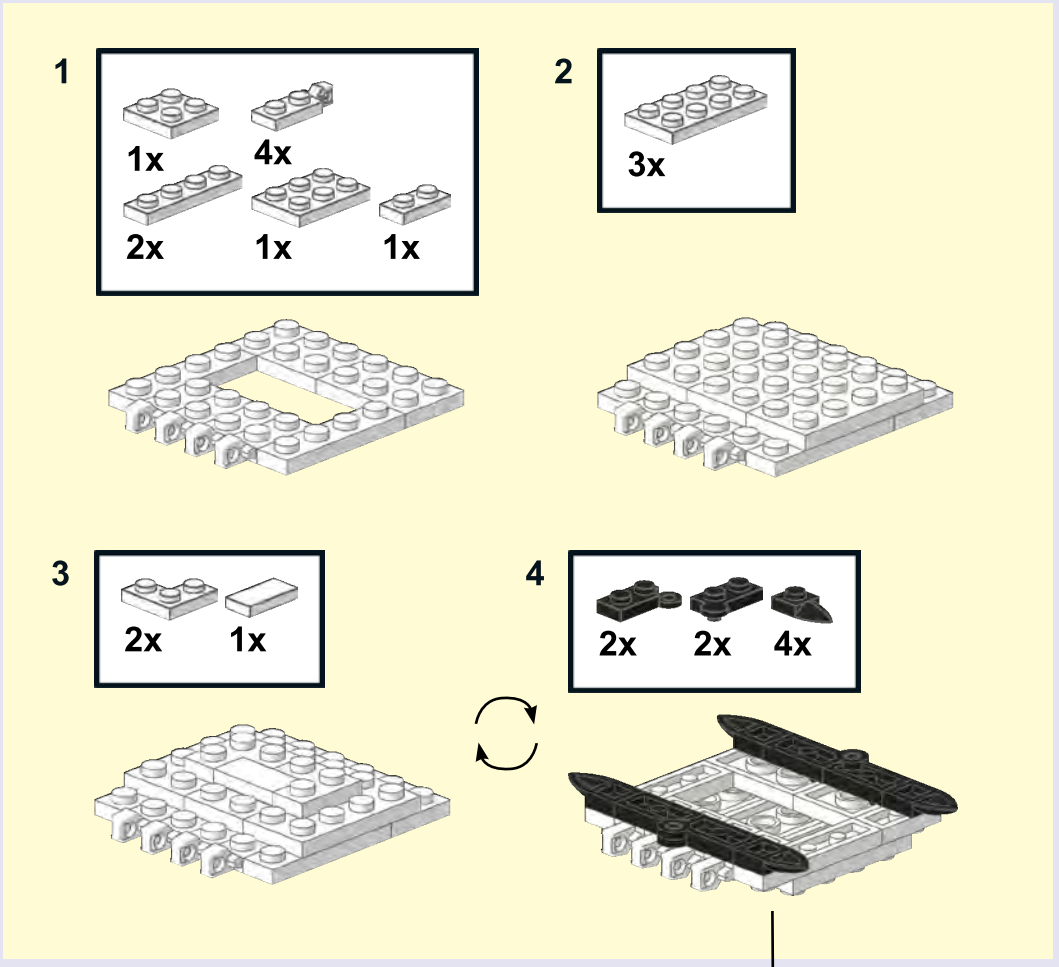

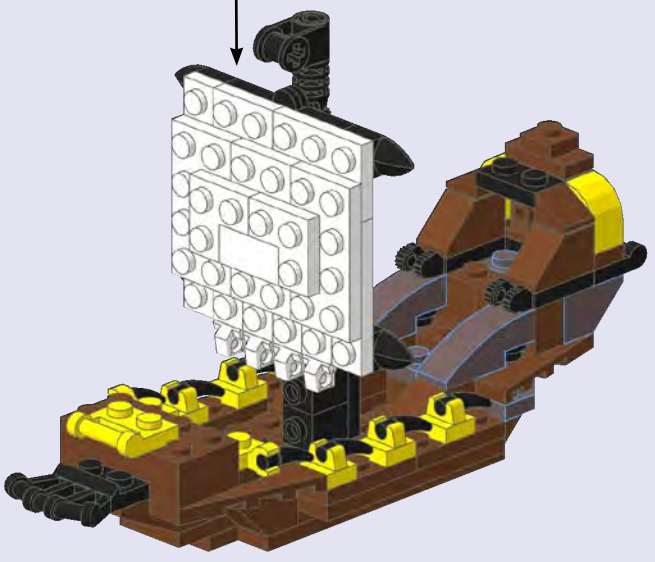

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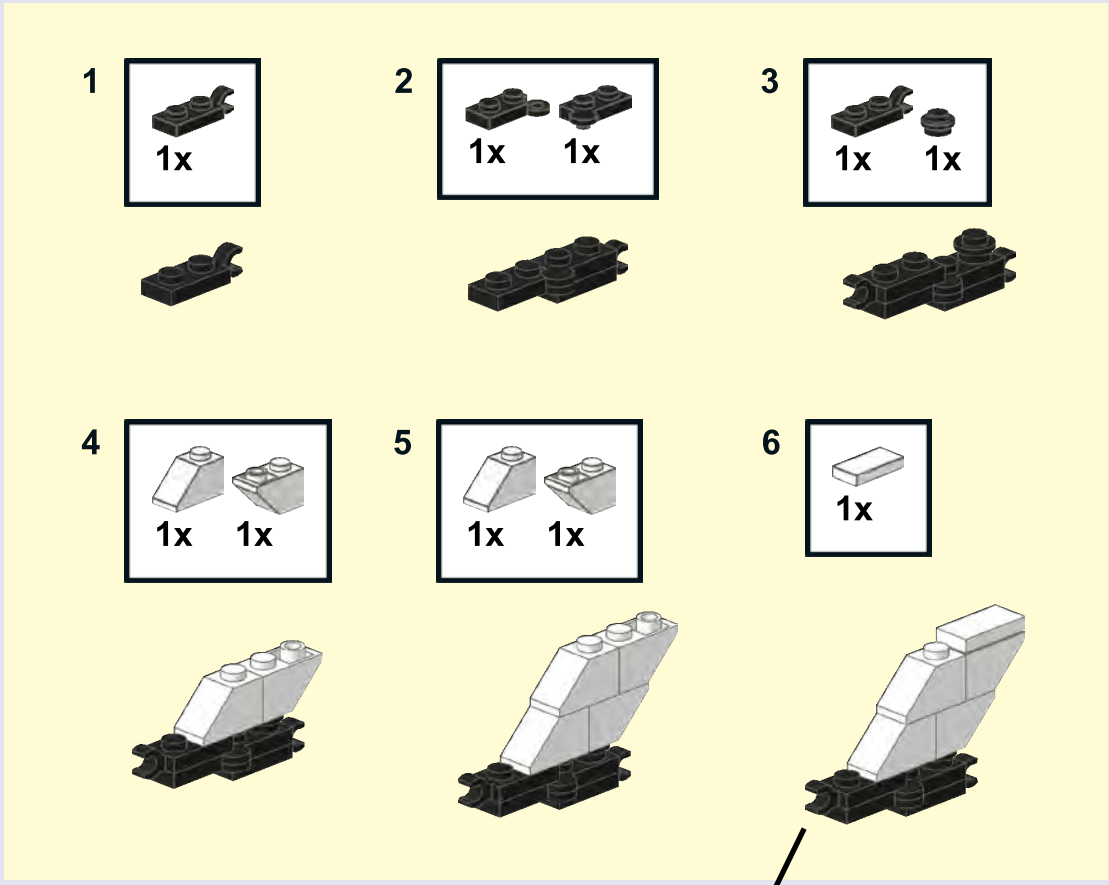

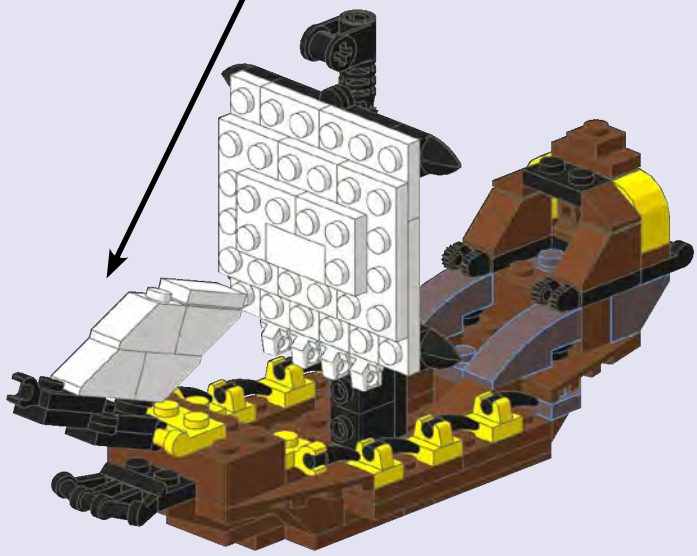

Building Robots with MINDSTORMS EV3!

Article by Damien Kee
Retail Rover Design and Instructions by Joe Meno based on Riley Rover by Damien Kee

One of the most important commands we can give a robot, especially a moving robot, are commands that tell the motors what to do. This article will show you how to build a simple robot and get it moving accurately.

The Robot

The great thing about LEGO is that you can build just about anything you can imagine. This is great when we have unlimited LEGO and all the time in the world, but often (especially in classroom situations) we have some pretty restrictive conditions. This article uses a version of my popular RileyRover Base. It can be built from a standard LEGO Retail EV3 Core set and should take no more than 15 minutes to put together. You can also use the EV3 Education edition, but you might have to flex your problem-solving skills to get around the slightly different arrangement of parts.

I'm the first to admit it is not the strongest robot design out there, but it is quick to build and uses very few parts, meaning you can get on to the programming a lot quicker!

You can find the Building Instructions for the Education version of RileyRover and additional attachments at *www.damienkee.com*.

Parts List

(All parts are in the EV3 MINDSTORMS Retail set)

Qty	Color	Part	Description
1	White	95646.dat	Electric Mindstorms EV3
2	White	95658.dat	Electric Mindstorms EV3 Large Motor
2	Red	32062.dat	Technic Axle 2 Notched
2	Dark Bluish Gray	55013.dat	Technic Axle 8 with Stop
2	Black	32523.dat	Technic Beam 3
2	Black	32526.dat	Technic Beam 3 x 5 Bent 90
2	Light Bluish Gray	64179.dat	Technic Beam 7 x 5 with Open Center 5 x 3
1	Black	40490.dat	Technic Beam 9
1	Black	41239.dat	Technic Beam 13

Qty	Color	Part	Description
2	Light Bluish Gray	92907.dat	Technic Cross Block 2 x 2 x 2 Bent 90 Split (Pin/Twin Axle)
2	Light Bluish Gray	3673.dat	Technic Pin
26	Black	2780.dat	Technic Pin with Friction and Slots
2	Red	41669.dat	Technic Tooth 1 x 3 with Axlehole
2	Rubber Black	44309.dat	Tyre 22/ 30 x 30 ZR
2	Light Bluish Gray	42610.dat	Wheel Hub 8 x 11.2 with Centre Groove
2	Black	56145.dat	Wheel Rim 20 x 30 with 6 Spokes and External Ribs

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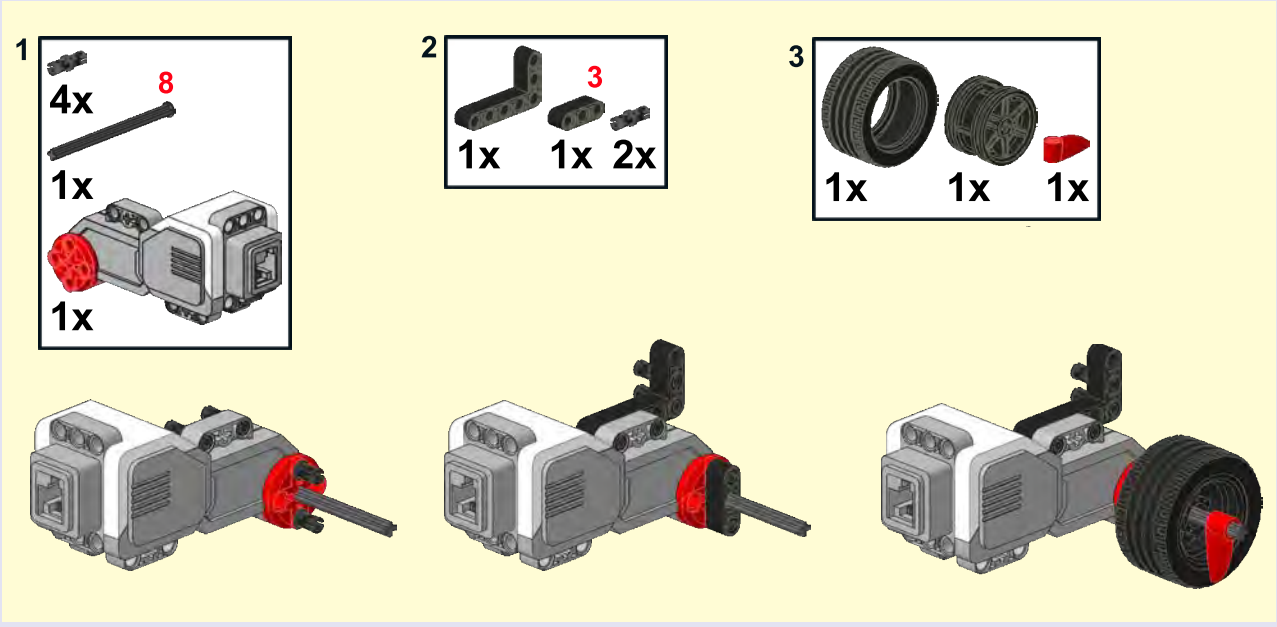

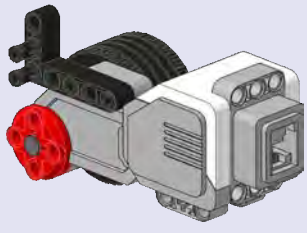

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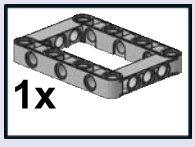

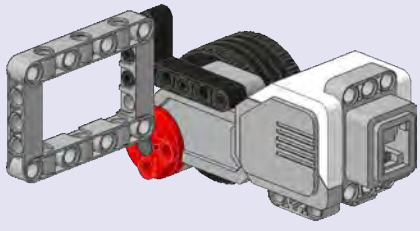

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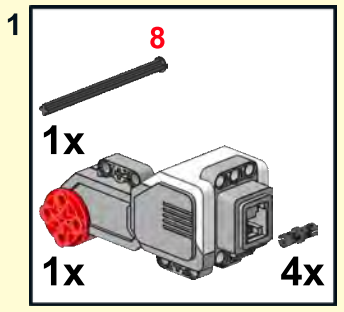

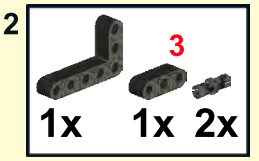

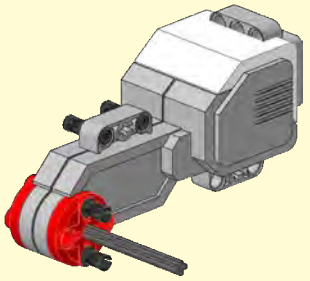

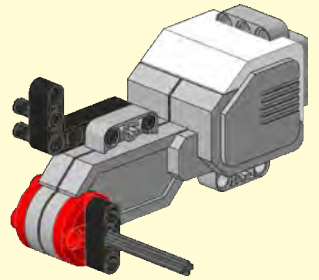

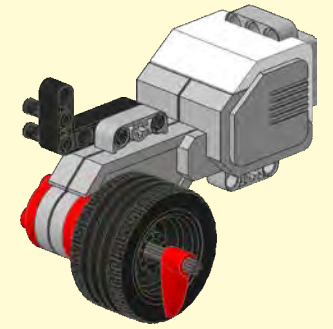

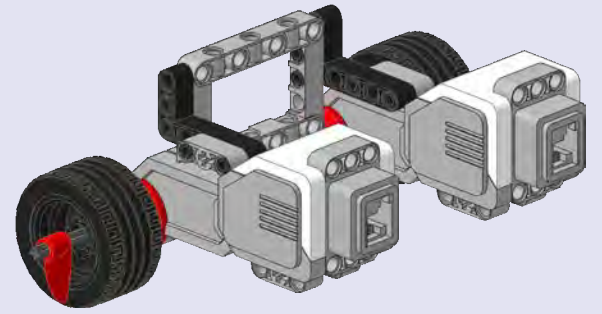

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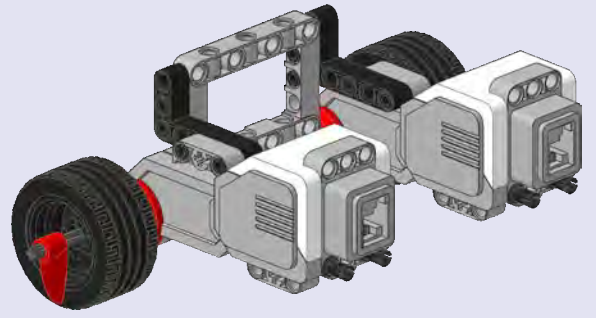

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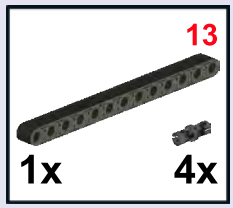

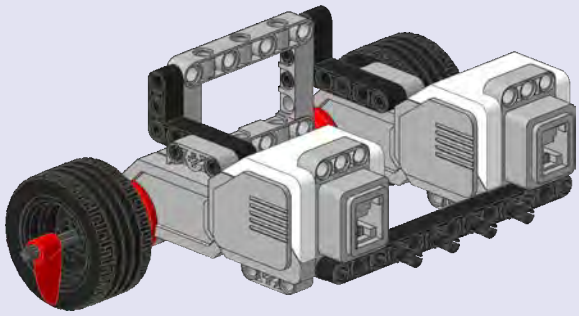

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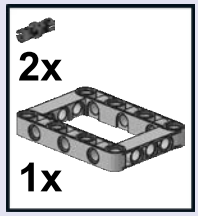

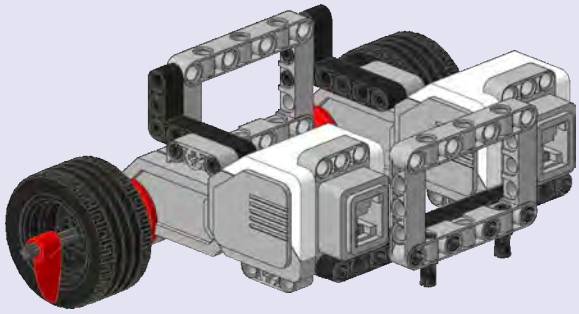

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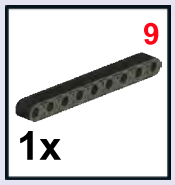
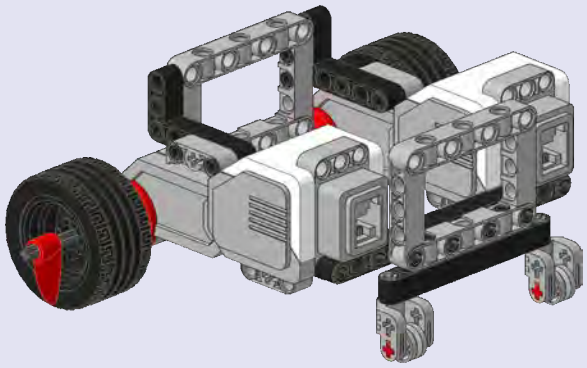
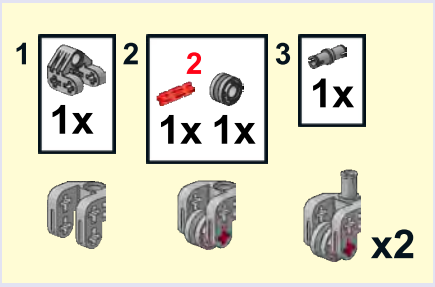


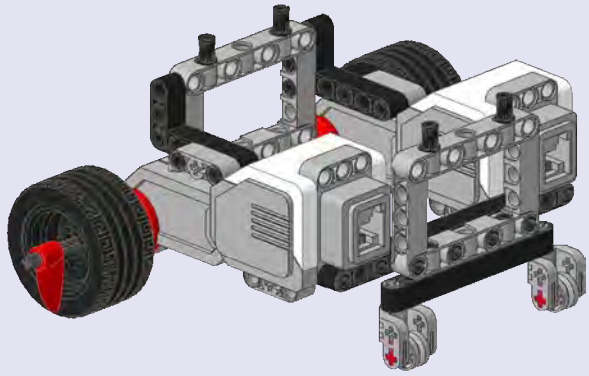




Making a Caster

This is a quick way to make a wheel that can turn any direction based on the motors, and is from the *LEGO MINDSTORMS EV3 Laboratory*, a book that is highly recommended!

8



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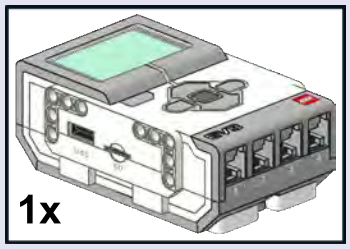
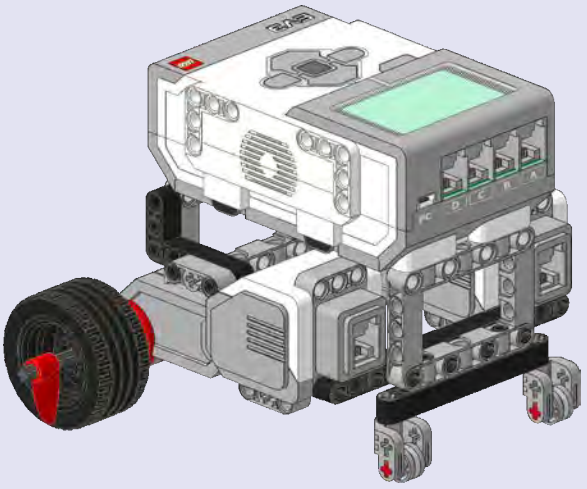
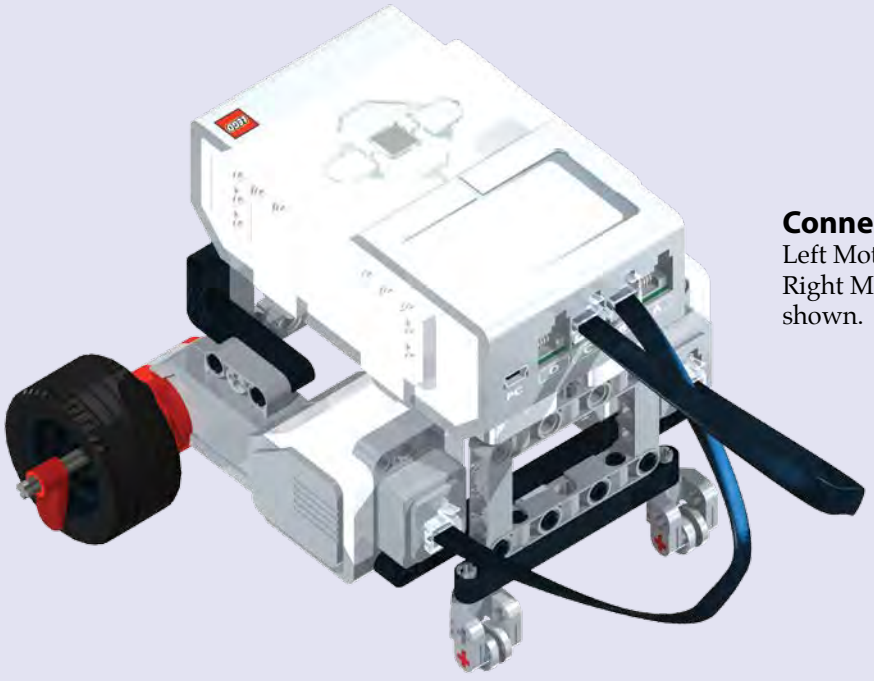


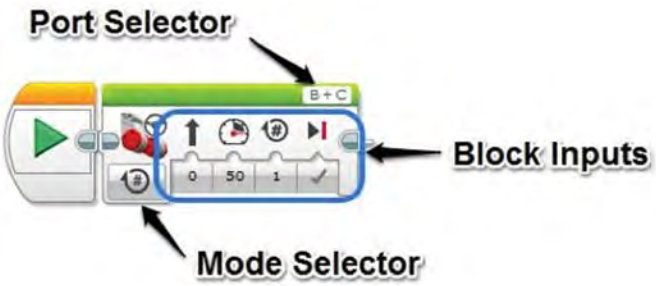




Connecting the Cables
Left Motor connects to Outlet B and Right Motor crosses to Outlet C as shown.

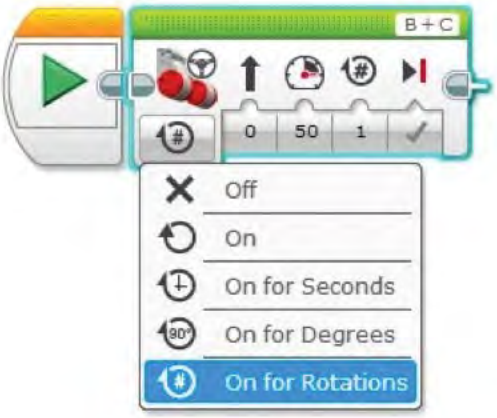
The Programming

The EV3-G programming environment is very user friendly, aimed at young kids, and you don't need a programming background to get started. General robot commands are represented by Blocks, and each of the Blocks can be customized through the use of Modes and Block Inputs (ie. the 'Move Steering' Block will tell the robot to drive around, but the Mode and Block Inputs will control how far/how fast/what direction, etc.).



The most common block I use is the Move Steering, as it is designed to control a robot with two opposing wheels (sometimes called differential drive or wheel chair configuration). If both motors go forward, the robot goes forward; if both go backwards, the robot goes backwards. If the motors go in different directions, then the robot will turn. By changing the ratio of speed between each motor, you can get very fine control of turning angles.

The Move Steering Block has 5 different Modes: OFF, ON, On for Seconds, On for Degrees, and On for Rotations. Each of these modes do the same essential thing—move the wheels—but allow you to choose how they will be moved. The Block Inputs then allow you to fine-tune the movement.



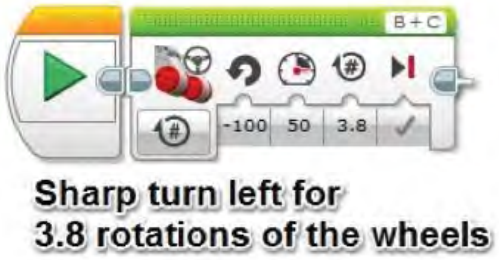
The block inputs are the four icons beside the mode button and are from left to right:

Steering (arrow icon with direction) – Left or right? Gentle turn or sharp turn? Direction is defined by the value, from -100 to 100, with -100 being a sharp left turn, 0 being straight, and 100 being a sharp right turn.

Power – Fast or slow? Forwards or Backwards? Speed is defined by the value, from -100 (reverse) to 100 (forward). 0 is no power.

Duration – How much should the wheels turn? Seconds/Degrees/Rotations

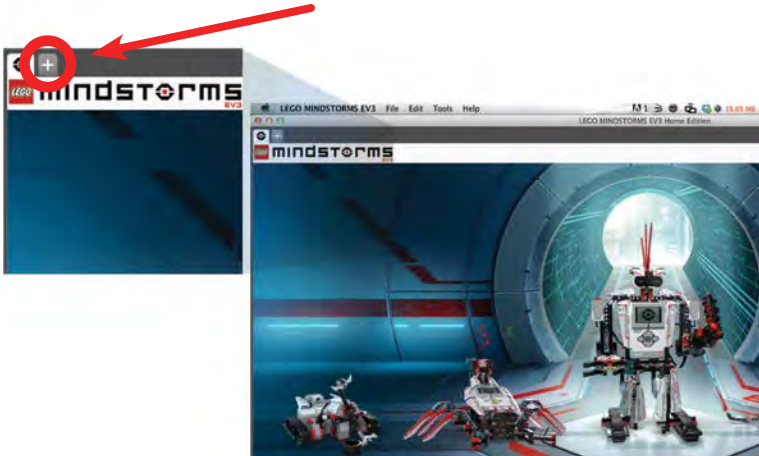
Here are a few examples:



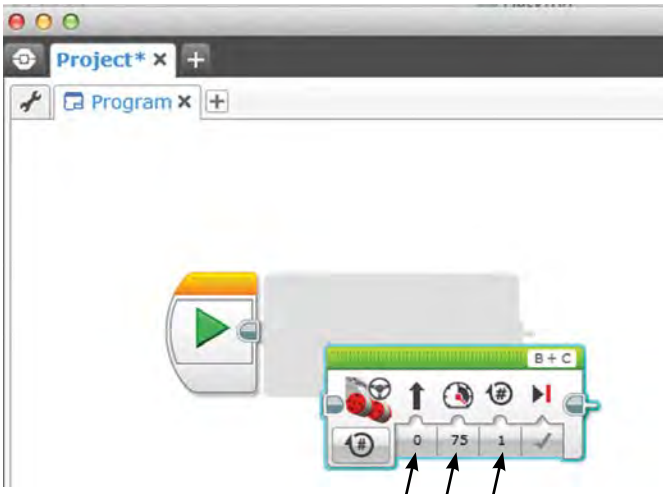
To make the robot perform multiple moves (forward, turn, backwards) we can put Programming blocks together.

Making Your Robot Move

If you haven't installed the MINDSTORMS EV3 software into your computer, now is the time to do it. Once installed, open the program and go to the upper left corner. Click on the '+' tab to create a new project.



Click on the green tab on the bottom to open the Action Blocks. Click and drag the Move Steering Block beside the green Play Arrow block.



Copy the following values in the three numerical boxes:

0 50 1.5

Plug the USB cable into the back of your RileyRover, make sure it is turned on, and press the green Play Arrow Block. Hold your robot off the table as it will run the moment the program finishes downloading, and we don't want your robot to go on an unscheduled bungee jump. If all has gone to plan, the wheels on the robot will have moved!

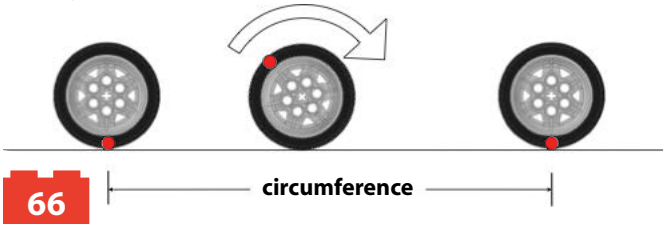
How far did your robot travel? Well, that will depend on what you set up with the Block Inputs.

While we can control how much the wheels rotate (either in seconds, degrees or rotations), this doesn't tell us directly how far the robot goes. Often when we're faced with a robotics challenge, there will be some part of the challenge where we have to make the robot drive a specific distance, say 500mm.

Now we could try and guess how much we need to move the wheels and do some tests. We could keep modifying the numbers and keep testing until we got the exact distance we need. This is often called Trial and Error or Guess and Check. While this approach will work, it is time-consuming. If we have a dozen different distances we need to travel, the time we need to check every one will start to add up very quickly. With a little bit of basic Math and some measurement of our robot, we can find a much easier way.

What would be really useful to know is, 'How far does the robot travel when the wheels do one complete rotation?' Imagine the point where the wheel touches the ground. As the wheel turns, that point follows right around the edge of the tire and eventually touches the ground again. This distance is the circumference of the wheel and can be calculated with the following formula.

Circumference = pi x diameter



For the LEGO wheels used in the Retail Version of the EV3, the diameter of the wheels is 43.2mm. If we take pi as being approximately 3.14, then we get a circumference of

Circumference = 3.14 x 43.2mm

Circumference = 135.65mm

This means that when the wheels of the robot turn around 1 complete rotation, the robot will travel forward 135.65mm.

(***Note:*** If you're using the Education edition of the EV3, you have much larger tires that are 56mm in diameter. Adjust your calculations as necessary.)

Try it out and see how close your RileyRover goes.

Once we know how far 1 rotation will take us, we can then do a little more Math to calculate how many degrees of the wheels we need to travel any distance we desire. Let's revisit our earlier challenge of making the robot drive 500mm.

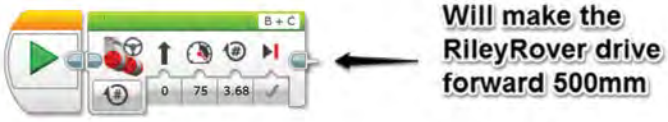
We know that 1 rotation = 135.65mm. If we divide 1 rotation by 135.65mm, this will tell us how many rotations we need to travel 1mm.

1mm = 1 / 135.65 = 0.0073719 rotations

We need to go 500mm so:

500mm = 500 x 0.0073719 = 3.68 rotations

Now in reality there a few factors that mean that it might not be exactly right: friction with the floor, carpet vs. hard floors, squishyness of the tires, etc., but the result certainly does get us extremely close to what we're trying to achieve. Tweak it just a little and you'll be good to go!



Using this same approach, we can now calculate how many rotations of the wheels we need to travel any distance we want!

Dr Damien Kee has been working with robotics in education for over 10 years, teaching thousands of students and hundreds of teachers. He is the author of the popular "Classroom Activities for the Busy Teacher" series of robotics teacher resource books.

You can find more information at www.damienkee.com

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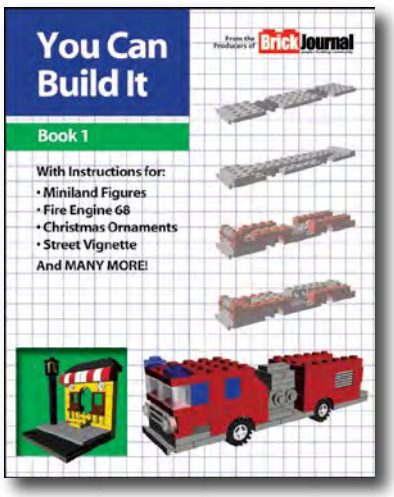
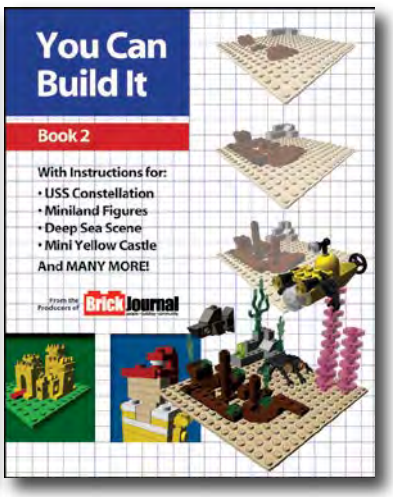
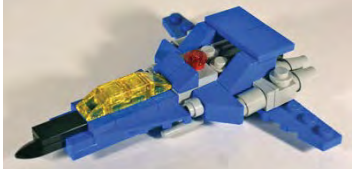
LEGO fans: You Can Build It!





YOU CAN BUILD IT is a new ongoing series of instruction books on the art of LEGO® custom building, from the producers of **BRICKJOURNAL** magazine! Spinning off from BrickJournal's popular "You Can Build It" column, these **FULL-COLOR** books are loaded with nothing but **STEP-BY-STEP INSTRUCTIONS** by some of the top custom builders in the LEGO fan community. **BOOK ONE** is for beginning-to-intermediate builders, with instructions for custom creations including Miniland figures, a fire engine, a tulip, a spacefighter (below), a street vignette, plus miniscale models from "a galaxy far, far away," and more! **BOOK TWO** has even more detailed projects to tackle, including advanced Miniland figures, a miniscale yellow castle, a deep sea scene, a mini USS Constitution, and more! So if you're ready to go beyond the standard LEGO sets available in stores and move into custom building with the bricks you already own, this ongoing series will quickly take you from novice to expert builder, teaching you key building techniques along the way!



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It's a Car! And...

Article by Joe Meno and Andrew Goodwin

Photography by Andrew Goodwin

LEGO CUUSOO is a crowdsourcing platform for builders interested in making sets. Designs are proposed online and supported by site visitors. When a design reaches 10,000 supporters, the LEGO Group will place the design under review to evaluate its viability as a set. If the design passes review, it will go through the LEGO production process and become an official LEGO set! With this issue, *BrickJournal* will be spotlighting a fan design and CUUSOO.

The Designer and His Model...

Andrew Goodwin is a 50-year-old Medical Practitioner in Adelaide, Australia, who has been building, playing and creating with LEGO for over 40 years. In that time he has built various models. One model he has presented online is on the LEGO crowdsourcing Cuusoo platform.

Inspired by the movie *Despicable Me 2*, Andrew built Lucy Wilde's car, which in the movie converts to a submarine and airplane. He built his model to do the same, with some clever building techniques and additions. The result is a unique LEGO model that allows you to create three models out of one! Take a look at the various forms of his model!

From Land to Sea...

The car body easily splits in half, and the upper part of the car body becomes the submarine roof. The car roof is removed and added into the new submarine roof. The car wind-screen becomes the front water screen of the submarine. The submarine is completed with the addition of motor-powered wings and under-water fins!

However, this is not the only form this car can take...

...to Air!

The car body is retained in its original format for the plane, and the wings grow out from the body, incorporating the headlights, taillights and bumper bars into the wings! In the movie, the wheels of the car are incorporated into the jet engines on the wings.

This car can be easily converted into the submarine and plane and back again, and comes with minifigures: Mr. Gru (with shrink gun), agent Lucy Wilde (with lipstick taser) and several minions!

You can vote for Andrew's idea here: *http://lego.cuusoo.com/ideas/view/55720*

or you can scan this QR code! If you think this should be a set, vote for it!

Mobile Crane MK II

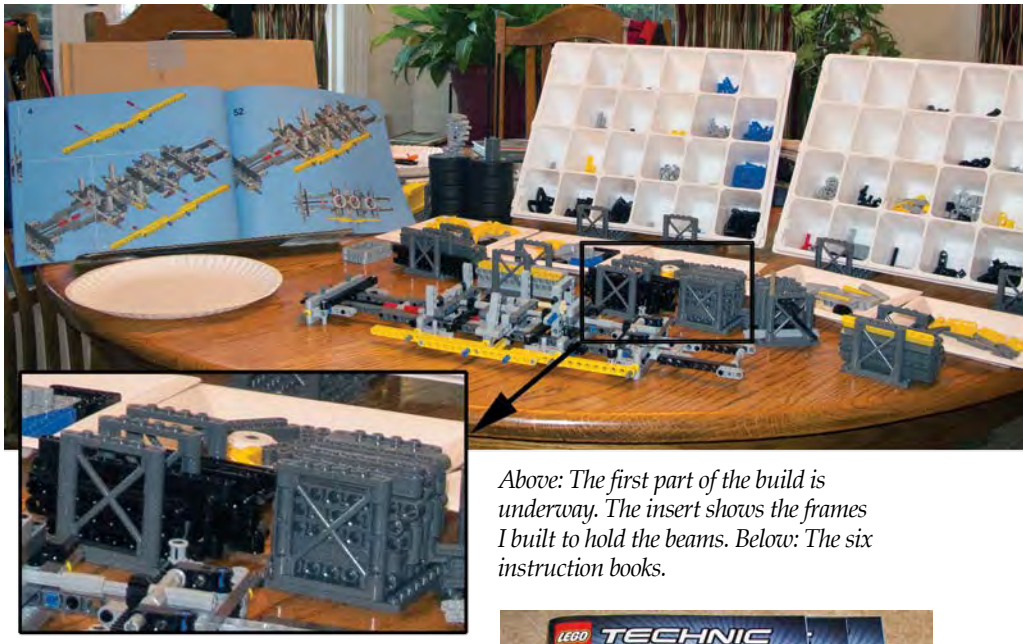
Article by Geoff Gray
Photography by Geoff Gray and The LEGO Group

The new mobile crane from The LEGO Group continues a long tradition of offering a great set, packed with features and solid technical design. I have been building official TECHNIC sets for a couple of decades, and I am always impressed with the way the sets come to life, and this set is no different. I have to admit that I am not nearly accomplished enough to come up with designs as elaborate or as stable as the large TECHNIC sets from LEGO, but as long as they continue to make these sets, I will still be happy.

The 42009 Mobile Crane MK II main model (photograph courtesy of The LEGO Group)

Building The Crane

This particular set appealed to me since I already have the original Mobile Crane (#8421) and enjoyed it. I knew this set would be bigger and more complex. My guess was confirmed when I opened the box and found six instruction books for the main model. The pieces were divided into three sets of poly bags, with the first set of bags being used for the main truck (instructions were in the first three books), the second set being used for the crane motor and turret frame (instructions in books 4 and 5) and the final set being used for the boom (instructions in book 6).



Above: The first part of the build is underway. The insert shows the frames I built to hold the beams. Below: The six instruction books.

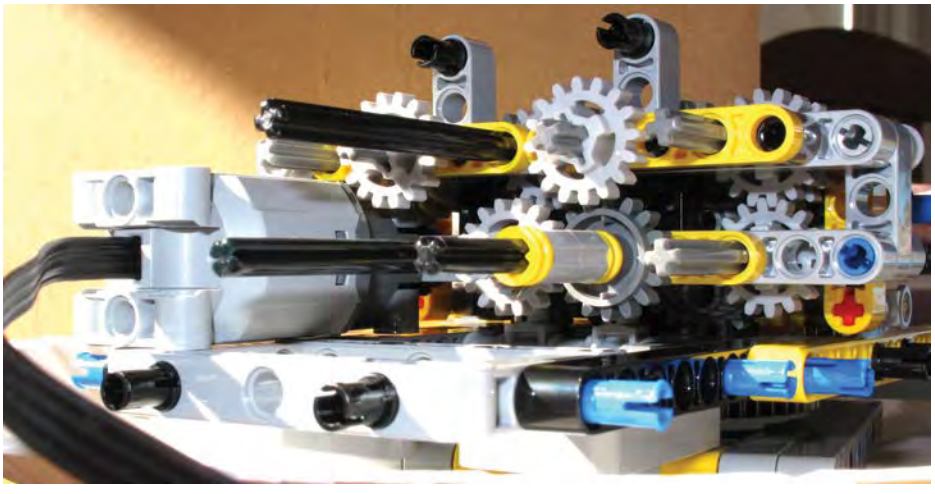
I decided to take a slightly different approach to the build this time. I was very busy with work and knew that I would not get a chance to complete the build over a single weekend. Therefore, I sorted the pieces much more than I usually do so I could easily find them over many different build sessions. Also, I decided to build some stands to hold the sorted beams and to keep the plastic trays of smaller pieces at an angle. The trays are from older LEGO Christmas Advent Calendar sets and are handy for sorting.

Functionality

The crane has a steering mechanism that uses three different radii on four of the five axles (13, 17 and 21 degrees). The center axle is fixed and ties into the motor with a typical TECHNIC differential. A single axle runs the length of the model and ties to four gear racks to turn the axles. The steering angles are set by having different lengths for the swing arms.

This set has a single motor mounted in the turret frame. It uses two different transmission sets to switch between 5 different functions. Three control the boom and hook cable, the other two control the stabilizers. The five functions' directions (up or down, in or out, etc.) are controlled by using the switch on the battery box. There is a sticker that goes on the battery box which has a white arrow and a red arrow. The stickers that are part of the transmission shifters also use white and red arrows to indicate that when the battery is shifted to the white side, the current function will behave "this way" (in this picture the boom will lower).

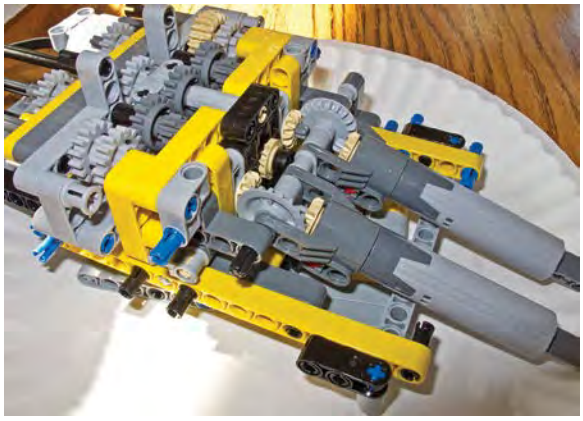
The transmission shifter on the turret has four positions, which control raising/lowering the boom, extending/retracting the boom, winding/unwinding the hook cable, or switching control to the second transmission (located in the main truck).



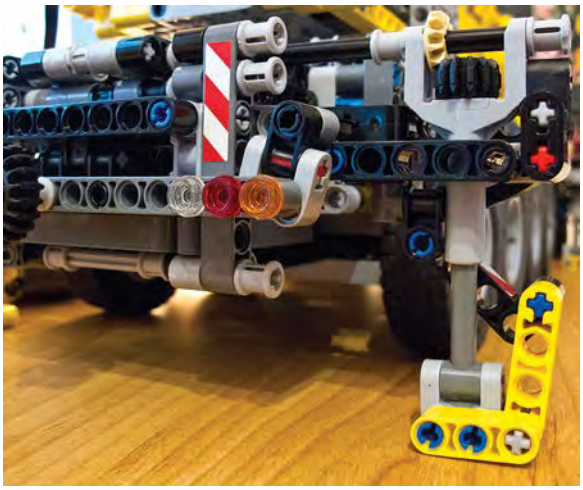
Left: This is a close-up of the motor and the first part of the turret gearing that will eventually become the main transmission for controlling all of the crane's functions. To learn more about how LEGO transmissions work, see the sidebar "Inside the design and mechanics of the LEGO transmission"

This transmission controls the crane's four stabilizing arms on the truck. The stabilizing arms are extended or retracted from one position and the legs are raised or lowered from the other position. I think it would be interesting to see someone redesign the superstructure of the crane to allow multiple motors which could drive two functions at the same time.

This set was a lot of fun to build and to study while building. It has a number of features that make it a lot better than the 8421 (see the sidebar comparison at the end of this article) and is a set that is worth adding to any TECHNIC collection. There are only a couple of things I would love to have seen added; a motorized control for turning the crane turret, and the ability to control it remotely, similar to the TECHNIC Bulldozer (#8275). Oh well, maybe The LEGO Group will add that to the next crane they offer.



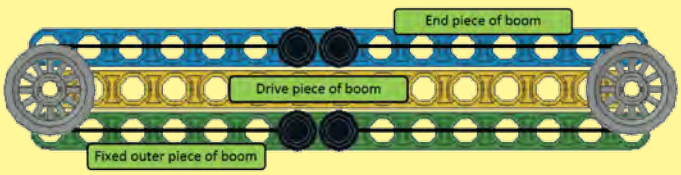
The turret is really complex with all of the gearing to handle the transmission and function gearing. Here, the turret is only about 1/3 complete.

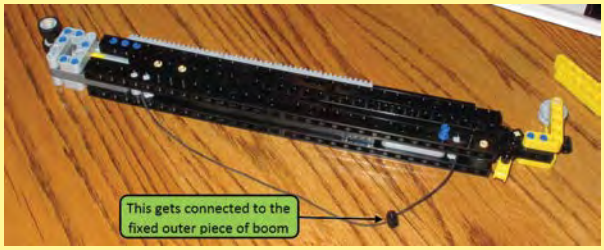


A close-up of one of the stabilizing legs.

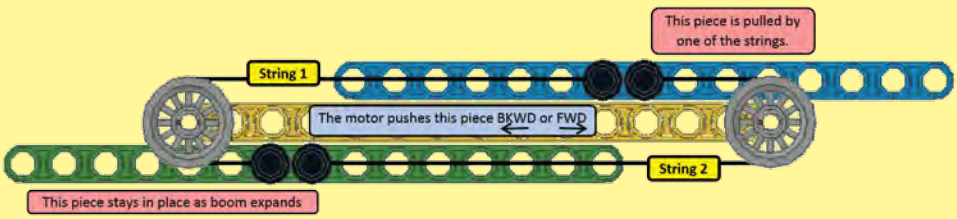
Inside the Design and the Mechanics of the Boom Extension

The crane's boom uses a simple mechanism to control the extension and retraction of the three sections. The diagram below illustrates the principles involved. In the diagram, the green beam is attached to the platform holding the boom. The yellow beam is moved by the motor, and the blue beam is moved by the pulling motion of one of the two strings. If the boom is being extended, then string 2 provides the pulling force. If retracted, then string 1 provides the force. The rate of motion between the yellow and the blue beam is identical to the rate of motion between the green and the yellow beam.





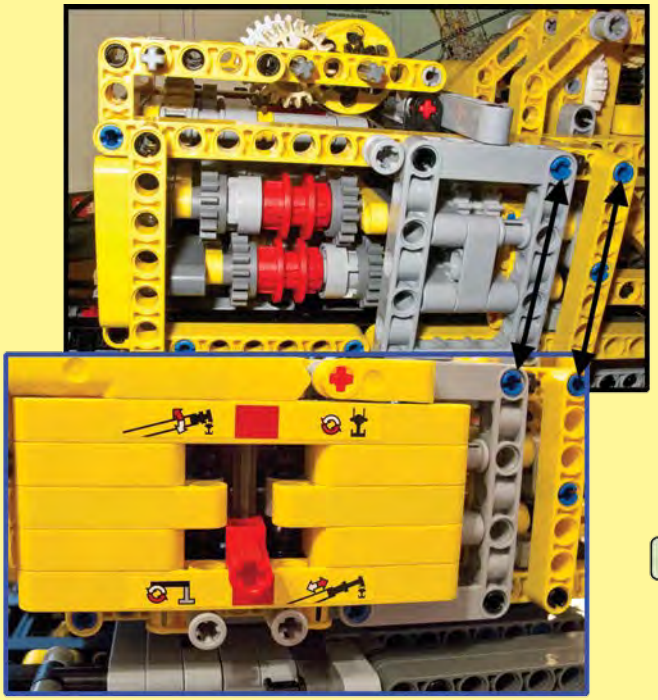
The picture above shows the inner two sections of the boom ready to be inserted into the main outer section.



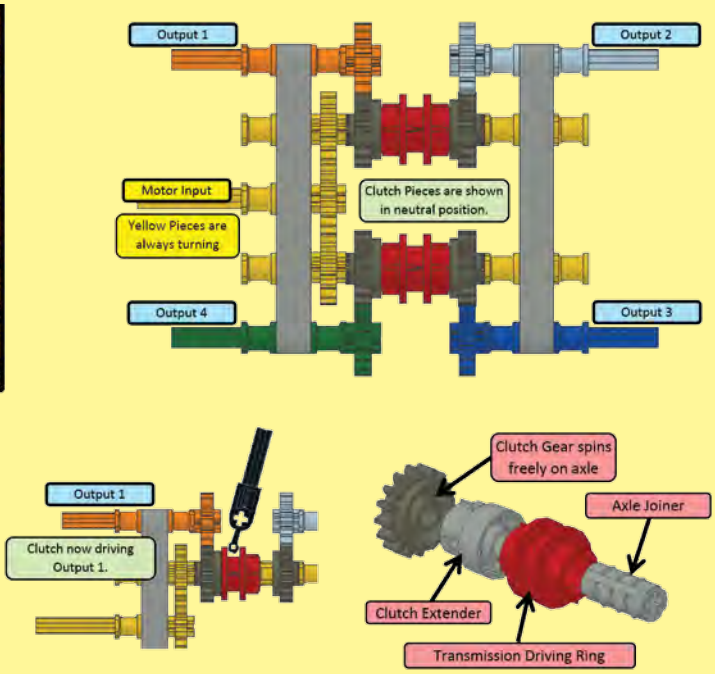
Inside the Design and Mechanics of a LEGO Transmission

Below is a diagram showing the major components that make up a LEGO Transmission assembly (lower part) and a finished assembly (upper part). This is a very simple design to demonstrate how the transmission works. First, let's define the operation of each piece.

- The Clutch Gear and Clutch Extender will spin totally independent of the axle they are on. This means that in our example, when the motor input spins the three gears (in yellow), the axles will also spin, but the Clutch Gears will *not* spin.
- The axle joiner and the driving ring will both lock onto the axle motion so they will spin when the motor input spins.
- The driving ring has ridges that, when inserted into a clutch gear or extender, will cause the gear to spin. Therefore, to cause one of the output sections to spin, we slide the driving ring into the gear tied to the output (lower left diagram). This is done with a transmission shifter piece.



Here is the turret transmission with the side cover off (top) and the side cover on (bottom). The stickers indicate the shifter position to perform each function.



The example above is not part of the design for this crane. It is intended solely to show a simple example of how a transmission can be used to drive different outputs from a single motor.

The set-up on the left is what I used to create the profile images that are used for comparison. The image above on the right is the set-up that captured the overhead view. Both sets of images were cleaned up with Adobe PhotoShop CS5.

	42009	8421
Year	2013	2005
Pieces	2606	1884
Price (USA)	$220	$150
Per Piece	$0.08	$0.08

42009 - 8421 Comparison

So how does the MK II Compare to its predecessor? Here are some interesting notes on functionality. First, the 42009 uses linear actuators instead of pneumatics to raise and lower the boom, which means that the boom stays in position on the 42009 if left raised for hours, and does not come crashing down when switched to the lowering position. Second, the extending of the boom on the 8421 is tied to the winding of the cable for the hook. You can raise and lower the hook by itself, but you cannot extend or retract the boom by itself. The motion of extending the boom arm on the 42009 does not cause the hook to raise or lower.

From the LEGO Idea House:

Building a Name...

This year the LEGO® name celebrates its 80th anniversary. Here is the story about how it came about...

Article by Kristian Hauge
Photography and art provided by the LEGO Group

Ole Kirk Kristiansen with his family, 1922.

After setting up business in 1916 as a self-employed carpenter and joiner mainly building houses and large items of furniture for local farmers, Ole Kirk Kristiansen, pressured by an economic crisis, reinvents his business in 1932. His focus is now on production of wooden toys and smaller furniture. Two years later, in 1934, Ole Kirk narrows his focus even more towards the production of wooden toys. With this decision it is apparent to Ole Kirk that his company, Billund Woodworking Factory, needs a new and more suitable name.

Ole Kirk Kristiansen throws open the challenge of finding a name for his company to a competition among his employees, friends and family. The competition winner—claiming the prize of a bottle of Ole Kirk Kristiansen´s homemade wine—is… Ole Kirk Kristiansen himself! Ole Kirk believes he has found the best name for the developing business—and it was perhaps just as well that he won the bottle of wine because, as his son Godtfred later revealed, his father's homemade wine could be something of a shock to the system.

Ole Kirk Kristiansen´s garden, from which he got the ingredients for his homemade wine.

The company name? Ole Kirk had played with the two Danish words **LE**g **GO**dt, meaning Play Well, to produce the LEGO® name. The name is intended to reflect quality and the child´s right to enjoyable play.

Before settling on the LEGO name, Ole Kirk Kristiansen was very close to choosing the name Legio for his company. Legio is the Latin word for Legion. As a legion is a large army unit with a vast number of soldiers, Ole Kirk´s hope was to produce toys in vast numbers—Legions of toys. To illustrate just how close Ole Kirk was to choosing Legio as the company name, he actually used it in 1953, when he and his son Godtfred Kirk Christiansen set up a production company in Norway under the name Norske Legio A/S.

1934

1953

and a Logo!

...and how the first company logo was created in the wake of the new company name.

1958

With the new LEGO name, it was also time to create a company logo. The first two logos created in 1934 and 1936 were with blue lettering, but the form and colors would change frequently in later years. In 1953 a new logo appears, consisting of a red oval with soft rounded white letters with black outlining. The 1953 logo is the first approach to today's modern LEGO logo.

In 1958 the LEGO Group patents the new groundbreaking interlocking system for the LEGO brick, and the same year another new logo appears. It features a rectangular shape instead of the oval. The rectangular shape and the addition of the word "system" symbolize the LEGO Group's focus on the LEGO brick. After a rendition of the logo in 1964, when the shape changes from rectangular to square, the logo more or less achieves its current look in 1973. To direct the focus at the company name, the word "system" is removed. The design of the soft letters is made more modern and a black and yellow outlining is added around the white letters, all of this being very much in keeping with the 1970s. In 1998 it is once again time to bring the logo up-to-date. The design of the letters is tightened further and the yellow outlining between the L and E, plus inside the O, is removed.

People's perception of color and shape change over time, which makes it necessary to alter a company logo occasionally. The fact that many of the alterations have consisted only of minor adjustments is because recognizability is the key to any strong and well-known logo. The LEGO name and the LEGO logo are here to stay, and the name is as relevant as ever—because children deserve the best!

1973

1998

Community Ads

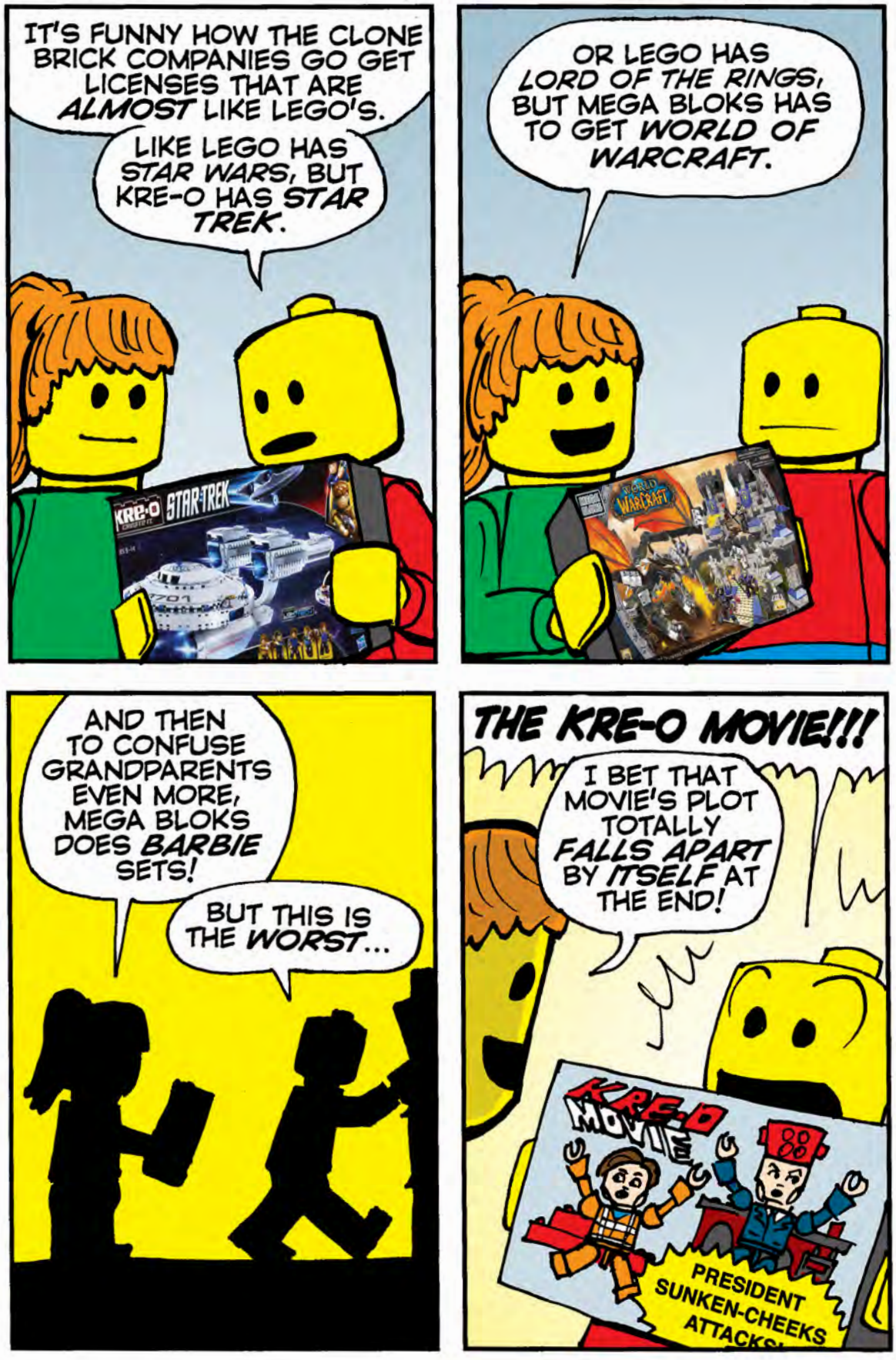
Sometimes the craziest things happen, and I get caught. Such is the case above, where I happened to be a guest for a NYLUG member and got to meet Wyld-style and Emmet at the LEGO Store at Rockefeller Center, New York City. The next day, I met up with *BrickJournal* advertisers and supporters Rachel and Kyle Peterson of BrickForge at NY Toy Fair! And Imagine is having fun peeking...

Wow, everything *is* awesome! See you next issue!

PS. Did you find the hidden minifig? If so, send me its location by May 31. All correct guesses will be gathered, and one person will win the minifigure! Thanks to Mark Marquez for providing it!

AFOLs

by **Greg Hyland**



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