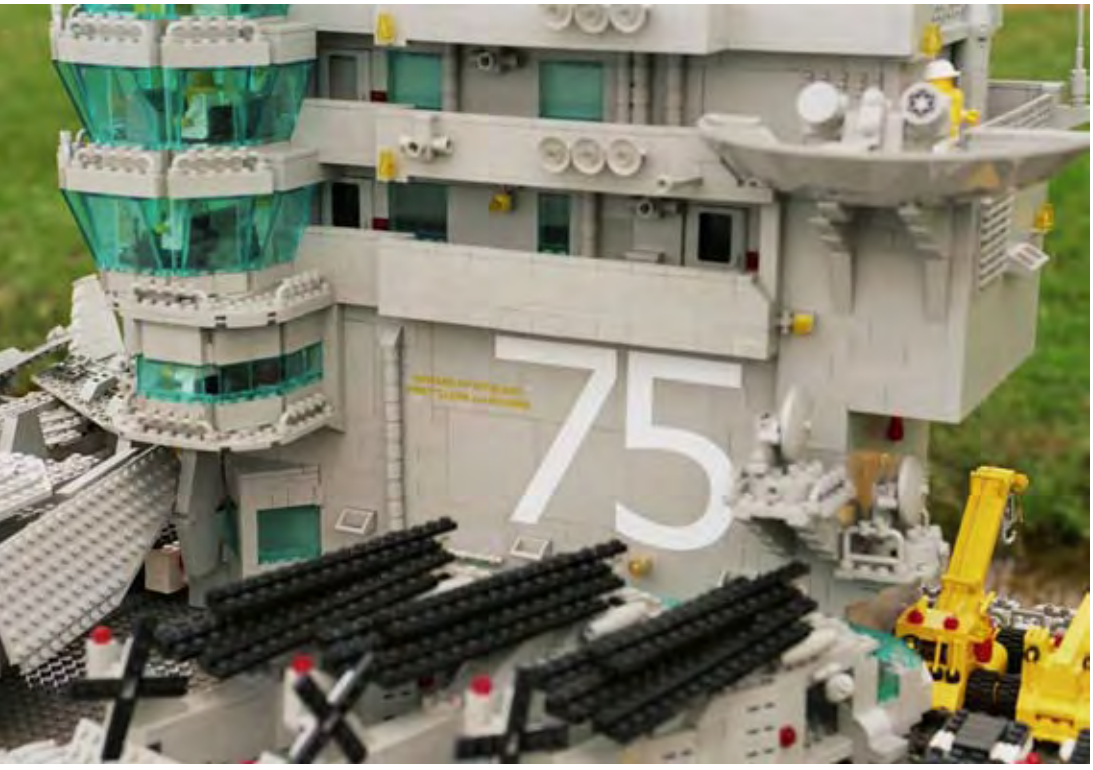
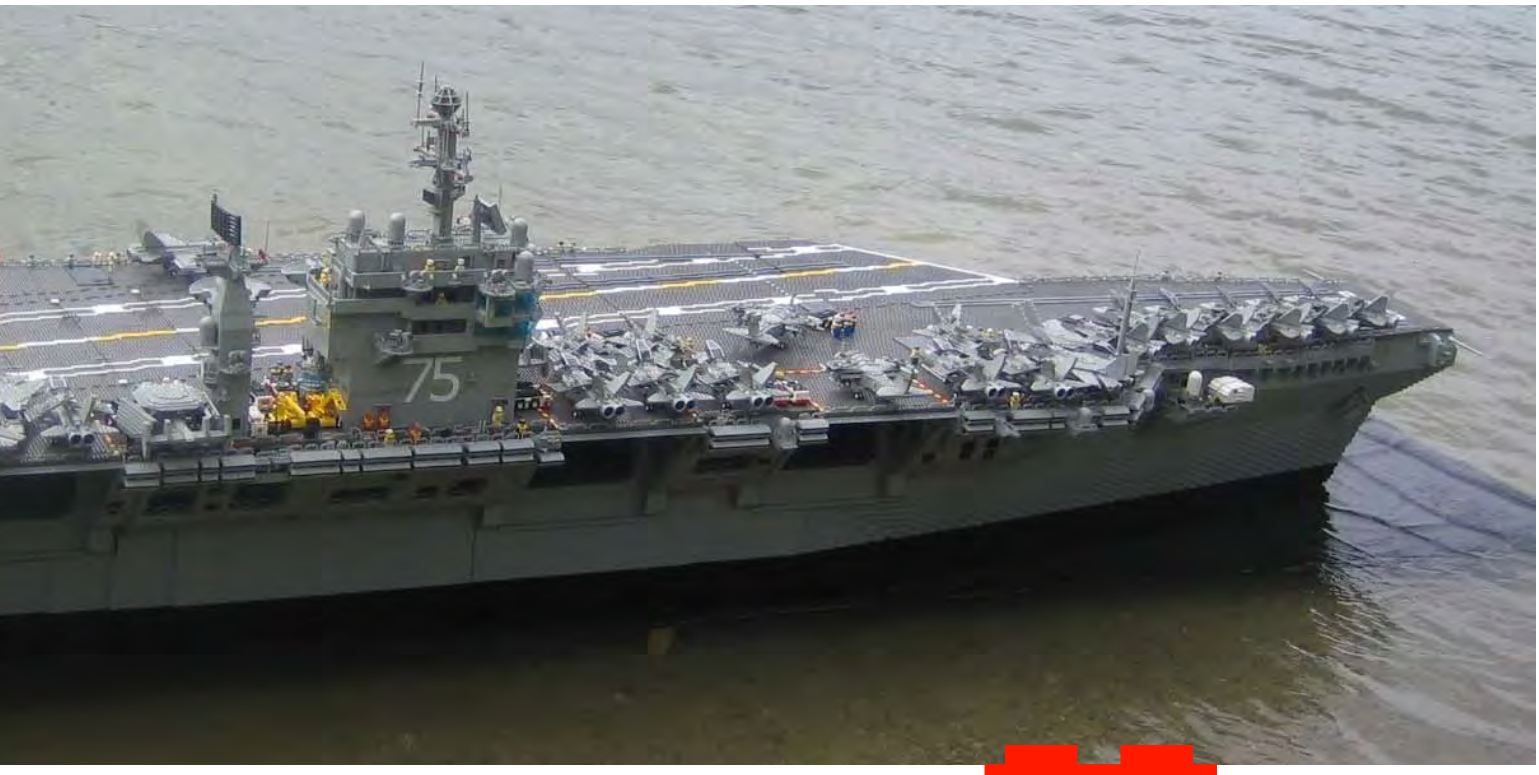


USS Harry S.Truman



BrickJournal
people • building • community

BrickJournal Is Coming to Your Town...Layout!

In support of *BrickJournal*, ME Models has created a Delivery Truck (ME #1004) and a London Bus (ME #1005). Both models are sporting the exclusive *BrickJournal* logos, with proceeds from the sale of every model going to support the magazine. Each model comes in a sealed collector box with high quality laser printed instructions and decals. The models may be purchased by going to this website: **http://www.me-models.com.**

ALL buyers and multiple orders welcome. PAYPAL, cash, money orders and personal checks are accepted. Postage will be calculated when you place your order.

BrickJournal Delivery Truck
(comes with minifigure driver) **$22**

BrickJournal London Bus
(comes with minifigure driver) **$25**

ME Models "Add a little realism to your hobby"
www.me-models.com

Please e-mail ME Models if you have any questions at memodels@me-models.com .

The last section, module 6 took 3 Months to complete due to scaling problems and the very highly detailed bow of the ship. Each of the modules were built with about 20 pics of the carrier. Even the detailed hangar bay is also modelled with electrical lights and a webcam to let the viewers take a look inside. The Flightdeck has also some electrical lights and a real "Meatball", which signals the landing aircraft. The whole 9v electrical arrangement took about 3 months to be implemented and final touches on the working catapult is ongoing. There are more electrical gimmicks on board but you will have to discover them yourselves when the Truman will come to Brickfest 2007!

"Creating the functional elevators in module 4 and 5 gave me quite a idea of what is possible to build with LEGOs. Also the angled flight deck and the structure below were challenging."

After assembling over 200,000 Bricks it was time to finalize the model and implement the last few bricks needed, give attention to details on the flight deck and to throw a glance on the 16 feet model. The tiles on the flightdeck were often reassembled in order to give the angled deck its original and detailed look.

An average of 35,000 Bricks per module raised the height to 60 cm and the width to 1.40m. Initially, I had some working space in my study room but after assembling the first 2 modules I needed to move down in the cellar to complete. It took me months to purchase the needed parts and besides assembling sessions after work, I cant think of anything I have done in my life before that was so exhausting as sorting bricks and to fiddle about - You builders all know what it's about!

The 6 Modules are shock-proof structured and have their own transport box to make sure the bricks remain on top of each other. I wasn't aware that I needed special wood shipping containers for delivery to the US, but I will have 6 of them thanks to Rainer Schmidt from the Munich "Bricking Bavaria" Community. The entire group of boxes can now be shipped via airmail or container ship.

The most amazing thing about building the *Truman* minifig scale was the feedback from the Public Affairs Office (POA) from the real Truman (CVN-75) at Norfolk, Virginia. I contacted them at beginning of the year and they were quite excited about the LEGO Model of their vessel. After a few mails and pictures I have sent to the POA we now have scheduled a visit to the *Truman* and display the largest LEGO Ship to the US Navy -a wonderfully unexpected result from this project I started last year.

The contact was very positive and I am looking forward to the opportunity to step onboard and take a deeper look at the original and see how daily work looks like. A single LEGO Tomcat remains onboard the real ship as a gift and for the appreciation of the outstanding work the seaman are doing daily at the *Truman*, especially at the most dangerous workplace you can find on earth: The flight deck of a *Nimitz*-class aircraft carrier! I will set foot on deck when travel arrangements have been sorted out for next years exhibitions.

I also created a Nuclear Sub and a Destroyer who escort the ship and are participants of the so called "Battle Group" which consist of 2 guided missile cruisers, 2 guided missile destroyers, a frigate and 2 attack submarines. It has its supply usually from an Sacramento class auxiliary ship. This huge Battle Group (The navy operates 12 of them!) supports and protects the carrier. But to build all of them would make the space for exhibitions too rare and some arguments at home too noisy!

My Son Niklas (4) and his friends will have the opportunity to play with the Fighters and be "Maverick" and "Goose" soon while I continue with my latest project: A Liner from the Cunard shipping company in Minifig Scale! But there is still a lack of black basic bricks so it will take another few months to raise a stock of needed parts. I'm still thinking about creating another ship model which is the "P&O Nedlloyd Manet", the biggest container ship ever constructed. I just build Ships and will continue till I tire, but I'm sure this will never happen. Creating such models is recreation to me and is a nice way to spend some time with my son, who also did some small work on the Truman.

But after such a large navy project, the next steps are upcoming exhibitions and displays - such as "Tausend Steine Land (TSL)" in Berlin from 18th till 20th August. During my 4th stay in the United States next year I plan to participate at "BrickFest" with other German Members from "1000Steine.de" to give everyone all the opportunity to take a look at the amazing models of our community! This is another challenge to face but I am sure we will meet at an US LEGO Event!

Here you can find some more nice pics and additional infos:
http://www.1000steine.com
http://www.brickshelf.com/cgi-bin/gallery.cgi?f=126969
http://www.truman.navy.mil

Mark's Modular Movers

Mark Stafford has been building big for some time and has shown his models at LEGO World in the Netherlands. In this issue of BrickJournal*, he showcases some of his most recent models, which are much more than what they first appear!*

Article and Photos by Mark Stafford

As long as I can remember I've been fitting smaller spacecraft into bigger ones. I think it started when I first saw the LEGO Galaxy Explorer and a small buggy being inside just blew me away. I went home, built a boxy LEGO spacecraft with swing doors at the back, filled it with small buggies and haven't looked back since.

I was born in 1971 in East Yorkshire, England. I sneaked past the overlords and was eventually educated to the degree level and have a 2:1 BA in Graphic Design. I don't remember my first LEGO set, though it was pre-minifig as the 'man' had his hands moulded into his pockets and had no face.

When real minifigs (with arms, legs, hands and faces) arrived, roughly at the same time as Star Wars warped my young mind, I spent the rest of my childhood building space bases and wishing I had more pocket money.

At 13 or 14 I packed my LEGO in a box and concentrated on trying to be a 'grown-up' (I'm still not very good at it). However I think the LEGO Company was secretly targeting me and kept hitting the people I lived with. I shared a flat at University with a friend who suddenly decided to collect all of the LEGO castle sets he could get hold of. Then shortly after I moved to London and I ended up sharing a house with Steve Burge (an AFOL and member of the Brickish Association) and his massive collection of Space, Pirate and anything else he can get hold of. Later I moved to The Netherlands and met and fell in love with Megan Rothrock (a Californian living in The Netherlands) and she turned out to be an AFOL too! Of course all this exposure had beaten me down and shortly after the Star Wars license began (in 1999) I was back in the build zone!

The first large ships I built coming out of my dark ages were throwbacks to those I built when much younger. These gradually progressed into the Outrageous Fortune [fig 01]. This is a classic space style carrier ship that had twelve smaller ships inside or attached and was designed to be a very thorough first contact vessel It could land, say 'hi,' send out lots of reconnaissance vehicles, and it also carried a few weapons too.

However, only with full-on, kick-butt military space vehicles do I feel the modularity / Russian-doll aspect of my space construction has begun to reveal its full potential. Let me give you a tour of a couple of them.

The Big Boys Toys

A war vehicle for a Spaceforce cavalry or mobile infantry forces, the Big Boys Toys is a single vehicle that can creep through a border or other secure perimeter and then become a fully deployed force of great adaptability and variety.

First the main vehicle can split in two, allowing the assault force to form a two-pronged pincer attack.










In the front end is a large gunship with plasma rockets, heavy magnetic rail guns and normal projectile weapons.

This unit carries its own small reconnaissance force of an assault buggy and a motorcycle and these units can either be deployed on cliff tops, the other side of canyons or can join with the troops in the rear end vehicle for larger assaults.

The front end also has a smaller flyer used for long term or rapid deployment reconnaissance This unit sits quietly for hours or days in concealed areas while the pilot sends 'blip' reports of highly compressed data back to the main vehicle.

When both of these flyers are out of the main body of the front end it can deploy the cockpit of the Tank Commander. This converts the front end into a fast moving and very destructive mobile gun vehicle. This is equipped with heavy particle weapons with plasma compression jackets that can penetrate all but the strongest of force-fields and all known forms of vehicle armour.

The rear end of the Big Boys Toys is equipped with several smaller units and a small high altitude spy plane from the front for long-range covert reconnaissance.

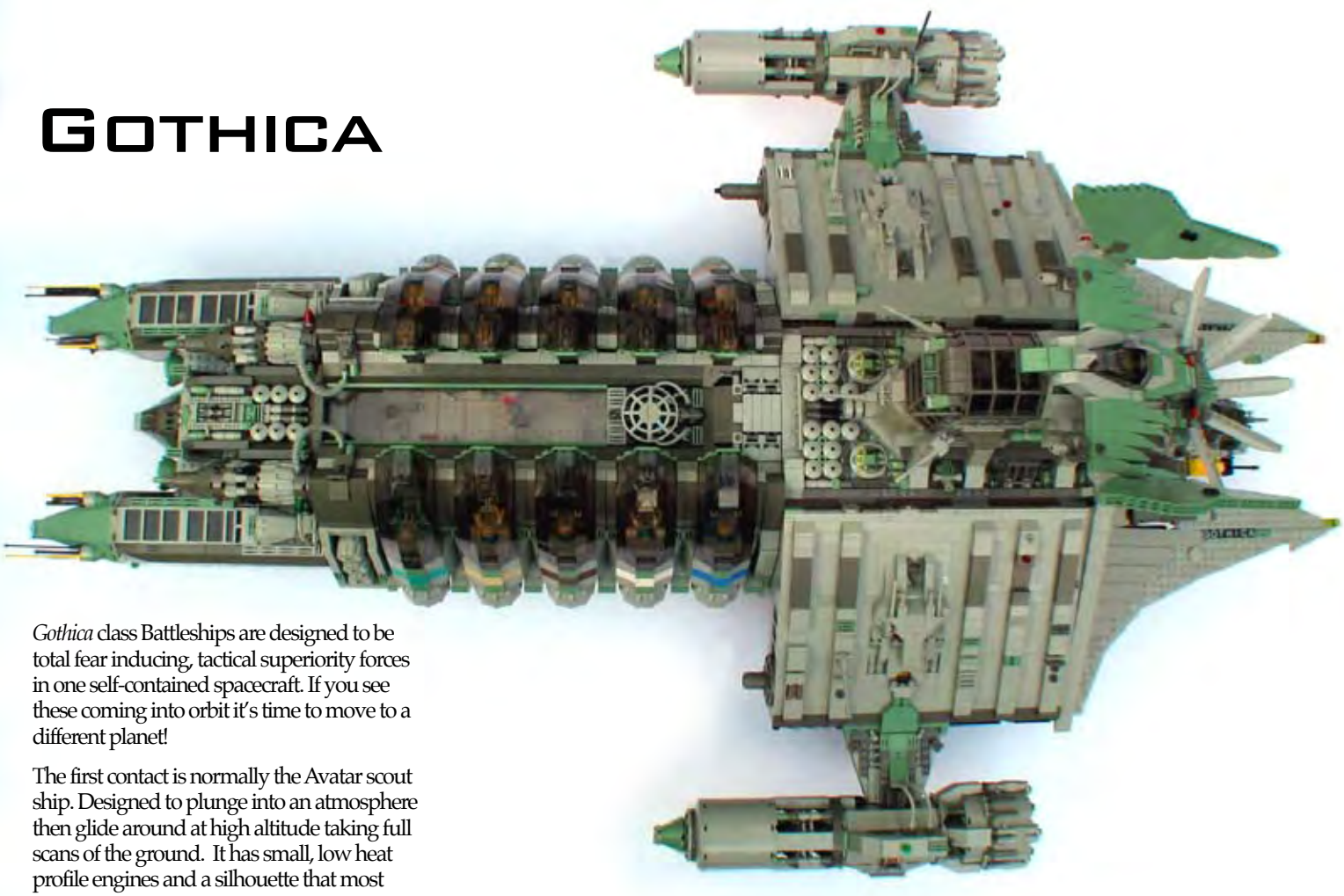
The rest of the rear end is an effective ground attack force; an infantry support flyer can launch from the centre and deploy its anti-personnel weaponry. This flyer is for close support and hovers just above the heads of the Big Boys Toys troopers picking off enemy forces.

In the back of the rear end are two assault buggies and four stealth troopers in body armour.

When all of these are deployed the rear end of the Big Boys Toys is controlled from the extendable gun platform built in near the rear. This has four light particle weapons, eight plasma rocket launchers, and can assist in any overt ground assault. There is also an extendable aerial in this part of the vehicle for send reports back to main base.

The Big Boys Toys is a valuable asset to any Spaceforce or security service.

Gothica



Gothica class Battleships are designed to be total fear inducing, tactical superiority forces in one self-contained spacecraft. If you see these coming into orbit it's time to move to a different planet!

The first contact is normally the Avatar scout ship. Designed to plunge into an atmosphere then glide around at high altitude taking full scans of the ground. It has small, low heat profile engines and a silhouette that most eyewitnesses would guess is a bird.

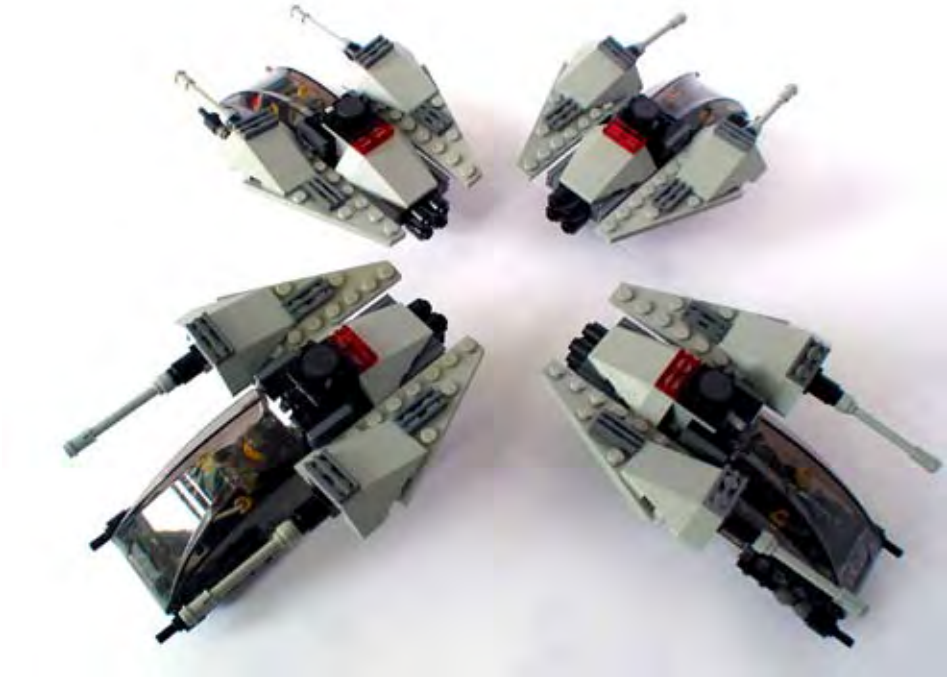
If the Avatar is not spotted, then the first warning planetary defence forces get that they are under attack from *Gothica* class spacecraft is on their sensor displays. One large ship enters the atmosphere and swiftly deploys ten smaller ships.

Arch Fighters are swift and deadly fighters equipped with plasma rockets. These ten ships split into five wings and take out strategic targets as plotted by the Avatar.

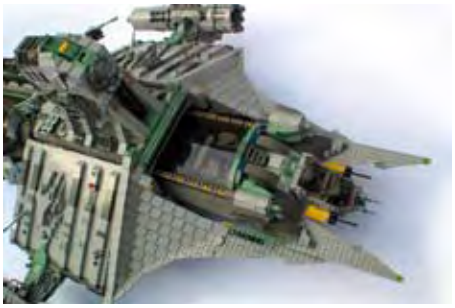
Meanwhile the *Gothica* deploys its second strength fighters, the Valkyries. These smaller, more agile fighters are designed for dogfighting and stick relatively close to the Gothica at this stage, waiting to see the response of the defenders. Armed with Magnetic Rail guns they are capable of defeating most similar sized fighter aircraft.

Once above the main target the *Gothica* initialises its Antigravity generator and floats just above normal ground based weapon range. Anything remotely threatening is targeted by the main guns at the lower front of the vessel and removed from the battlefield.

The *Gothica* is also equipped with several Magnetic Rail guns of its own just in case resistance is stronger then expected and some enemy vessels get within range.



Once air superiority is secured then the ground assault can begin. The Turtle, a troop drop ship, emerges from the aft section of the *Gothica*.



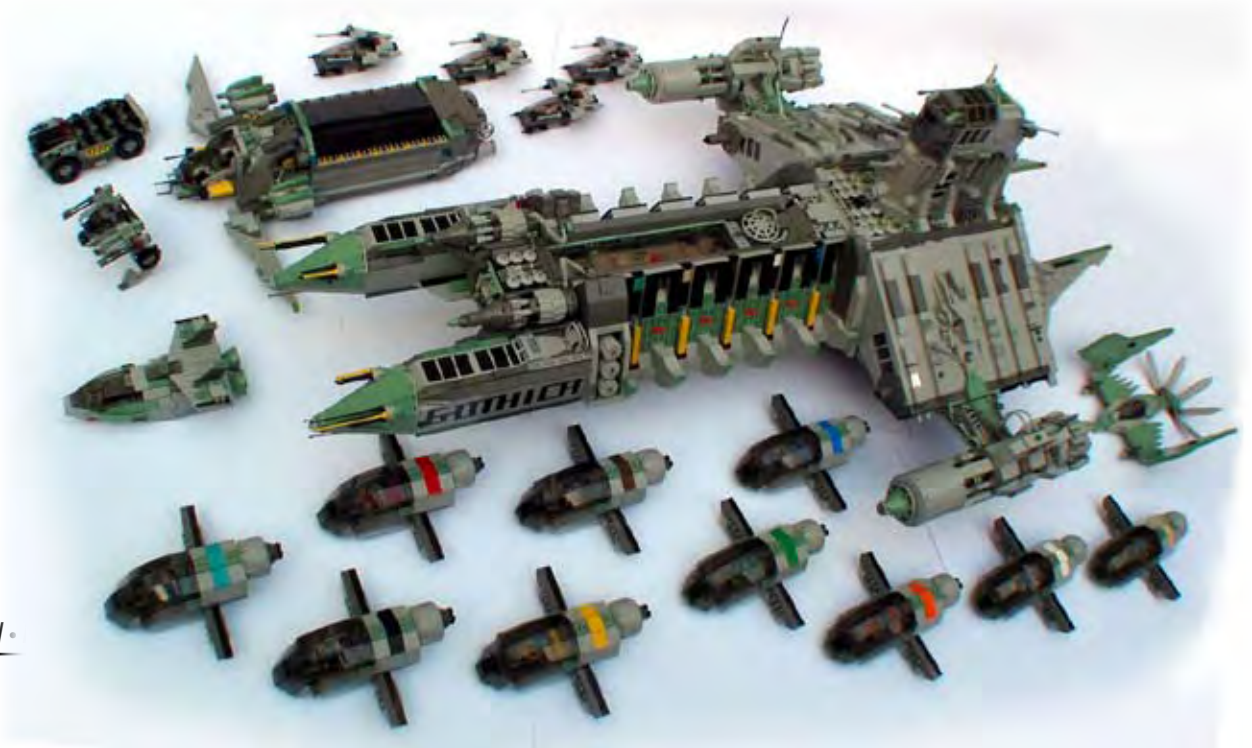
Though the Turtle can be used for just troops (carrying over sixty troopers if required) it comes with the Venator troop carrier as standard equipment. The speed of deployment of an eight man squad of troopers in this heavily armed vehicle can be more of an advantage then sheer numbers in most assaults.

The Venator also comes equipped with the trailer 'Trach' Mecha. It, in turn, is equipped with rail guns, plasma rockets and old-fashioned projectile weaponry it giving it a formidable advantage in any ground action.

Now fully deployed as an attacking force the *Gothica* still has one last trick left. Built into the heavily armoured front section of the vessel is the Nephilim medical evacuation ship. This can be dispatched to retrieve any injured troops or rescue downed pilots. Troops are then returned to the *Gothica* for treatment in the state of the art medical bay.

(Some complaints have been received about the lack of proper airlock technology in the Nephilim docking process. But lets be honest, if you're injured on a planet or space platform with a poisonous atmosphere—or worse, no atmosphere, then you're not going to live long enough for med-evac anyway!)

Lastly a word on the design theory of the *Gothica* Battleship. This vessel is designed to look good, very expensive, to echo the battles and fortresses of the past, and to remind the opposition of the human price of warfare. In point of fact it's designed to be so damned cool that most opposing forces will just back down and go home without offering serious resistance. If you can afford to send in a *Gothica* then you are to be taken very seriously indeed. The *Gothica* is the best a Spaceforce can get.



Reaching the Sky with LEGO Buildings

Adam Tucker builds LEGO skyscrapers and BrickJournal *talks with him about building and a new way to build tall!*

Article and photos by Adam Reed Tucker

BrickJournal: ***So who is Adam Tucker?***

Adam Tucker: I grew up and have lived in the Chicagoland area all my life, except for my "college years" when I lived in and around the Kansas City area. There I received my Professional Degree in Architecture with an emphasis on the Philosophy of Design Theory at Kansas State University in 1996. I am now an architect and in my free time enjoy designing & building LEGO & non-LEGO robotic & animatronics systems aside from my LEGO architectural interests. In addition, I have a passion for all disciplines of engineering: be it structural, mechanical, electrical, industrial, etc... Aside from this and Architecture, I enjoy graphic design, volunteering, college football and playing ice hockey.

BJ: ***When did you begin to build with LEGO?***

AT: At the age of 4 in 1975. Growing up I remember vividly receiving only LEGO sets for birthdays & holidays. As I got older I soon graduated to the Expert Builder series sets and equally enjoyed building with Kenner's Girder & Panel sets. (I did not make the connection between the two until almost 30 years later, more on this to come).

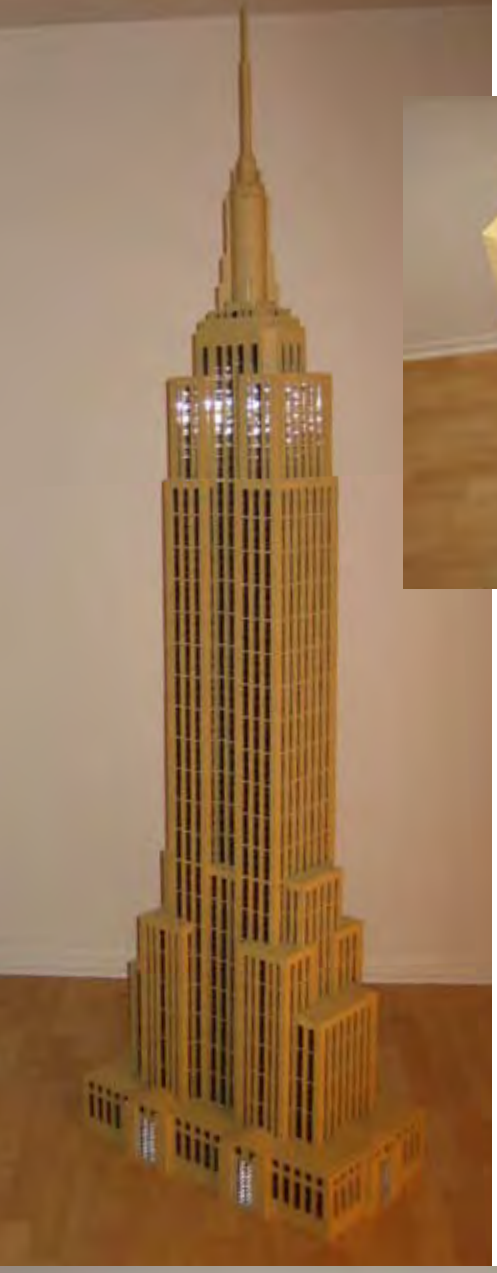
BJ: ***Did you experience a 'Dark Age,' where you stopped building for an extended time?***

AT: I am really no different than most Adult Fan of LEGO enthusiasts (AFOL). I did experience a "Dark Age" from about 1986 through 1996; a span of about 10 years. This was primarily the years spent from high school through college.

BJ: ***When did you notice the architectural possibilities with LEGO building?***

AT: I had run across an old LEGO book entitled "The World of LEGO Toys" by Henry Wiencek published back in 1987. As I was thumbing through it I noticed a really neat article on the architectural possibilities with LEGO bricks found on pages 110 -111. It was then logical for me to make the connection between my favorite building bricks and my favorite architectural building type: The Skyscraper. Again, as an architect I have always been fascinated with skyscrapers, so I decided to start constructing realistic LEGO versions and most uniquely enjoy the process of translating the real building in adaptation with LEGO bricks.

That pretty much started it all back in 2000. (I guess it also helps to live in a city where many famous skyscrapers have been erected). The design criteria I chose when deciding on which buildings I do are fairly simple, It must be a Skyscraper. Basically, any building topping out at or around 100 stories in overall height. Aside from that I consider the building challenge, building technique and overall appeal.



Empire State Building,
New York City

BJ: ***What buildings have you built?***

AT: Completed buildings are:

Sears Tower, Chicago, USA , World Trade Center One, New York, USA, John Hancock Center, Chicago, USA, Empire State Building, New York, USA

BJ: ***What buildings are in progress?***

AT: In progress buildings are:

Aon Center, Chicago, USA, Jin Mao Tower, Shanghai, China, Burj Dubai, Dubai, United Arab Emirates

BJ: ***What buildings are up for consideration?***

AT: Chrysler Building, New York, USA, Miglin-Beitler Skyneedle, Chicago, USA (never built), 7 South Dearborn, Chicago, USA (never built), Fordham Spire, Chicago, USA, Petronas Towers, Kuala Lumpur, Malaysia, Taipei 101, Taipei, Taiwan, 2 International Finance Centre, Hong Kong, China

BJ: ***You use a lot of LEGO elements, so how long does it take you to build a skyscraper?***
AT: Basically, there are 3 phases: Planning, Designing, and the Final Build. The Planning takes up roughly 50% of the time. This phase is image gathering, scaling conversions, various technique studies (I have easily had to build and re-build sections up to a dozen times before getting it just right), and most importantly the actual interpretation or LEGO transformation for the real life design elements into its LEGO form. The hardest part in all of this is actually buying and keeping track of all my "Bricklink" orders. I can easily have 60 – 130 orders placed within any given month. Most buildings use roughly between 15,000 -40,000 pieces and take 2 months from conception to placing the last piece. It should also be known that I make a full effort to reconstruct a given buildings complete internal super-structure, the way it would have been built in real life. I do this not only to be accurate but also because at the scale I build at the internal structural system becomes an important and integral part of the design and building phase.

BJ: ***You developed a new way to build skyscrapers, what is it called?***
AT: Yes, I have. It is called BrickStructures. BrickStructures is an innovative system of joining pre-existing LEGO pieces to replicate the way real-life structures are built.

BJ: ***I know you struggled with the name - How did you decide on BrickStructures?***

AT: I felt it was important to convey both LEGO & Architecture in the name. The "Brick" represents LEGO and the word Structures defines both Architecture and Engineering. I felt that BrickStructures best represents that combination.

BJ: ***Ok, now tell us a bit more about BrickStructures and its conception.***

AT: Due to the scale and size of my accurately portrayed towers, I noticed that the internal structure began to mimic the way a real building was structured; this naturally led to wanting to develop my buildings into real life engineering systems. In real life you have girders and beams....and I had a flashback to Kenner's Girder & Panel sets. When I had made this connection I realized that I could use about 1/10 parts to produce about the same model in scope, scale and size. I also realized that LEGO has not really touched on architecture before, in terms of offering it in set form. LEGO Dacta Educational division does offer a primitive "Structures" set that focuses more on using LEGO as an engineering tool rather

Sears Tower, Chicago

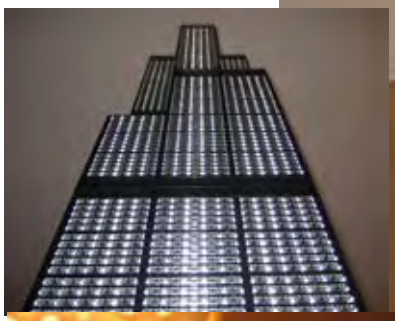
than an Architectural one. Seeing as how LEGO is a "Building Toy" it seems to lend itself naturally also as a "Building Tool" as well, an area that LEGO has not pursued when relating engineering, construction, and architecture to each other.

BJ: ***You came up with a very interesting concept for this connection that you have innovated. Can you discuss how this reflects real world building methods?***

AT: Structural systems for the most part are based on three-dimensional grid coordinate systems. This is achieved and quite recognizable in my building set using the unique 6-point connection, thus allowing the girders and columns to reflect the way real buildings are design and built. Furthermore, one's own imagination can take the parts in any one of my sets and freely design a half-dozen other building configurations. To further enhance and truly provided an unlimited design experience I will be developing some triangular, circular and half-grided adaptations to my basic line.

BJ: ***This is a pretty neat overall building innovation, what are your eventual plans for this?***

AT: First off let me explain the two divisions I am exploring. The first is BrickArchitecture. This will be an outlet for offering my buildings for a selected client as a sculptural conversation piece. Basically, offering a scaled replica of their unique building for use as a display piece in their respective lobby. These will be the large 7-12 foot models containing 20,000+ pieces much like the fully detailed buildings I build for myself. The second is BrickStructures. This is meant as the educational building sets offered in the more affordable kits. I do not consider my sets / kits to be a toy, but rather more along the lines as an educational / engineering exploration, a display or 3-D diagram of the structural systems used in building skyscrapers, towers, bridges, etc. BrickStructures will further develop and eventually go on to umbrella many different subsets. To give you a hint at some of these to come are: BrickArtchitecture, BrickSpaceframes, BrickTowers, BrickBridges, BrickBuildings, and BrickSkyscrapers. While my kits can be used in cityscapes or as backdrops for train layouts and the like, my real hope is that the kits can be used as real life sculptural and/or educational tools. I think of my idea as more a technical / learning / display set rather than an actual play themed type set. Don't get me wrong they are really fun to build, you feel like you're the crane operator erecting a building just like they would in real life. The initial BrickStructures sets will feature landmark recognizable buildings such as office buildings, towers... Eventually, I will be introducing specific lines, such as "World Famous Buildings," such as the Sears Tower, the Empire State Building, in addition to generic building types, such as a factory, department store or office buildings. In the interim, my hope is to offer the kits as limited runs, via my website or through Brick events and Brick conventions. I plan on further developing this idea and pitching it to the LEGO group for possible collaboration, further development or even greater unrealized possibilities.



BJ: ***What inspired this different direction?***

AT: Growing up I was fascinated with what I believe to be the 2 most amazing construction sets of the 70's, LEGO's Expert Builder line and Kenner's Girder & Panel sets. It simply came to me one late night. I thought about combining the structural accuracy and real-life construction methods found in Kenner's Girder & Panel sets with the high quality and great versatility of LEGO's Expert Builder line (Now known as Technic). I soon

World Trade Center,
New York City

realized that it would be a great method to offer my buildings for fellow enthusiasts that would be both affordable and challenging to build just like a real building is constructed. I wanted to offer people affordable kits where they could construct world famous buildings in a practical and affordable manner. So, the idea was born and I began exploring the best ways to fulfill the connection I made.

BJ. How did you go about combining Kenner's technique using LEGO's bricks?

AT: There are ONLY two adaptations to make that connection realized. The first is the unique 6-point connection that I developed through a simple modification: adding a pair of adaptive holes to each end of a traditional 1x8 Technic beam. This modification does not change in any way its original design intent, but actually only increases its versatility and usefulness. The second is my proprietary "curtain wall or skin" building panels, much like the Girder & Panels sets offered. Overall my kits are composed of five integral parts:

1. The "Column", which is a standard 1x1x5 brick
2. The "Girder", which is a standard 1x8 Technic beam
3. The "Connector", which is a standard 1x1 four sided studded brick
4. The "Panel, which is my proprietary 7x8 "curtain wall" piece
5. The "Roof", which is a standard 8 x 8 plate

I will also be offering spare parts and expansion sets to further refine and detail an existing model. This might include elevator shafts, stairways, etc.

BJ: ***Can you explain how you developed the panels that are used with the traditional LEGO elements?***

AT: The panels were designed and developed to be used in conjunction with basic LEGO elements. The panels are simply pinned into place using the half pin connectors. This is achieved by pre-die cut holes found at the top and bottom of each panel.

BJ: ***Can you discuss for us the different panels that will be offered?***

AT: At this time, we are offering three different types for each building. A basic lobby level panel, main building or body panel, and the mechanical equipment louvered panels found at the top of most skyscrapers. Currently, my supplier has no limit on the designs or colors to be offered, but the variety will naturally increase with time as new buildings are offered.

BJ: ***What all LEGO fans can really appreciate is that LEGO has always been the #1 building toy for quality. How have you developed your panel to maintain a similar quality?***

AT: There are two main areas of quality that one will notice from the start. The panels were designed with three main quality criteria in mind:

1. They had to be durable. The panels are made from a 30 mil thick rigid PVC/PET plastic. To give you an idea of what it looks & feels like, simply pull out a credit card from your wallet and there you go.
2. They are UV resistant.
3. The actual panel design graphics will never scratch off. Our design images are actually embedded within by use of a laminated protective layer.

BJ: ***You mentioned that these sets will be limited editions. Can you go into more detail on that?***

AT: Based on the supply of parts at any given time and the color choices available to me, these kits will have to be produced as a series of "runs." These will be offered when they are available. However, I will be offering limited editions from time to time or as a show promotion. I have incorporated a chronological serial number to each kit identifying it from run to run.

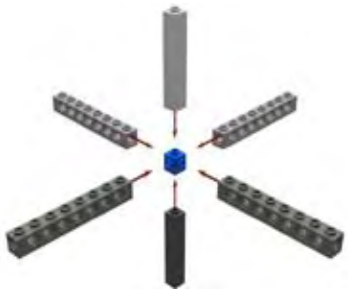
BJ: ***What sets will you be offering?***

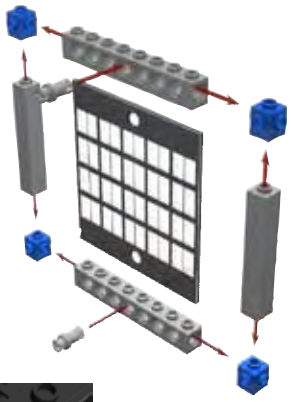
AT: As of this interview, I am still figuring all of that out. Specifically, the Sears Tower will be one of the first larger sets offered and it will be right around 5 feet tall with around a 1500 piece count. It appears that I will be offering sets that range from 100 – 2500 pieces. Again, all of this is very new. Accomplishing the panels and figuring out how the 6-point connection worked was the biggest challenge to overcome. Now that is all behind me I can begin choosing the buildings to offer and designing the sets. Each kit will contain brand new parts, all parts needed to complete the set or given building, an instruction manual, CD-ROM construction animation, and an Identification & Building Facts card. This will all be contained in a unique storage package reminiscent of the old style building toy packaging of the early 1970's.

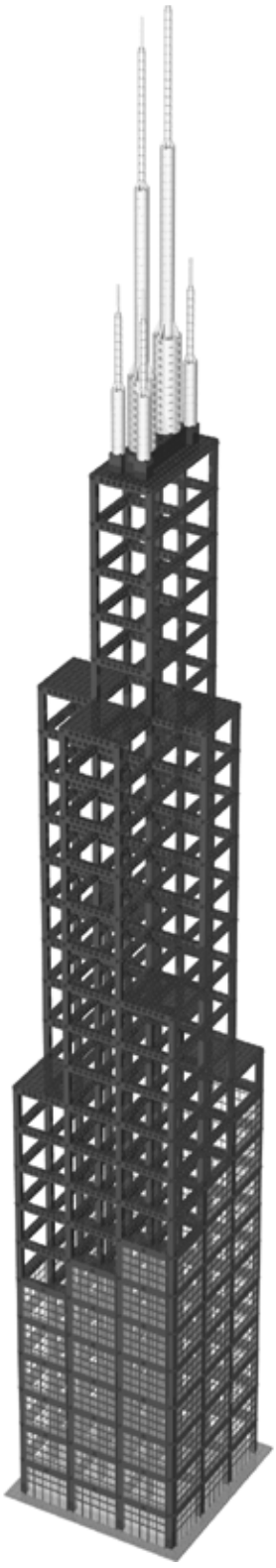
BJ: ***Aside form your Architectural work and the launch of your new idea BrickStructures, what else do you build using LEGO?***
AT: Generally, anything mechanical including robotics, pneumatics and gearing systems. Since my buildings are so static I stay balanced by this very dynamic opposing interest. I love the process of tinkering, creating the seemingly impossible, and exploring it with different techniques. I also enjoy designing Retro/Art Deco Flash Gordon styled Rocketships from the 1950's era.

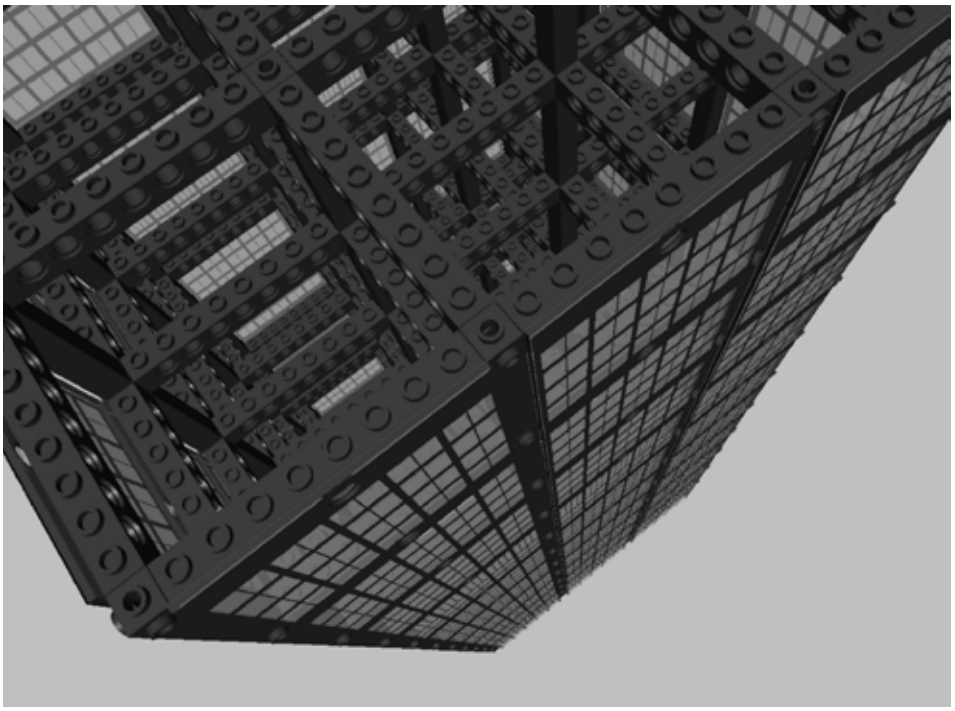
More information will become available by visiting www.BrickStructures.com.

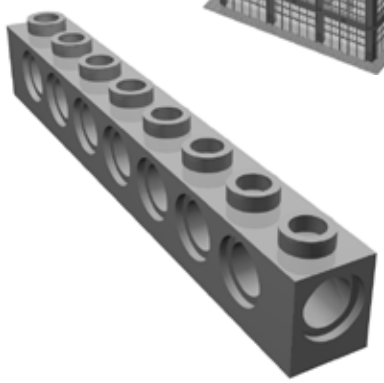
Sears Tower, BrickStructures











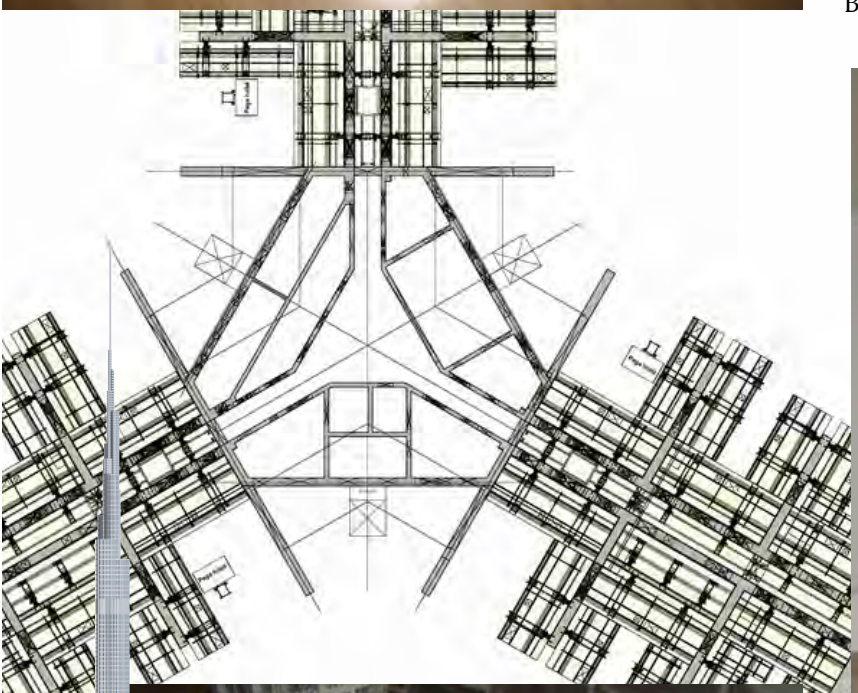
Burj Dubai,
Dubai, United Arab Emirates

This is a building Adam is working on that has not been completed, but *BrickJournal* was lucky enough to get a sneak preview of the building in progress!

The final height of this building is 16 feet (over 5 meters), making it among the tallest buildings constructed by a single builder (there have been towers done by groups that have gone higher, but they have been specifically for record-breaking attempts)

Final construction is set to be done by late August, in time for it's first display at BrickFest in Washington, DC.

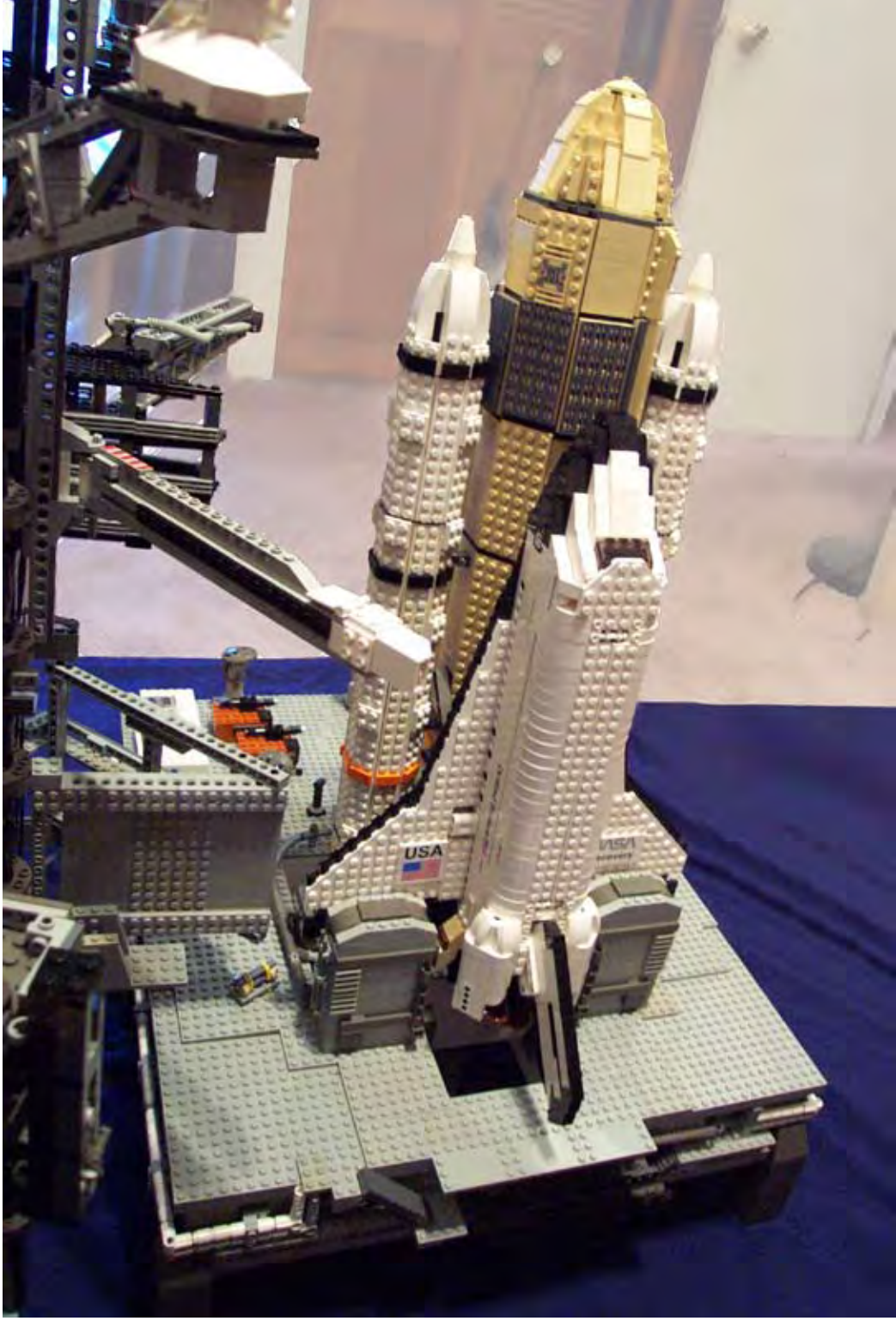
You'll see more pictures of this model when *BrickJournal* covers BrickFest!



"And the Countdown is at T-minus 30.."

One of the most complex machines ever designed is the Space Shuttle. Builder Brian Hastings took on the challenge of building this spaceship and its launch pad. BrickJournal *was able to briefly discuss his observations about building this massive project.*

Article and photos by Brian Hastings



***BrickJournal:* Tell us about yourself. When did you start building?**

Brian Hastings: I have no idea if I'm a 'typical' AFOL or not, but the ones I know are an eclectic and fun bunch, so at least I'm in good company… I am 32 years old and very fortunate to be married to someone who in addition to all of her excellent qualities – is supportive of my LEGO habit… I pastor a church in Fond du Lac, Wisconsin, and when I do have free time, it gets split between LEGO, playing computer games and paintball with friends, and a little bit of amateur astronomy and storm chasing on the side.

My very first LEGO set was a Christmas present; one of the Universal Building Sets from the late 1970's. From there, even though there were periods of time when I wasn't building much, I was usually in the middle of some project or other. I took a big container of LEGO with me to college, but I really started getting back into the hobby when LEGO began to release the Star Wars sets. Like a bunch of fans my age, I was building Star Wars vehicles out of LEGO long before the sets came out – and having the right parts and minifigs to do the job was wonderful.

And what inspired you to do space models?

From about as far back as I can remember, the whole idea of travelling into space fascinated me. Unfortunately, since I'm rotten at science and so-so at math, and since I don't expect to ever have 20 million dollars to pay for a week's vacation on the ISS, those trips are pretty much locked into my imagination. LEGO has been a way to explore and express that interest, and hopefully spark the imagination of others too.

In the past few years, my larger projects have been the result of encouragement from friends in the Sheboygan Astronomical Society, many of whom participate in an annual educational program called Rockets for Schools. It's an excellent program that allows teams from middle and high schools to build and launch high powered rockets. Along with the launch activities are special speakers, interactive materials and booths that promote science education and fun. I've built LEGO displays for that event for the past four years, and though I'm kind of surprised at the reaction these models have gotten, it's been a great motivation to build.

My latest model began with the LEGO NASA/Discovery Shuttle, and from there I built as much of the launch complex as I could. The idea to do the tractor-crawler and launch platform had been in my head for a while, but when the Star Wars Sandcrawler came out I began to think it was really workable. My wife (did I mention how wonderful she is?) got me that set for my birthday, and though I didn't have the heart to take the whole thing apart right after I built it; those treads were gone in a week, and the NASA crawler was underway. It took a long time to build, partly because of a lack of free time, and partly because it was an on again/off again process of research, sketches and experimentation.

About half of the build time of my space projects are devoted to research, which includes a lot of time on NASA websites, 'google' searches for as many pictures and diagrams as possible, and whatever print sources I can get my hands on. I draw sketches, and use powerpoint to create slide shows in order to skim through my reference pictures more easily.

The problem with pictures is that although they're great for getting a sense of detail, it's sometimes hard to understand exactly what is going on in a three-dimensional sense, especially with complex structures. This gave me lots of headaches when it came to the service structures of the launch platform, especially because good 360 degree coverage in pictures (especially top-down) was hard to come by. The folks at the Glenn Research Center were helpful, but oddly, it was at a French website that I found some incredibly helpful schematics.

The techniques I used in the build were not all that complex; since the structure would be fairly large, I wanted to use SNOT (Studs Not on Top) for detail and regular techniques to support the weight. The real challenge was trying to recreate scale, structure, and detail as accurately as possible across several different components that were interrelated; the crawler, the shuttle stack, the launch pad, the fixed service structure, and the rotating service structure. The shuttle solid rocket boosters and the external fuel tank both took some work to be reasonably strong and scaled correctly. I borrowed some of the design for the external fuel tank from Reto (Warhawk) Geiger, who has made some absolutely impressive space models, including the capsules for the Mercury, Gemini and Apollo spacecraft.

Several times, I thought I had the scale transferred correctly, only to find that I'd made a mistake that had implications for how the rest of the build came together – since all of the components (built separately) had to be correctly proportioned in all three dimensions.

Another challenge in building a model this big is part and color consistency – I almost always feel like I could do a better job *if only* I had more of this part or that part. Finding the best compromise with the parts I had on hand (or could reasonably obtain) was a constant struggle. I didn't achieve all that I wanted to in this model because of this, but there were several truly bright spots. My Astronomy group allocated some funds for a Bricklink purchase that made a big difference in the launch platform, which was a generous thing to do – and the first time I used Bricklink (I think I'm hooked!). I also had the chance to visit the LEGO store at the Mall of America, and met some terrific people who bent over backwards to help me find bricks that would work in the model. Joe and Judy – you rule! I guess there's always something I would add or do differently; I was working late into the night right before the Rockets for Schools event, and even brought a tray of LEGO parts with me to add some greebling; but eventually just had to let it stand as is.

Building Bugs

Pat Bunn talks about building his unique creations to BrickJournal *- and where his inspiration comes from.*

Article and photos by Pat Bunn

It's midnight. There is a sound coming from the basement. It's a crunching, shuffling, stirring type sound. Not quite the sound of broken glass. Scrunch, scrunch, scrunch. And then…Aha! There it is! The piece I needed that was buried in the bottom of the bin, sorted into the wrong pieces. It's exactly what I needed to connect parts A and B in just the right way.

I am making a robot. Not a real robot. It's a science fiction type robot with a little guy inside to drive it. I drew it the other afternoon when the class I was in became so boring I was lost in my doodles and sketches of what I would be building if I was in my LEGO room. I do that a lot. Wishing I were in my LEGO room working on some way to connect four Star Wars Gun pieces so that they would work as a leg.

I have a secret weapon. I went to an art school, the Maryland Institute College of Art. I have a degree in Sculpture. I just wish it were in engineering, because the way I build is like knitting a spider web and the slightest push on the wrong point crumbles my entire creation. I look at things in the world and think "I could build that". Like Google image searches for Goliath and Rhino Beetles, the old 80's cartoons like Robotech and the Herculoids or flying wing aircrafts. So I work in LEGO but not as Art. It is a release of my creative juices that I don't get from work, that is immediately a finished product I can play with and crash around and rebuild again and again.

My robot is oddly shaped. It doesn't follow the usual anthropomorphic design of two arms, two legs, a head and body. Yet again I have made a Bug. I often make bug shaped robots. I figure if you are going to make a science fiction creation, a spider tank is a good place to start; better yet a spider driving a tank, or best of all, an alien driving a spider that is the size of a tank! This is the sort of creation I have built the most.

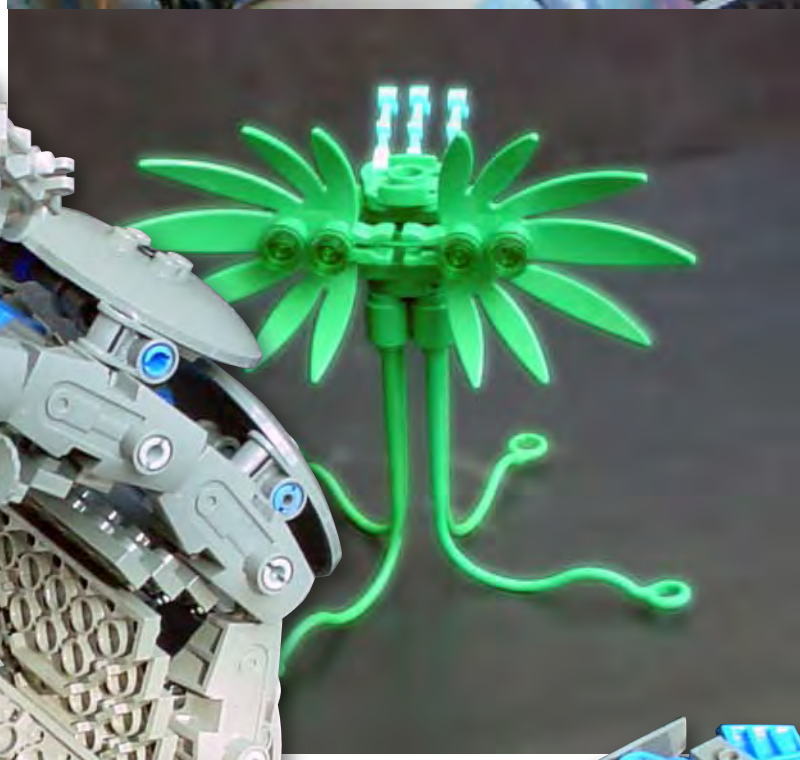
I love to dig into the bins and find a piece that I haven't used yet, like a sliding board or a dinosaur tail. Then figure out how they could be used for a space ship, robot or alien. When you are a science fiction builder all of your LEGO pieces become useful. Pirate ships become airships or heavy robot armor, a dump truck bucket makes an excellent engine cowling, and an ATV trike without the wheels is the chassis for a mecha. The best part of using science fiction as your genre of choice is you don't have to worry about scale or whether it would actually work or not. It just has to look really cool when you are done. If you add a few touches like vents, handles, wheels, dials, hoses and things you would expect to find on a craft of this type, then it looks believable.

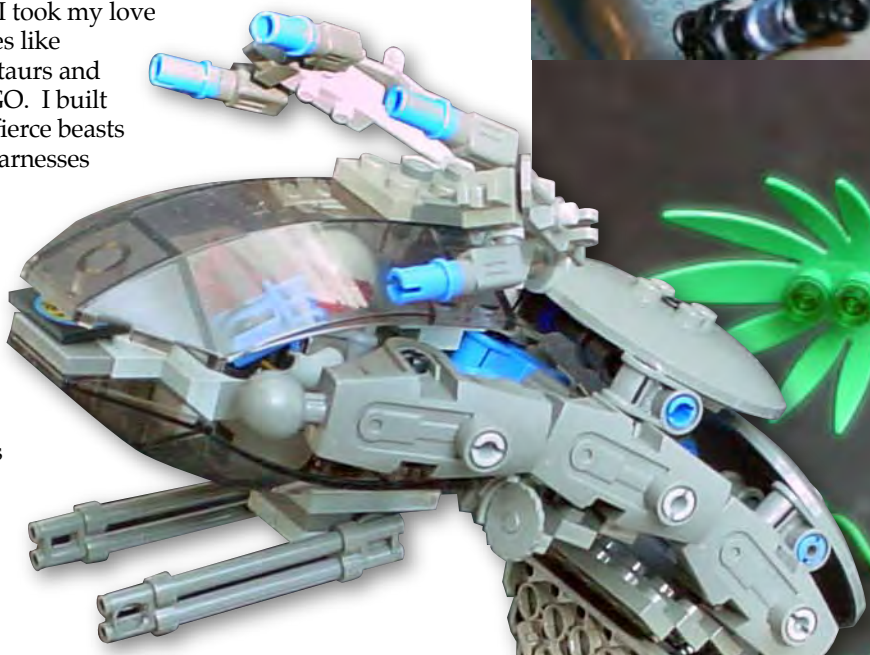
Anime and Japanese comics have a lot to do with what I build. Though I don't directly reference any one thing, they all influence what I make. Movies and comics like "Appleseed", "A.D. Tank Police", "Ghost in the Shell", and "Robotech" are all there rattling around in my brain. "Robotech" was on tv when I was in middle school. I made a point to watch it everyday. I loved the two legged battle pods and the other Mechs from the shows. Toys are a big part of my hobby money. For twenty years I've picked up every action figure, robot, dinosaur, or space ship I could find at yard sales, flea markets, and thrift stores. I sold a lot of them to make room for LEGOs but I still have all my favorites: My Shogun Warrior, the cap firing ED-209 and a box full of Sectaurs, not to mention about a thousand Star Wars figures and vehicles.

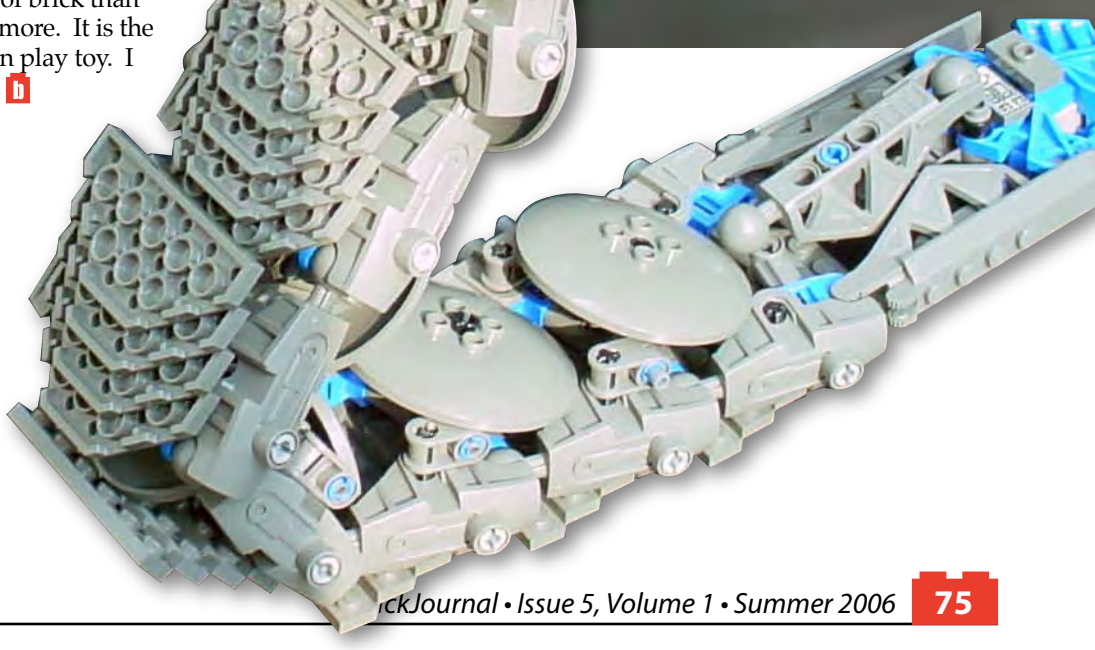
For every creation I finish there are four or five I haven't started. My most intriguing idea with which I haven't done much is based on the Uplift novels of David Brin. In the future,

man has tinkered with apes and dolphins making them able to talk and work alongside people. Dolphins make excellent star pilots since they naturally travel in three dimensions. I haven't made a dolphin piloted ship but it's on the drawing board. I did make a monkey driven robot but it wasn't an original design so I haven't showed it off. The other end of the creative process is the cast-offs or ideas that don't go anywhere. I have lots of pieces of things that may or may not make their way into some future creation.

In 1997 LEGO blew me away with the alien minifigs in the U.F.O. line. Then they did it again with the Insectoids. I thought this was a great idea to change the figs heads and have them be aliens. But what if you used something other than a minifig head? I had seen it done on Brickshelf.com and thought I would come up with a few of my own. After creating a whole group of new races of aliens it was suggested that they need crafts to move around in. I was inspired to greatness. Alien technology doesn't have to look like anything real. I took my love for the action figures like Dinoriders and Sectaurs and applied that to LEGO. I built aliens riding huge fierce beasts with cupolas and harnesses holding weaponry and technology on the backs. Space ships would be next as not all the aliens were earthbound. I am a slow builder though, working in bits and snatches of time when I am not obligated elsewhere or putting children to bed.







LEGO did it to me. They've messed me up pretty good. 10 years ago I was minding my own business and LEGO came back into my life. Is there a cure? I think if I build until I've run out of brick than I'll be done. Only, LEGO keeps making more. It is the perfect combination of collectible and fun play toy. I couldn't ask for a more enjoyable hobby.

You can find more of Pat's models at: http://www.brickshelf.com/cgi-bin/gallery.cgi?m=nnubtap

A LEGO Aviary:

The Models of MisaQa

MisaQa, a builder in Japan, has built elegant models that show a almost origamic approach to form and design. Here, she describes where she started building and shows some of her recent models for her calendar.

Article and photos by MisaQa

When I was a child, LEGO was very expensive in Japan. At that time (and even now) the most popular brick construction toy was DiaBlock. I was a girl who grew up with no interest in LEGO at all.

When I grew up, I realized LEGO was excellent as an expressive medium. It was at that time when I saw the big pirate, whom a professional builder created, and the LEGO built town in LEGOLAND Billund and other inspiring LEGO models.

When our daughter was born, we gave her LEGO as a learning toy, because I knew the excellence of the power of expression of LEGO. LEGO was popular also in Japan in those days, though DiaBlock was more popular. However, it was not my daughter but I that became crazy with LEGO building. I enjoyed assembling a lot of models. And I wanted to create an original work. But I couldn't find my own theme to create.

I got a #2250 (the 2000 Advent Calendar) at that time. All the models in this set are cute, peaceful, and joyful. My daughter picked them up with her small hand, and began to play happily. At that moment I found the theme to create! I imitated #2250, and began to make small models. They are small enough size to fit her palm. She smiled more and more.

Since then, I enjoy creating this lovely theme with which is so pleasing to my child. Moreover, all the models in #2250 are designed small, simply, and symbolically, which matches to my sense of beauty and design as Japanese. And, it became the style of my creations.

Afterwards I kept creating Angels and Dogs. The holiday calendar announced every year was my ideal.

However, when I looked at #7324 (the 2005 Advent Calendar), I was disappointed. The technique is more complex than all the old holiday calendars. Also, the theme was different from what I hoped, so I produced the holiday calendar for me. I chose a theme of the bird. It is cheerful, and has the same sense of design . I liked this theme so much, I continued creating Birds even after the holiday season.

Birds are really varied and beautiful. Dogs are also similar. There are a lot of living things in the world, and they are all unique.

Therefore, my desire to build is never exhausted.

MisaQa

http://STUD-and-TUBE.com

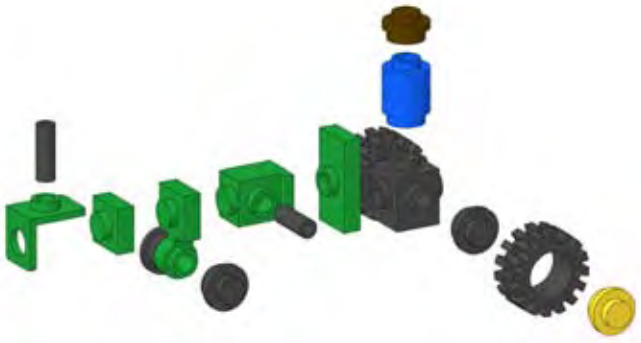
You Can Build it:
Tractor and Equipment

Photos and Art
by Jason Allemann

This microtractor was first seen at BrickFest 2005 on an award-winning layout by Jason Allemann. He has since built some more farm equipment, and *BrickJournal* is proud to present the tractor and a disk harrow to build.

Jason's micro building is very clever, and a great example of "less is more" - and you can see more of his micro work at this webpage:

http://www.truedimensions.com/LEGO/customs/micro.htm



You Can Build It: *MINI Invisible Hand*

by Christopher Deck

Hello everyone, I am glad we meet again in this jubilee issue! As in previous issues I want to continue the line of miniatures from the latest Star Wars movie – *Revenge of the Sith*. For this special issue I made a special vessel, a spot-on capital ship from the opening scene of the movie. For those who have not guessed it yet, it's the *Invisible Hand*, flagship of the infamous General Grievous.

This particular model is a bit larger than my usual mini size, as the Invisible Hand is a long and sleek ship, but it definitely deserves a detailed mini model of its own. It is built from many slopes and wedges, which I love to use. The building style is pretty straightforward without any complicated sections. Furthermore, it consists of two main sections which you can pull apart at exactly the point where the ship breaks apart in the movie!

The model does not have any ultra hard to find pieces, but let me give you some hints anyway. The nose of the ship is made from the well-known "space wing" or "space nose" which is an older part no longer produced, but still readily available at the usual online marketplaces for bricks (ex. www.Bricklink.com). The transparent bricks for the hangar unfortunately only come in one set, but you can use any transparent 1x4 brick here. The 2x3 slope with one yellow stripe is from the popular "Skyhopper" set, but if you don't have any, you can just use one without a stripe, although you lose a detail with that. The 2x2 slope with diagonal yellow stripes is a common part which came in almost every "Rock Raiders" set, and thus is readily available.

A last comment for the instructions: That particular slope with diagonal yellow stripes does not yet exist for the software used to create the instructions, so I used a similar element in a colour that doesn't exist in reality. It's only for instruction purposes. You have to use the one from the "Rock Raider" sets, although the unreal slope would have been more accurate.

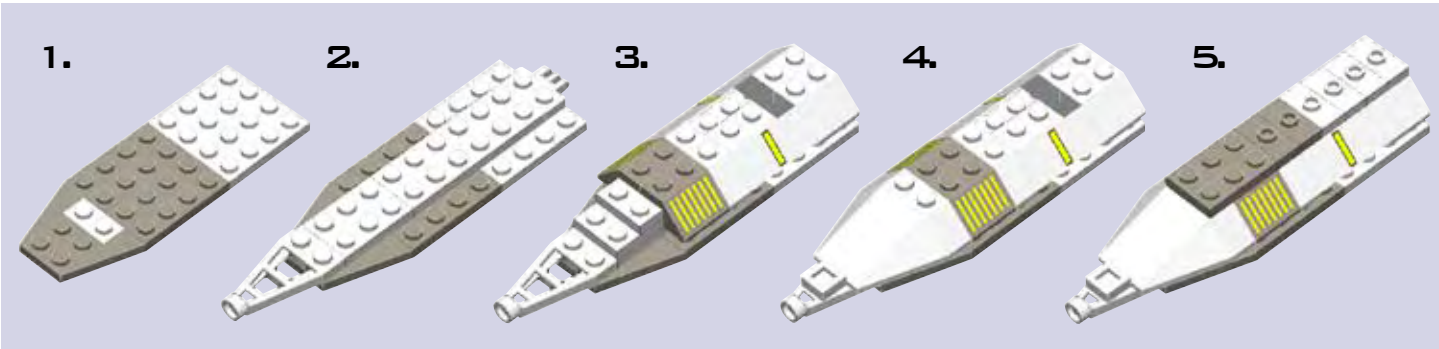
unreal slope

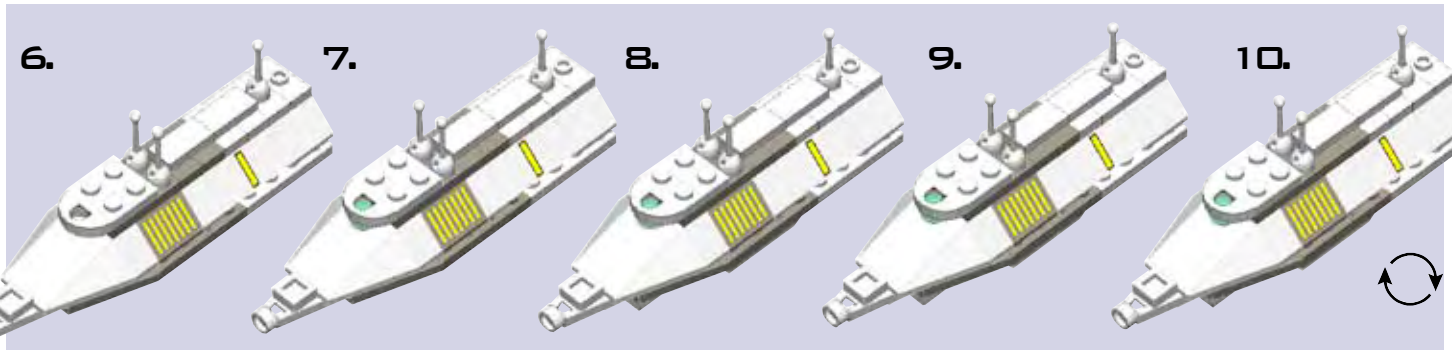
real slope

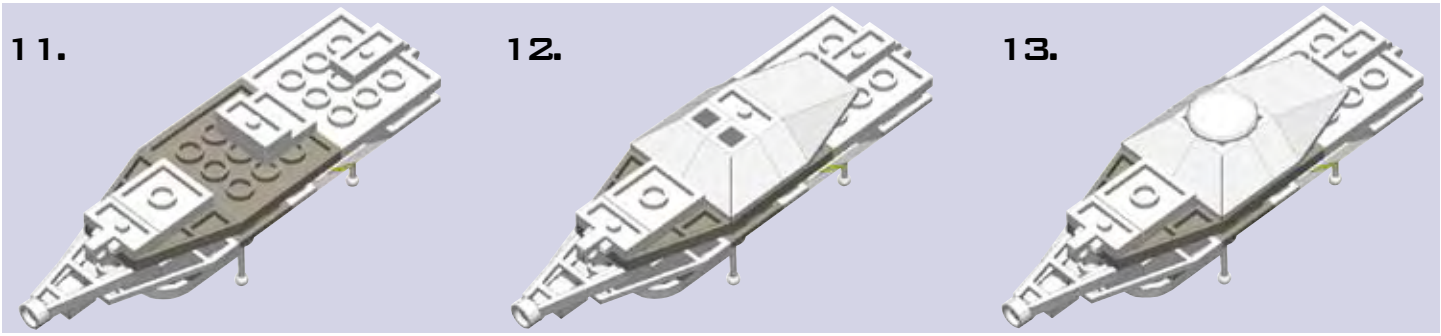
With that, I am done, and wish you happy building and will see you next time!

Invisible Hand Front Parts List

1 Light-Gray	Dish 2 x 2
3 Light-Gray	Hinge Control Stick
3 Light-Gray	Hinge Control Stick Base
1 Light-Gray	Hinge Plate 1 x 2 Locking with Single Finger On Side Vertical
1 Light-Gray	Hinge Plate 1 x 2 with 3 Fingers On Side
1 Light-Gray	Plate 1 x 1
1 Trans-Black	Plate 1 x 1 Round
3 Light-Gray	Plate 1 x 2
5 Light-Gray	Plate 1 x 2 with 1 Stud
2 Dark-Gray	Plate 1 x 2 with 1 Stud
3 Light-Gray	Plate 2 x 2
1 Light-Gray	Plate 2 x 3
1 Dark-Gray	Plate 2 x 3
1 Light-Gray	Plate 2 x 6
1 Light-Gray	Plate 3 x 2 with Hole
1 Light-Gray	Plate 4 x 4
1 Dark-Gray	Plate 4 x 4
2 Light-Gray	Slope 45 2 x 3 with Vertical Yellow Line Pattern
2 Light-Gray	Slope Brick 45 2 x 1
2 Light-Gray	Slope Brick 45 2 x 2
2 Light-Gray	Slope Brick 45 2 x 2 Inverted Double Convex
2 Dark-Gray	Slope Brick 45 2 x 2 with Yellow Grille Pattern
1 Light-Gray	Space Wing 4 x 2
2 Light-Gray	Tile 1 x 2 with Groove
1 Dark-Gray	Wedge 3 x 4 Plate
1 Light-Gray	Wedge 4 x 4 Triple
1 Light-Gray	Wedge 4 x 4 Triple Inverted

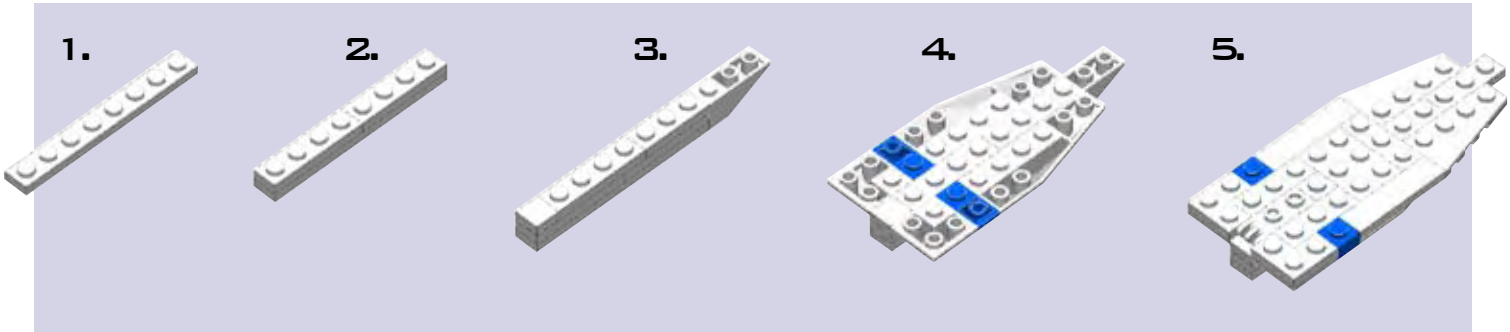


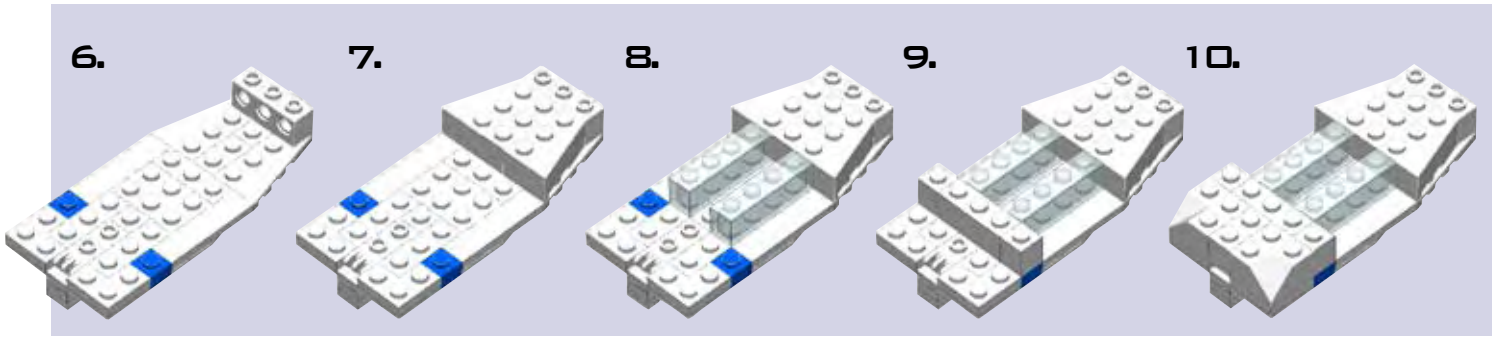




Invisible Hand Back Parts List

2 Light-Gray	Brick 1 x 1	1 Dark-Gray	Plate 1 x 2	1 Light-Gray	Tail 4 x 1 x 3
3 Dark-Gray	Brick 1 x 1 Round with Hollow Stud	5 Light-Gray	Plate 1 x 3	1 Light-Gray	Technic Brick 1 x 1 with Hole
		1 Dark-Gray	Plate 1 x 3		
1 Dark-Gray	Brick 1 x 1 with Headlight	4 Light-Gray	Plate 1 x 4	1 Light-Gray	Technic Brick 1 x 2 with Holes
		1 Dark-Gray	Plate 1 x 6		
1 Light-Gray	Brick 1 x 2	2 Light-Gray	Plate 1 x 8	1 Light-Gray	Technic Plate 1 x 4 with Holes
1 Light-Gray	Brick 1 x 2 x 2/3 with Studs on Sides	2 Light-Gray	Plate 2 x 2 Corner		
		1 Light-Gray	Plate 2 x 3	2 Blue	Tile 1 x 1 with Groove
2 Light-Gray	Brick 1 x 3	1 Light-Gray	Slope Brick 33 3 x 1	9 Light-Gray	Tile 1 x 1 with Groove
2 Light-Gray	Brick 1 x 4	1 Light-Gray	Slope Brick 33 3 x 1 Inverted	2 Blue	Tile 1 x 2 with Groove
2 Trans-Light-Blue	Brick 1 x 4 without Centre Studs			4 Light-Gray	Tile 1 x 2 with Groove
		2 Blue	Slope Brick 45 2 x 1	2 Light-Gray	Tile 1 x 4
1 Light-Gray	Hinge Control Stick	2 Blue	Slope Brick 45 2 x 1 Inverted	1 Light-Gray	Wedge 2 x 6 Double Inverted Left
2 Light-Gray	Hinge Control Stick Base	1 Light-Gray	Slope Brick 45 2 x 1 Inverted	1 Light-Gray	Wedge 2 x 6 Double Inverted Right
1 Light-Gray	Hinge Plate 1 x 2 with 3 Fingers	2 Light-Gray	Slope Brick 45 2 x 1 without Centre Stud	1 Light-Gray	Wedge 2 x 6 Double Left
1 Light-Gray	Minifig Tool Binoculars Town	2 Blue	Slope Brick 45 2 x 2	1 Light-Gray	Wedge 2 x 6 Double Right
2 Blue	Plate 1 x 1	2 Light-Gray	Slope Brick 45 2 x 2 Double Concave	1 Light-Gray	Wedge 3 x 2 Left
2 Light-Gray	Plate 1 x 1			1 Light-Gray	Wedge 3 x 2 Right
1 Light-Gray	Plate 1 x 1 Round	2 Light-Gray	Slope Brick 45 2 x 2 Double Convex	1 Light-Gray	Wing 2 x 4 Left
2 Trans-Black	Plate 1 x 1 Round			1 Light-Gray	Wing 2 x 4 Right
3 Trans-Light-Blue	Plate 1 x 1 Round	2 Light-Gray	Slope Brick 45 2 x 2 Inverted Double Convex		
1 Light-Gray	Plate 1 x 2				

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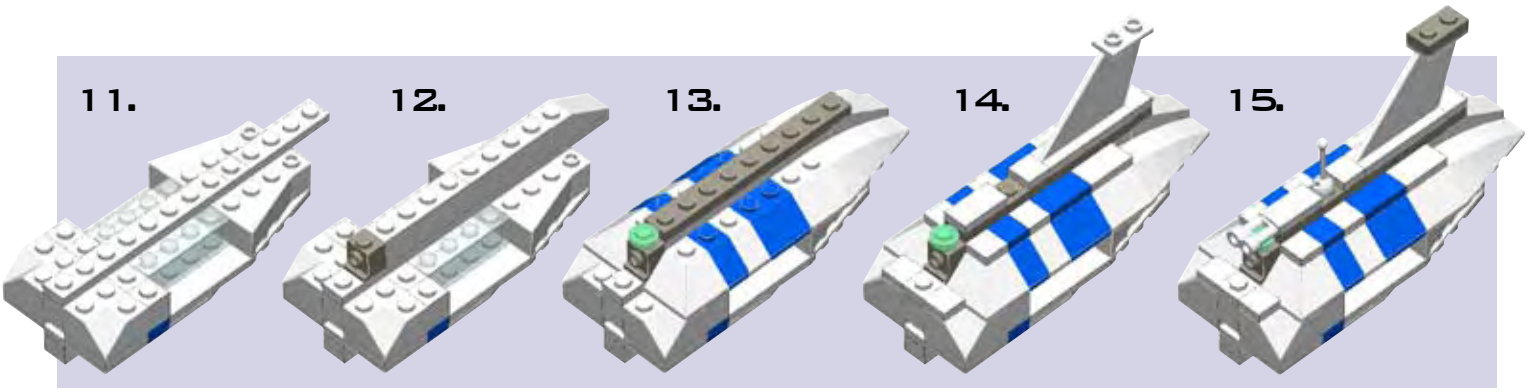
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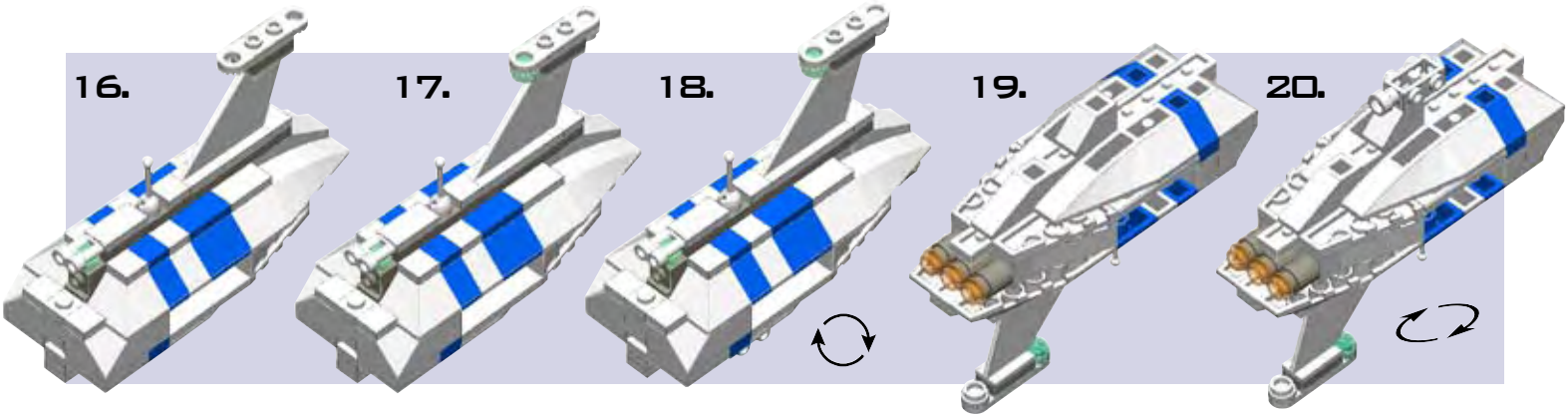
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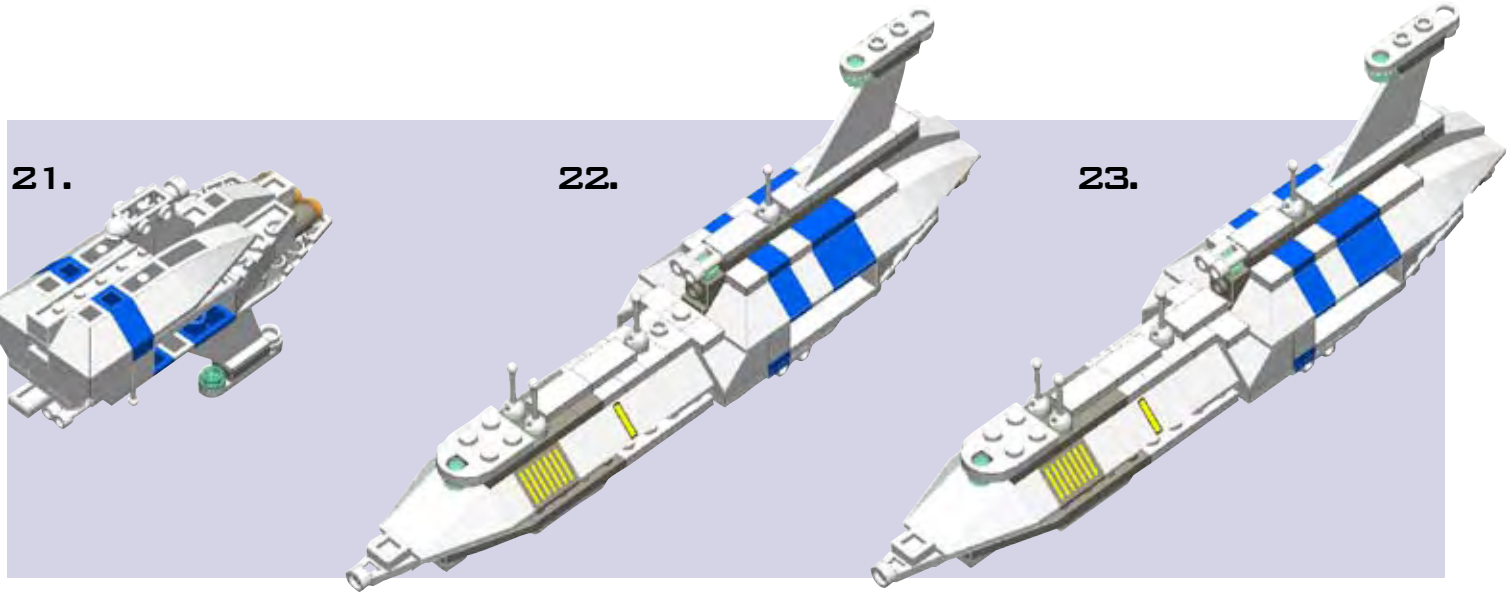
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Microscale Train Building

One of the more challenging and rewarding building themes is microscale, and some of the hardest models to build are of trains. Didier Enjary takes a look at the challenges and rewards of building small!

Article, photos, and art by Didier Enjary

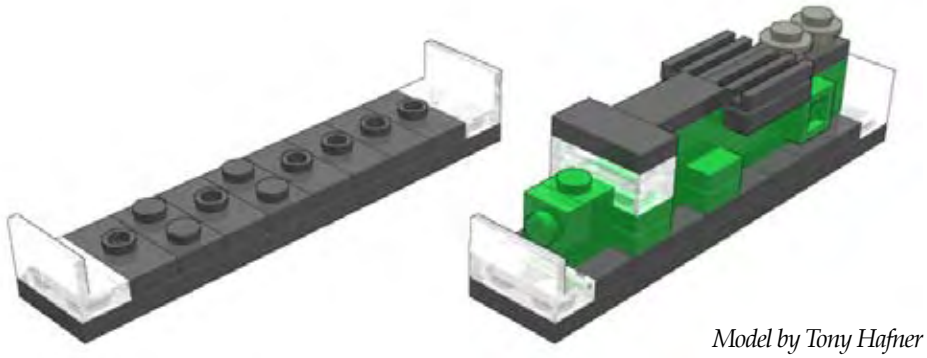
What are microscale trains? Microscales are scales under the Minifig scale which is about 1:48. Some authors consider that in microscale, people should be less than four plates tall which leads to a 1:150 scale. After a quick search on the internet, it appears that microscale LEGO trains are mostly 2-wide (that is 2 studs wide), corresponding to a 1:200 scale.

Official LEGO train models are 6-wide. Some specific parts exist that can be reused in creations in 8 or 7-wide: train wheels, couplings, train bases, windscreens, motors etc. It is easy to see that these parts are not as reusable when you deal with microscale. Every part of the model has to be reinvented.

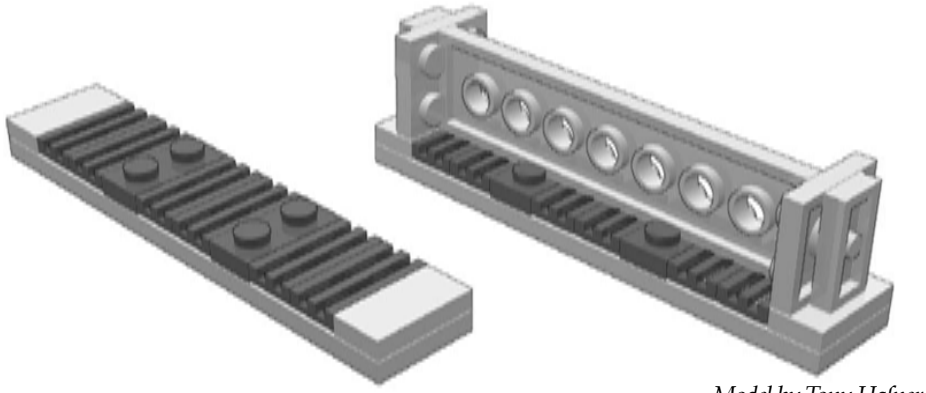
Microscale has advantages: it needs only a few parts and you can realise scenery and landscape even though you have a small room... and it requires great creativity. The knowledge and pertinent use of building techniques is part of this creativity.

Offset building techniques have their obvious uses in microscale. When you deal with minifig scale, one stud resolution (studs stacked directly over each other) is enough, microscale needs half-stud offsets to recreate details. In other words, offset building techniques allow one to center parts on or under 2xN plates or, more generally, to center parts between two studs. What are these techniques?

Building Techniques



Model by Tony Hafner



Model by Tony Hafner

The best known (and simplest) offset technique uses the famous jumper plate (plate 1 x 2 with one stud). It is extensively used in microscale train models. Have a bunch of these parts handy as you begin to explorebuilding at this scale.

The second offset technique is the stud-to-tube technique. It's quite simple. Rather than stacking the underside tubes between the studs in a classic way, you stack them directly on the studs. This technique works fine only if the plate you stack is bigger than the one it is placed on, because of the effect of the edges.

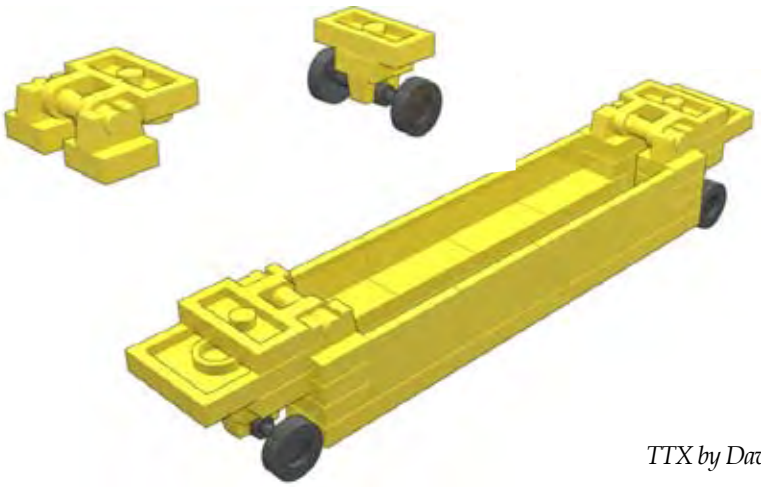
In microscale trains, 2xN plates are logically used as train bases. They are common, available in a wide variety of colours and sizes. A warning though! The use of side-by-side 1xn plates is to be avoided as they will prevent you from centering bogies (wheelsets, trucks).

There are other offset tricks as well. Among them the "pony eared" trick (a plate wedged between studs).

Building Wheels

Creativity is good but has limits. We are able to make wheels for our microscale trains but they aren't functional, only decorative. The size of wheels and the scale (micro) naturally leads to a few choices:

BOB by James Mathis



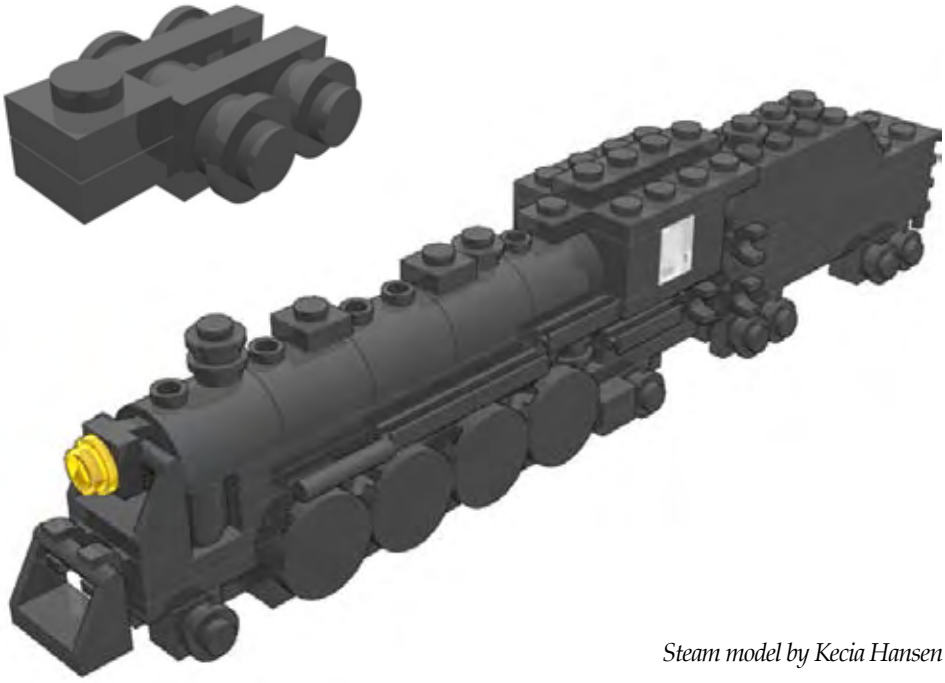
TTX by David Vinzant

Hinges 1x2 top (http://www.peeron.com/inv/parts/3938) are pretty easy to use (no SNOT or offset building techniques required) but are probably undersized. They will fit well only for metros (subways), some EMUs (see BOB by James Mathis) or for specific models such as low bed and shared trucks.

A wheel trolley (http://www.peeron.com/inv/parts/2496) clipped on tile 1x1 with clip (http://www.peeron.com/inv/parts/2555) requires some SNOT180 (building upside down). As they are bigger, they will probably fit most of rolling stock models but they lack a flange, that makes them quite unrealistic.

In many situations the plate 1x1 round (http://www.peeron.com/inv/parts/4073) is the best choice. They can be used torepresent train wheels perfectly with a tread and a flange. Some SNOT building techniques are required. The simplest one in this particular case is the use of the 1x1 plate with clip light (http://www.peeron.com/inv/parts/4081b).

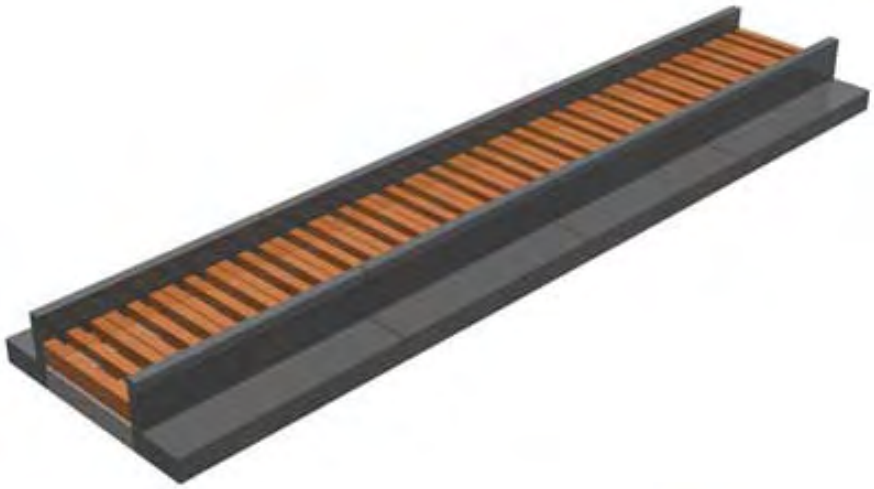
These solutions for making wheelsets are also good for the front pilot wheels or trailing idler wheels of steam locomotives. The coupled wheels (drivers) will benefit from round 2x2 parts such as round tiles (http://www.peeron.com/inv/parts/4150) or dishes (http://www.peeron.com/inv/parts/2654)

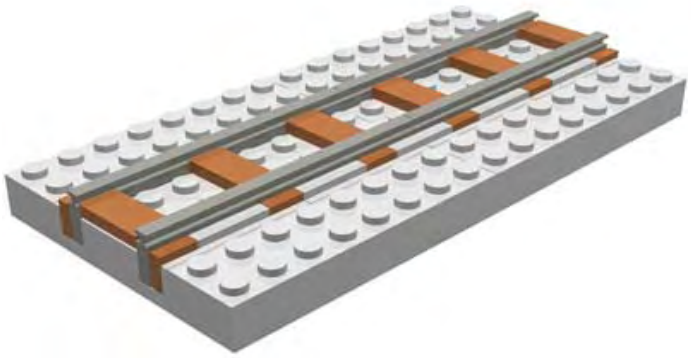


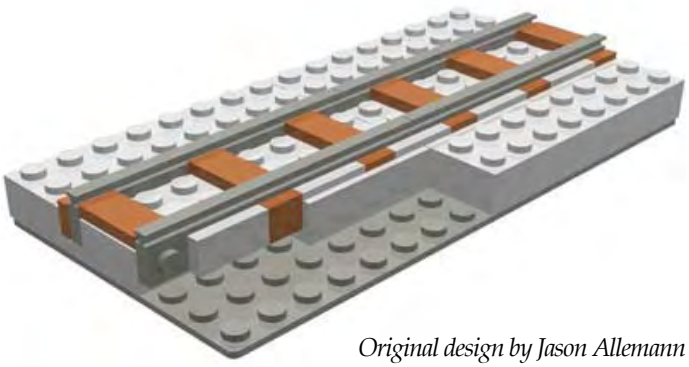
Steam model by Kecia Hansen

Building Rails

Real life rail tracks are made of rails and sleepers. LEGO Rails can be made easily with the use of snotted 1x8 plates with door rail or more simply 1x4x1 panels. Sleepers are nicely represented by brown (wood) or gray (concrete) tiles, and can be modified with grilles.



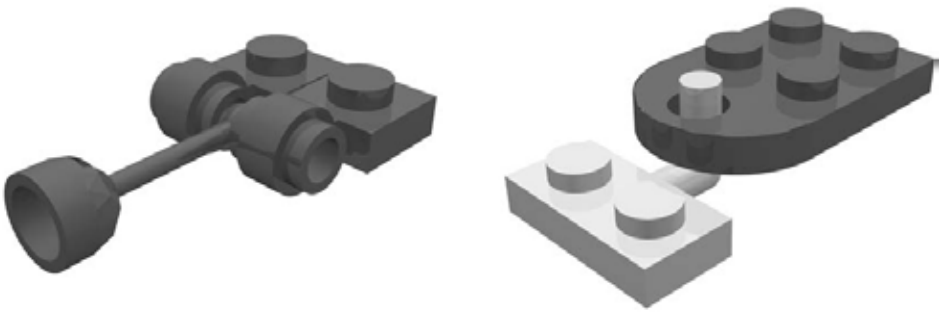




Original design by Jason Allemann

Building Joints

As 2-wide trains are not functional, couplings or couplers are not of high interest. You can recreate some in a decorative way with 1x1 plate with clip for instance.



The usual LEGO balls and sockets are too big for 2-wide trains. Jason Allemann used a very nice idea in his microscale farm by using a lever and 1x1 tile with clip light.

Again Jason proposed the use of a plate 3x2 with hole and plate 1x2 with bar as couplers. The plate 3x2 with hole can also be used in association with Technic half pins.

James Mathis proposed the use of bar and clips which is more compact but has one drawback: friction (see BOB model on page 86).

Powering Your Microtrain

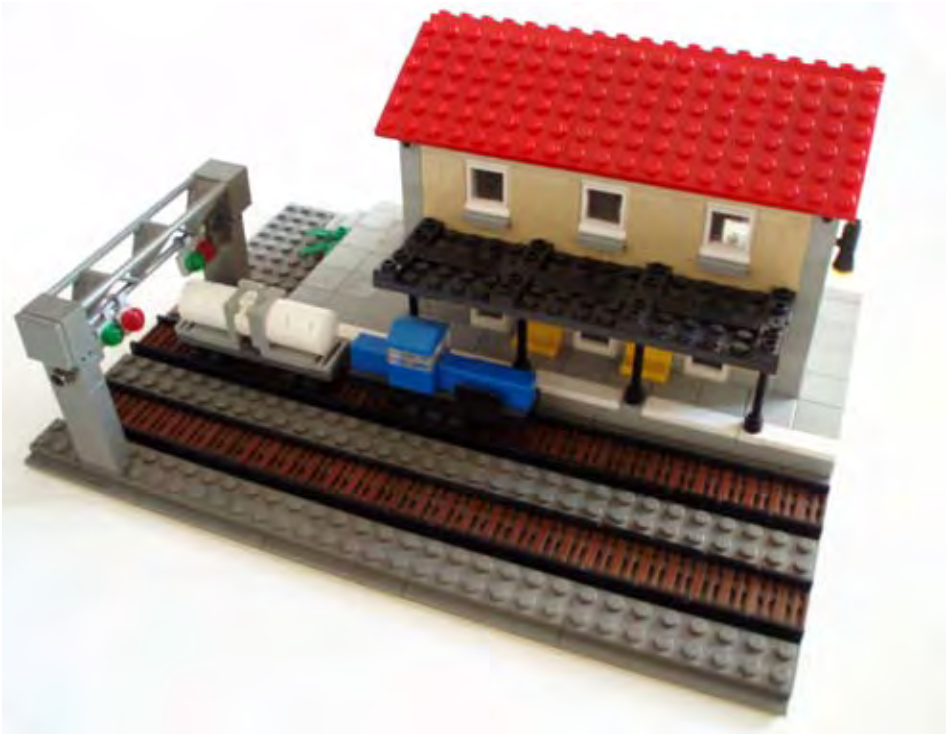
Finally, motorising may seem simply impossible. It's not. To motorise microscale trains, two ways have been used so far: magnets and modding.

For magnetic powering, just place a LEGO magnet in the model. Instead of building rail tracks, just a build a flat track with tiles. On the underside, use your Technic skills, a 9v Technic motor, some gears and tread links. It's quite easy then to let your microtrain run.

Another way for motorising A LEGO purist won't practice is modding (modifying parts). Build your model, glue it and cut out the inner part of it. It gives you enough room to put in some model train motors with wheelsets and couplings if you choose Z scale (1:220) accessories.

Many things have been done. As far as I know, however, nobody has motorised a 2-wide train with a micromotor.

I've talked about train bases, wheelsets, couplings and tracks: the previous discussion is just an overview of the main design components of trains. Thanks to the following collection of links, you will definitely free your creativity using ideas for pantograph and lights, windows and windshields, containers and sideways structures. It's your go now. *Play Well!*



Didier Enjary is a member of FreeLUG, a French LEGO User's group, and is a regular contributor and correspondent to BrickJournal.

Credits and Links

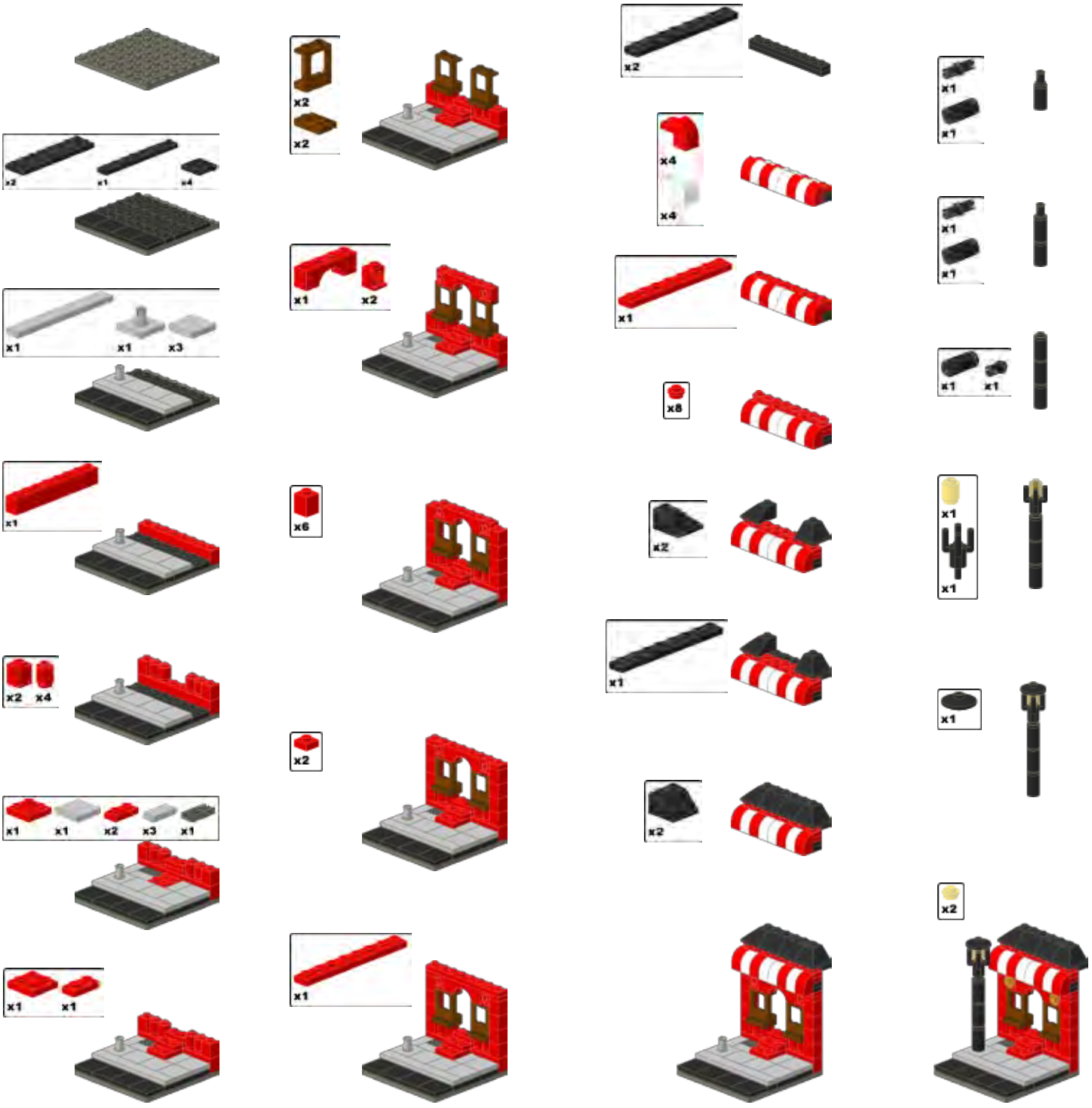
Jason Allemann :	http://www.truedimensions.com/LEGO/customs/micro.htm
John Barnes :	http://www.brickshelf.com/cgi-bin/gallery.cgi?f=108296
Didier Deses :	http://www.brickshelf.com/cgi-bin/gallery.cgi?f=77092
Timothy Gould :	http://www.brickshelf.com/cgi-bin/gallery.cgi?i=1654347
Tony Hafner :	http://www.hafhead.com/LEGO/mytrain/index.html http://www.brickshelf.com/cgi-bin/gallery.cgi?f=13862 http://www.hafhead.com/LEGO/mytrain/2wmckee/
Kecia Hansen :	http://www.brickshelf.com/cgi-bin/gallery.cgi?f=77728
Hitahita :	http://www.brickshelf.com/cgi-bin/gallery.cgi?f=141239
Mijasper :	http://www.brickshelf.com/cgi-bin/gallery.cgi?f=127994
Anders Isak :	http://www.brickshelf.com/cgi-bin/gallery.cgi?i=565188
Paul Janssen :	http://news.lugnet.com/build/microscale/?n=573
Peer Kreuger :	http://news.lugnet.com/announce/moc/?n=2998
Antony Lau :	http://www.brickshelf.com/cgi-bin/gallery.cgi?f=155116
LEGOloverman :	http://www.brickshelf.com/cgi-bin/gallery.cgi?f=180039
James Mathis :	http://www.brickshelf.com/cgi-bin/gallery.cgi?f=3416 http://www.brickshelf.com/cgi-bin/gallery.cgi?f=170973
Alban Nanty :	http://www.brickshelf.com/cgi-bin/gallery.cgi?f=107483
Ross Neal :	http://www.brickshelf.com/cgi-bin/gallery.cgi?i=339317
Sullis3 :	http://www.brickshelf.com/cgi-bin/gallery.cgi?f=15285
David Vinzant :	http://www.brickshelf.com/cgi-bin/gallery.cgi?f=118430

Bricks for Thought

A note about this particular creation: This was done by Kjeld Kirk Kristiansen, the owner of the LEGO Group, when *BrickJournal* visited earlier this year.

You Can Build It:
Street Vignette

One of the more recent building styles that have emerged has been the vignette, which is a small scene done on a plate, which usually is 8 studs by 8 studs wide. While this may seem limiting, there have been some great examples of the genre by Nelson Yrizarry and Bruce Hietbrink, who can be found on LUGNET in the lugnet.build.vignette newsgroup. Here's a vignette built by Geoff Gray, who also provided the art. Enjoy!!



Faster Than Fire!

You Can Build It:
CL415 Firefighting Plane

Article and Art by Allan Bedford

What do you do when flames erupt on a hillside and threaten to engulf an entire canyon? If you're a fire service lucky enough to have a Bombardier CL 415 standing by you call for help from above. One of the plane's primary roles is to act as an 'initial attack' aircraft and attempt to suppress a forest fire in its earliest stages.

The amphibious CL 415 is a direct descendent of the CL 215; a plane that first saw action back in the 1960s. The newer plane isn't much larger than its legendary predecessor. It is, however, a more effective fire fighting apparatus thanks to increased operating weight and speed. This flying fire engine can accommodate 6160 litres (1622 US gal) of water/foam mixture and has the amazing ability to skim just above the surface of a body of water and refill its tanks. It can completely fill the tanks in a blazing 12 seconds!

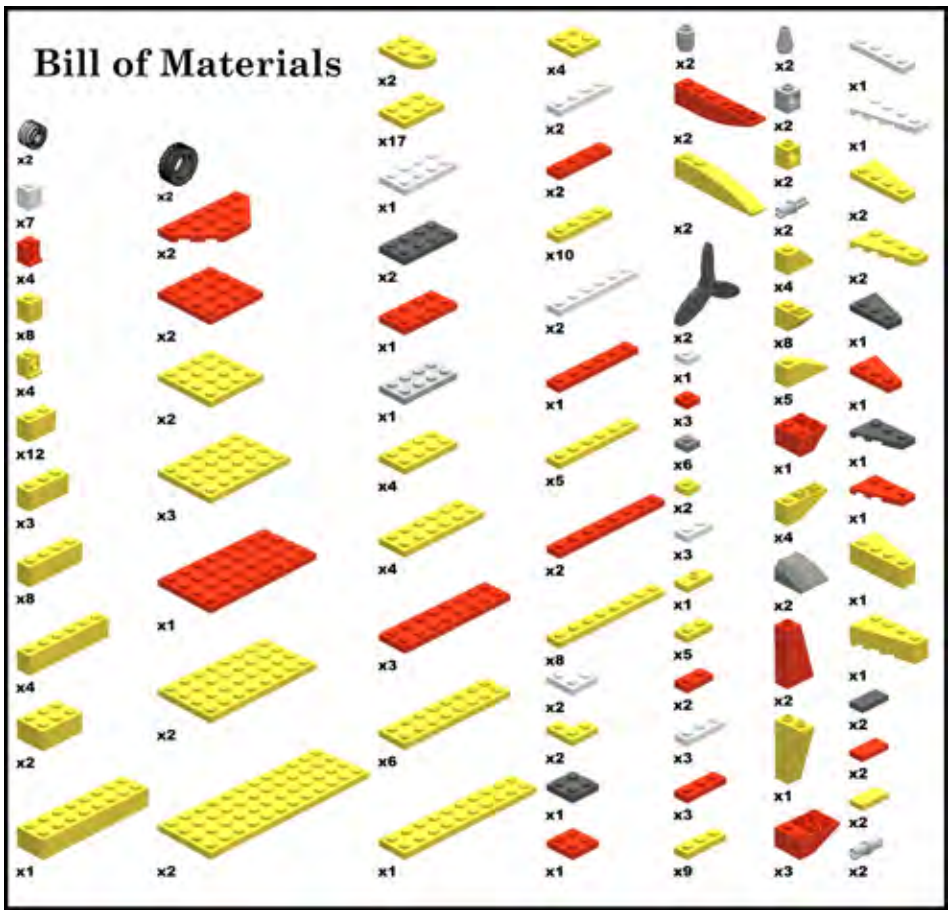
Today, the plane is in use in countries such as France, Greece, Italy, and Croatia. Of course, the 415 is also flown in Canada where all of them are built. The first production version was delivered in late 1994 and to date the 415s have collectively logged more than 190,000 water drops.

Creating a model of the Bombardier 415 out of LEGO elements was something I've wanted to do for a long time. The screen saver on my computer features a number of images of this aircraft. I love it's disproportionately wide wings that allow it to fly low and slow; a critical feature for a plane undertaking its fire fighting role. And I also love the fact that it's often painted in yellow/red combinations that remind me of those same colored LEGO pieces. The challenge in building the 415 as a "small" model was to figure out just how small to make it. I wanted to maintain the overall look and feel of the plane but knew I couldn't replicate every last detail. As with many of my projects I picked one piece upon which to base the scale of the rest of the model. In this case it was the 3 bladed propeller part (#4617) and I used it as a base to decide how long/wide/high everything else should be. This article provides all the information you need in order to build your own copy.

CL 415 Statistics

Wings Span	28.6 m
Overall Length	19.82 m
Overall Height	8.98 m
Cabin Length	9.38 m
Max. Prescooping Weight	16 420 kg
Max. Afterscooping Weight	21 319 kg
Max. Cruise Speed @ 10 000 ft	375 km/h
Typical Drop Speed	195 km/h

Notes: The colors of parts shown above represent those used in the instructions that follow. In some cases you may not have the same parts in the same color. Don't be afraid to substitute parts in different colors as needed. If you search for images of the Bombardier 415 on the Internet you'll find it is painted in a variety of patterns of yellows, reds, whites and blacks. Customize your model using the parts you have on hand.



In fact, in order to actually build the model you also may need to substitute when you simply don't have the parts listed regardless of color. In those cases just try to match up the size/shape of the missing part as best you can. For example, a 1x6 brick could possibly be replaced by two 1x3s or a 1x4 plus a 1x2. If you don't have the exact wheel and tire combination shown, then simply use whatever ones you have that are roughly the same size. When building the wings, as another example, you can use whatever sizes and shapes of plates you have in your collection. Just try to end up with a final combination that is about as long and wide as the one shown in the instructions below.

Of course, you can always use a site like www.bricklink.com to obtain the parts you're missing but not having each and every part shown above shouldn't keep you from trying to build this model. Sometimes finding an alternative part solution is half the fun. Now… on to the instructions!

Fuselage

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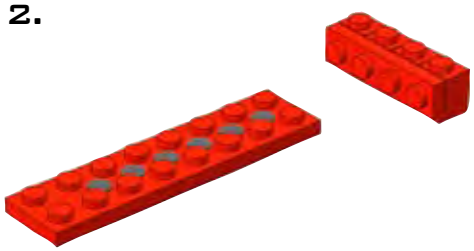
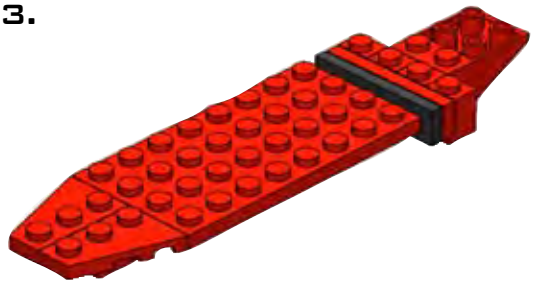


*** The grey dots show you where the 1 x 6 plate from the previous step is located under the 2 x 8 plate.*

3.



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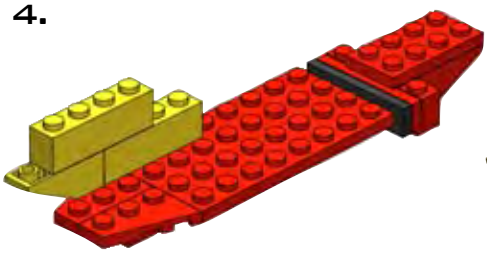

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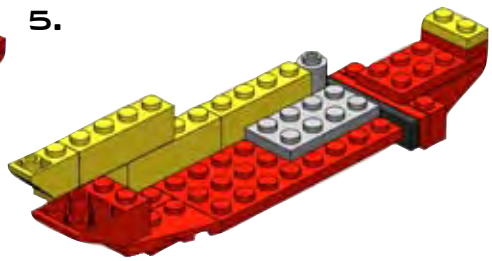

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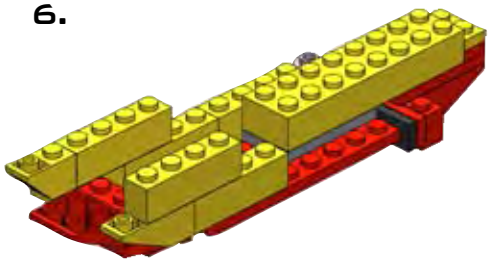

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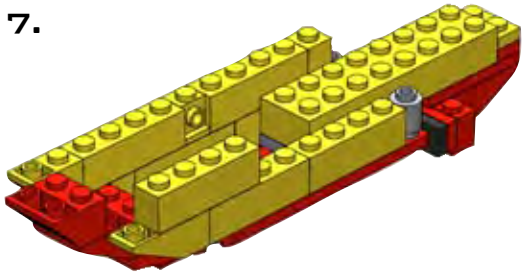

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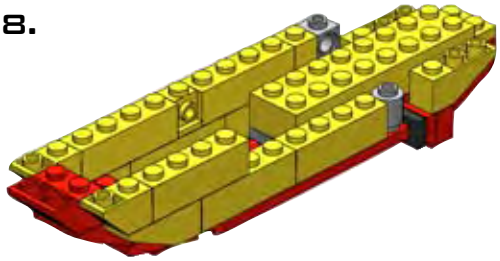

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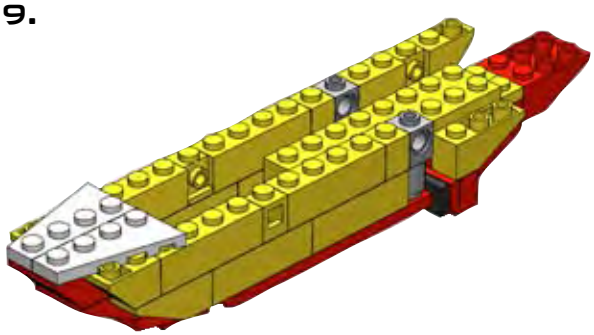

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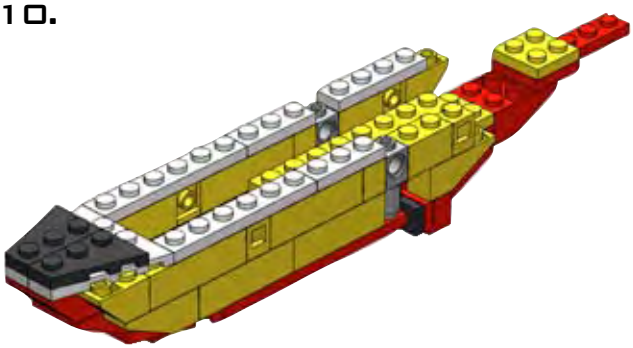

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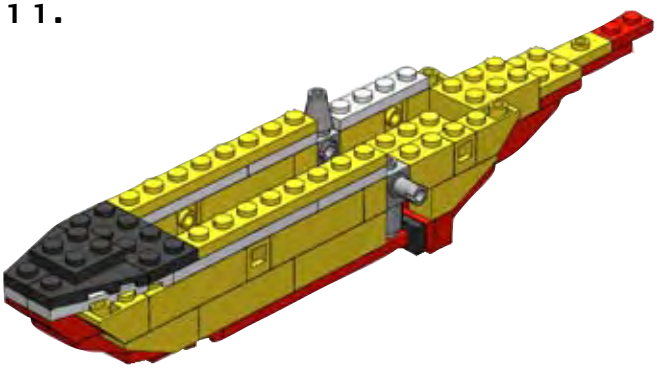

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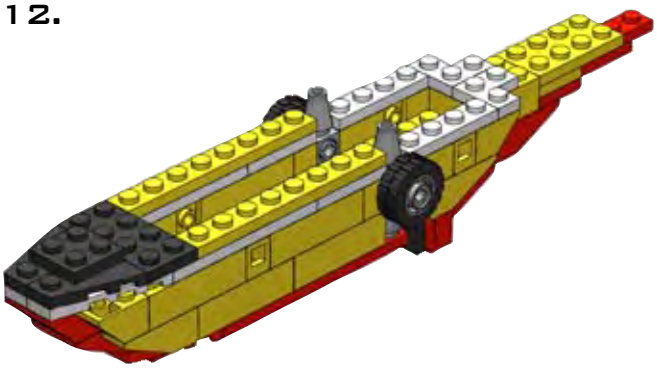

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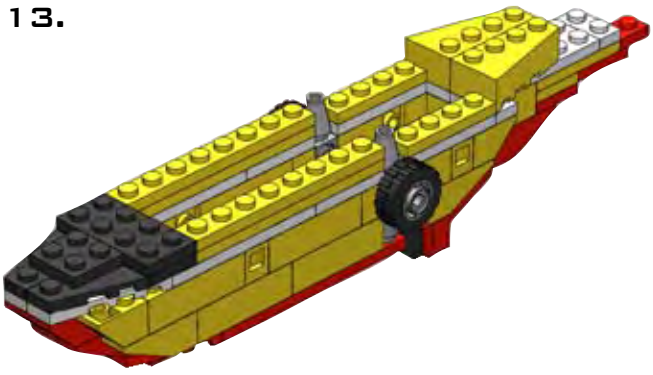

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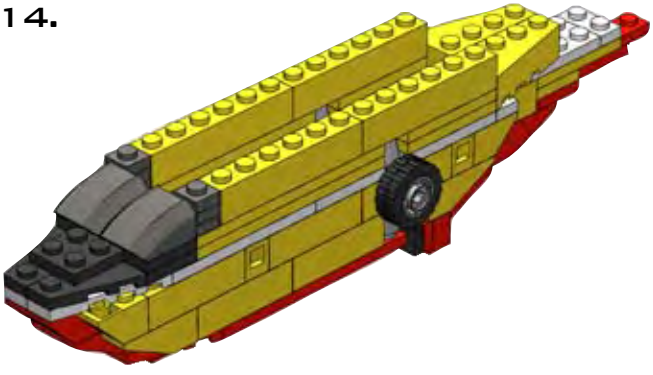

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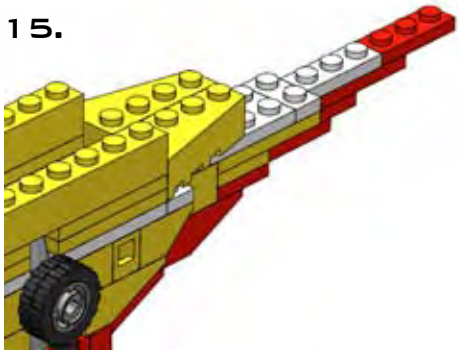

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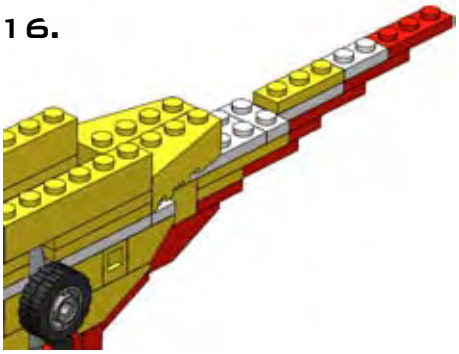

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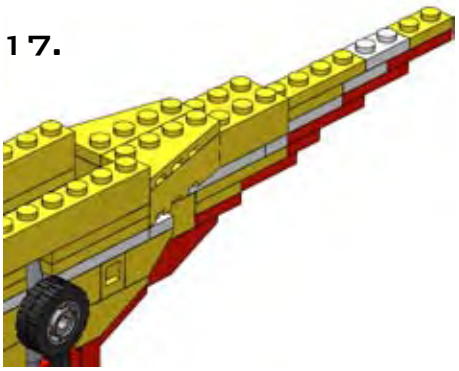

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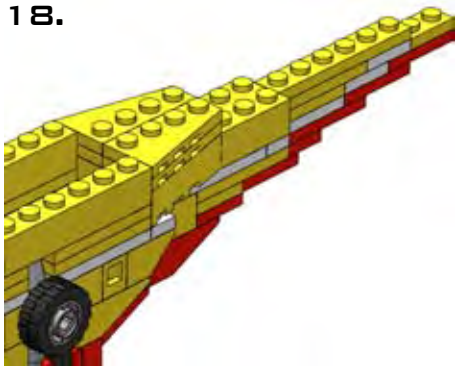

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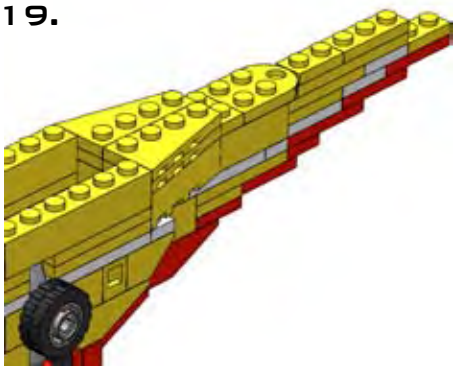

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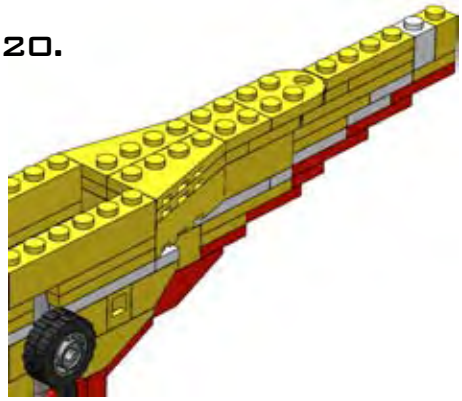

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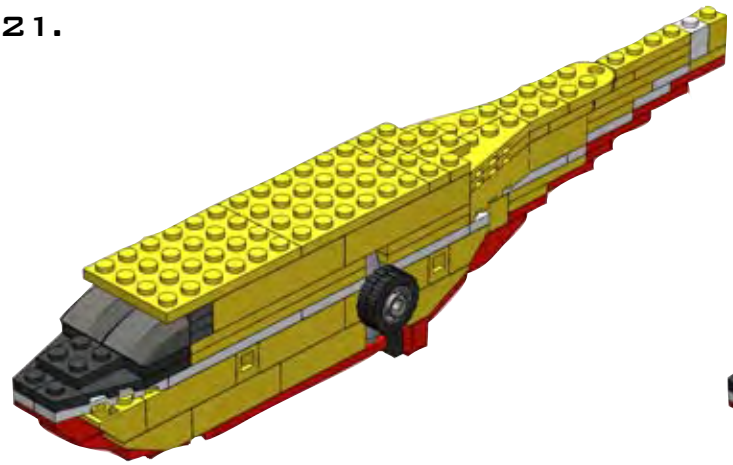

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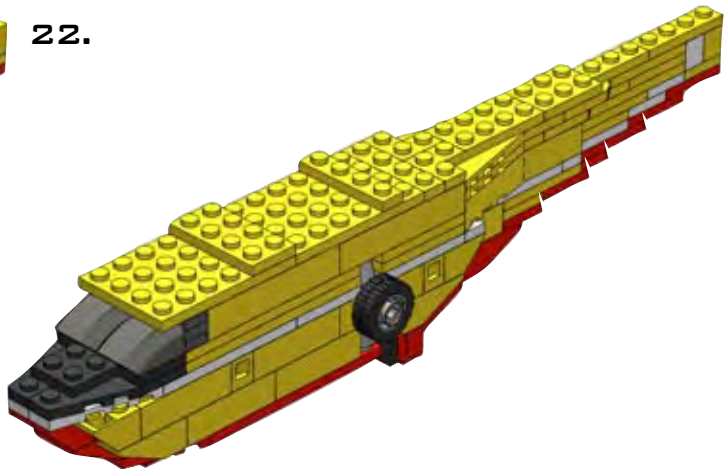

Left Wing

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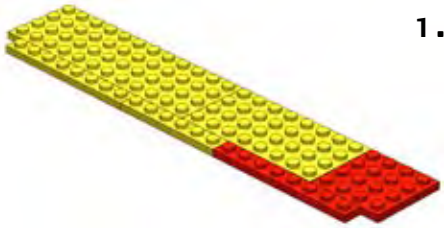

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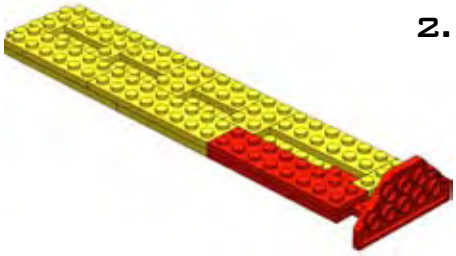

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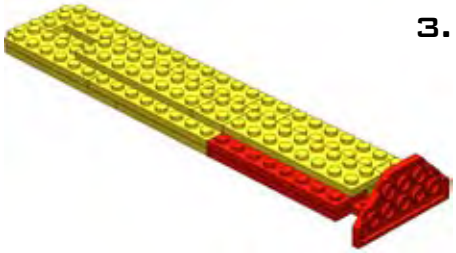
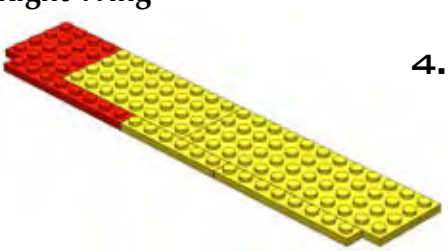


Right Wing

4.



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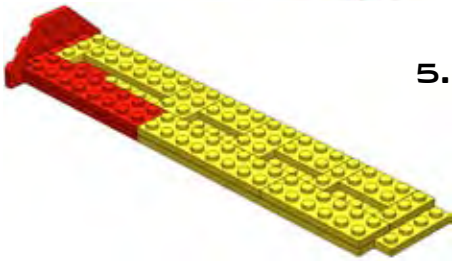

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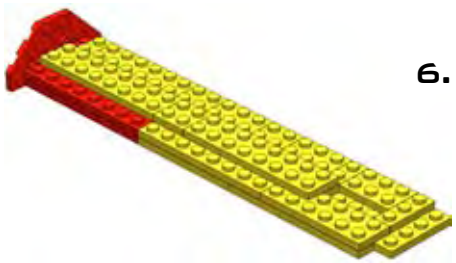
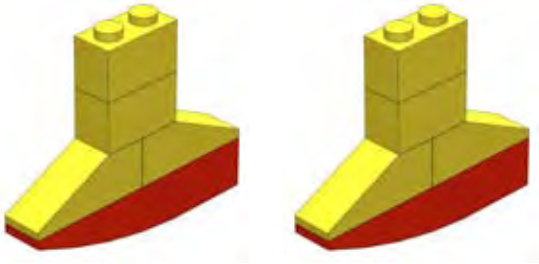


Pontoons (2x)



Engines (2x)

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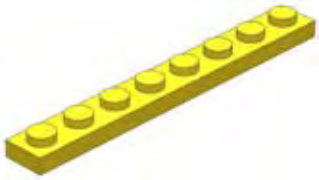

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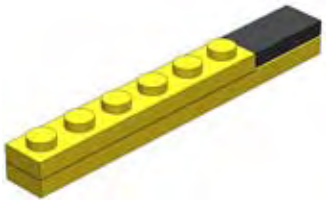

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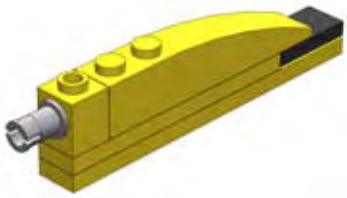

4.

Tail

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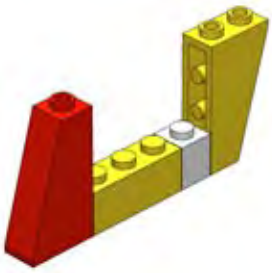

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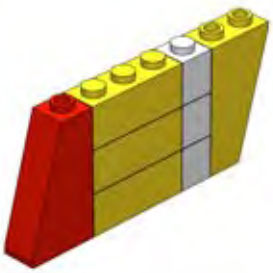

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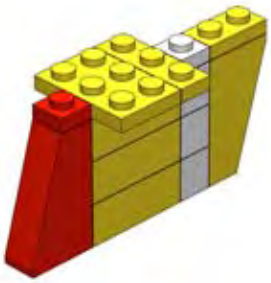

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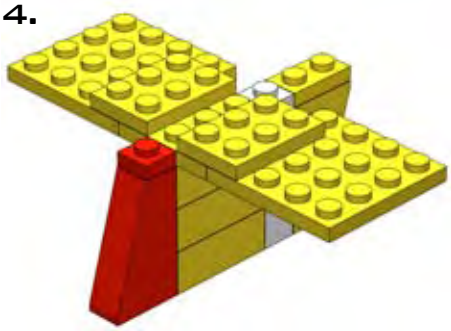

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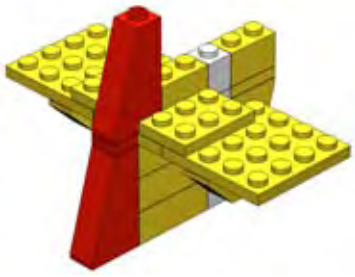

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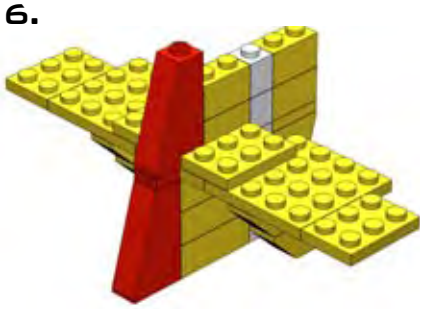

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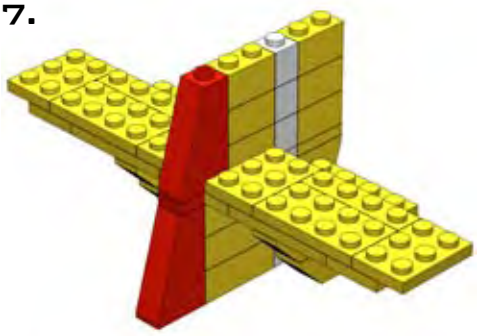

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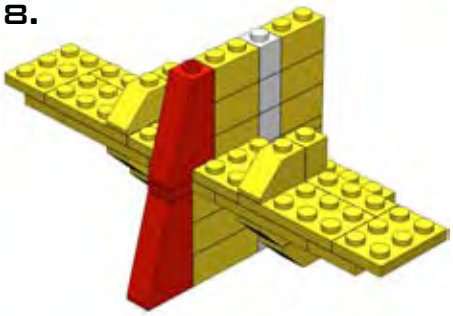

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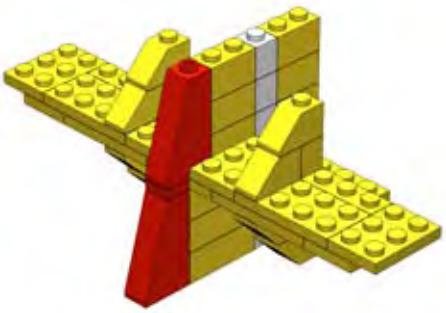

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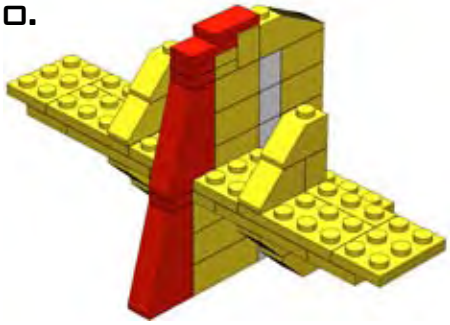
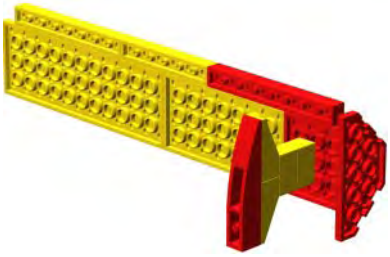


Final Assembly

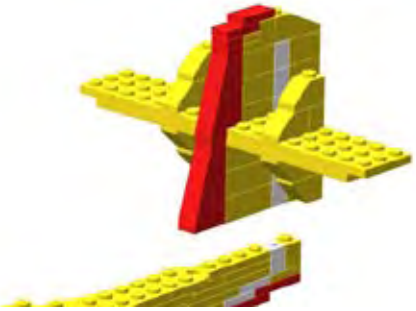
Now you've got all the components you need to finish your version of the Bombardier 415. Here's how to bring them all together into a model you'll want to 'swoosh' around the room.

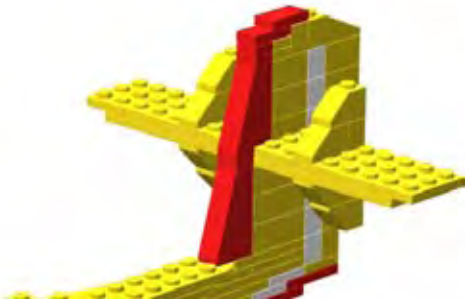
Pontoon Locations

The pontoons attach underneath each wing, nearly at the tip. Repeat this step for the right wing.



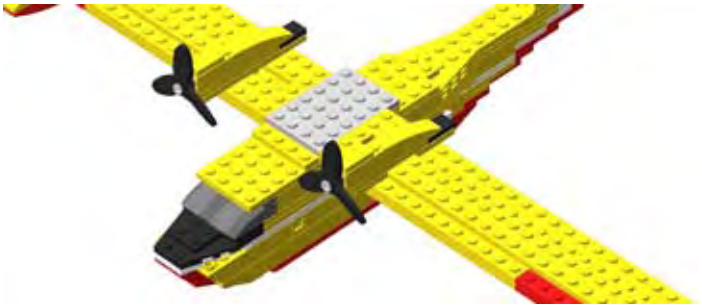
Tail Location





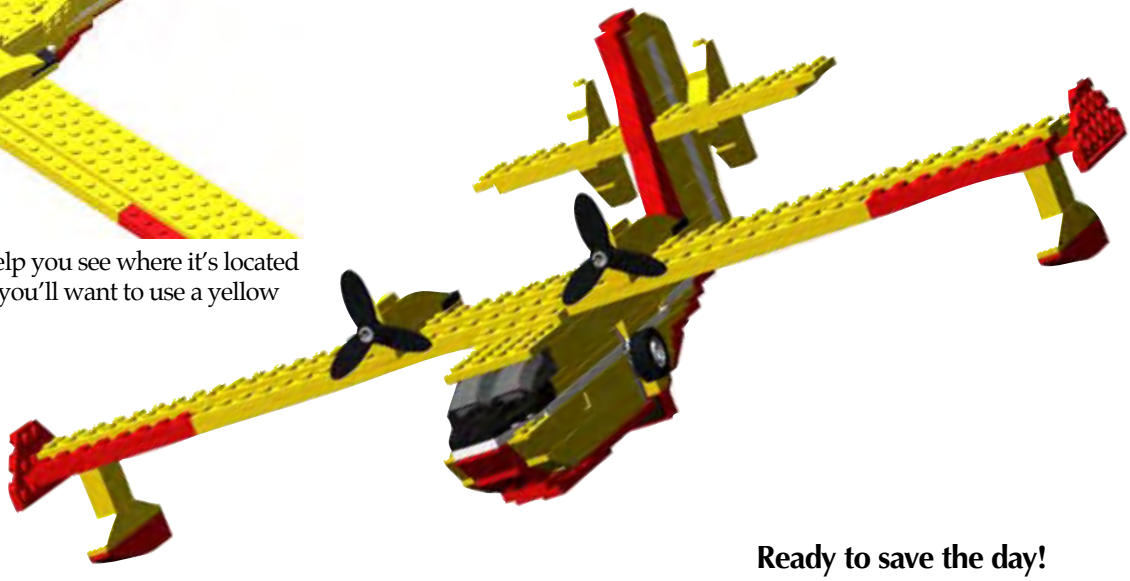
Engine and Wing Locations

Attach the wings between the 2 x 4 and 1 x 4 plates already on the top of the fuselage.



I've shown the next piece in grey to help you see where it's located on top of the fuselage. But, of course, you'll want to use a yellow 4 x 6 when you build your 415.

I've shown the last piece in grey to help you see where it's located on top of the fuselage. But, of course, you'll want to use a yellow 2_10 when you build your 415.



Ready to save the day!

To learn more about the Bombardier CL 415 visit the company's website at: http://www.bombardier.com/en/3_0/3_3/3_3_1.html

The photograph featured at the beginning of this article was used with kind permission from Pierre Landry. He is a pilot and a photographer. Please be sure to visit his photo galleries at: http://www.pbase.com/northflyboy and http://pierrelandry.photostockplus.com

Allan Bedford is from Stratford, Ontario Canada. He is the author of The Unofficial LEGO® Builder's Guide. *Information about the book can be found on his website: http://www.apotome.com*

Additional instructions created by Allan can be downloaded from: www.apotome.com/instructions.html

Minifig Decal Application

Article and photos by Jared Burks

Now that you know how to create waterslide decals from the *BrickJournal 4* the next skill to conquer is waterslide decal application. Waterslide decal application is quite easy and can be done by most anyone. There are basic application instructions, that work well for flat surfaces and advance instructions, that are needed for complex curves like helmets. In order to begin applying your decals you need to start with a clean slate or brick in this case. Don't have a torso without any printing on it? No problem. A quick trip to the grocery store, or Wal-Mart, to pick up a $3 bottle of Brasso® will solve your problem. Brasso is a micro abrasive used to polish brass that will literally sand the printing off that LEGO has applied to the element. It is also great for removing scratches on older bricks or for making cloudy transparent bricks clear again. It is a great product for any builder to have and one bottle will last practically forever.

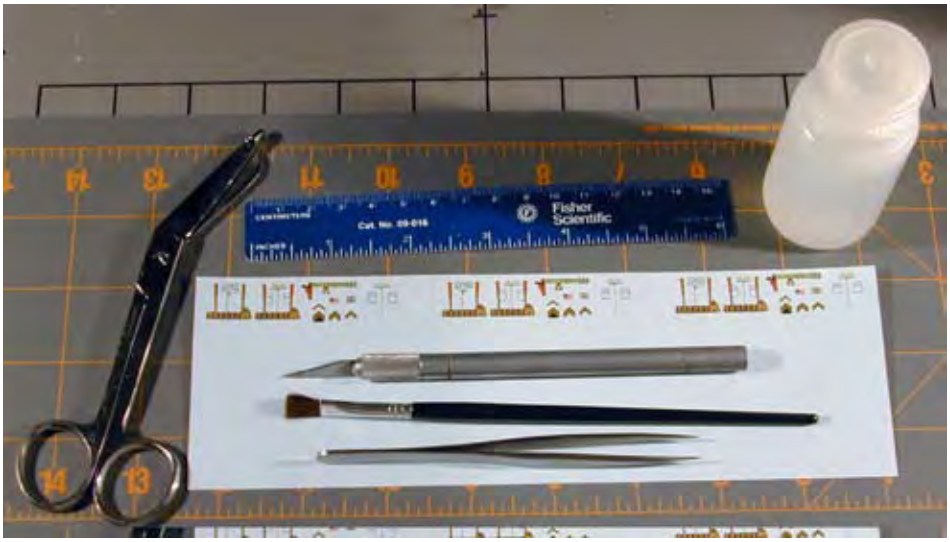
Brasso micro-abrasive cleaner

Brasso Instructions:

1. Pour a small amount of Brasso (about the size of a quarter) on paper towel or cloth.
2. Rub the LEGO element or minifig part vigorously against cloth containing the Brasso. Apply more Brasso if necessary. Removing the printing from a torso should take 15 seconds to 1 minute depending on how much elbow grease you use.
3. Once the original print has been removed, wash the piece with soap and water, making sure to remove any residual Brasso, and then allow the part to dry.

Now you have a clean LEGO element and your newly designed decal (created using the instructions in *BrickJournal 4)* and you are ready for application. This can be done by using the basic or advanced methods. The difference is the advanced method helps the decal to conform and adhere to the surface a bit better than the basic method, but it requires a few more components, that will be mentioned below. Before you begin, gather together the items that you will need for application, these include:

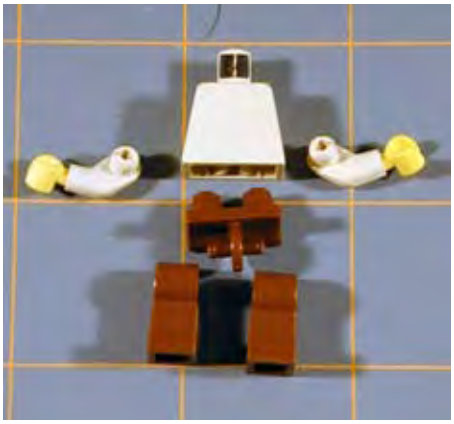
1. Pair of scissors
2. Ruler
3. X-acto® Knife
4. Small Paint brush
5. Tweezers or forceps
6. Q-tip® or cotton swab
7. Bottle of distilled water



Decal application supplies (Q-tip not pictured)

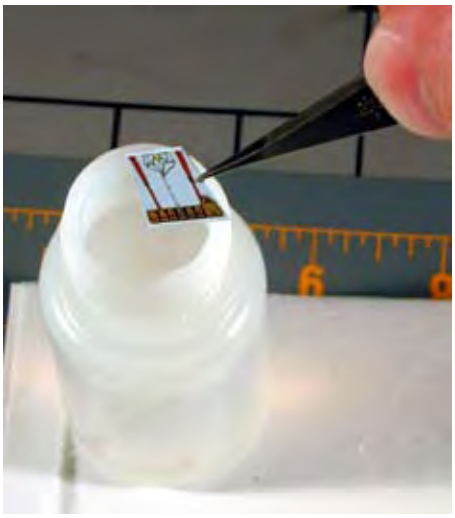
Basic Waterslide Decal Application Instructions:

1. Disassemble the minifig completely, especially if you are using the advanced decal application technique or kits.



A disassembled minifig

2. If the minifig has printing that needs to be removed use Brasso or a similar micro-abrasive polish to do so, using the instructions noted previously in this article.
3. Trim the decal with scissors or an X-Acto Knife preparing it for the distilled water.



4. Using the tweezers, dip the decal into the distilled water. DIP the decal into the water quickly and remove. Do NOT hold the decal under the distilled water for any extended period.

5. Allow the decal to sit for 1 minute giving the distilled water time to dissolve the water-soluble decal glue.

6. While the decal glue is being softened by the distilled water, apply some distilled water to the application surface with either the Q-tip or paint brush.

7. Gently slide the decal from the paper backing onto the wet application surface.

8. Position the decal into its final place with a wet cotton swab. Gently roll the cotton swab over the surface of the decal to remove any trapped air bubbles as these can detract from your finished figure. If the decal shifts slightly during this stage reposition it and allow the decal and torso to sit and dry untouched.

9. Once your decal has completely dried protect it by applying a clear coat of clear spray paint or hobby paint such as Krylon Crystal Clear or Model Master's Clear Acryl. The Model Master's will have to be applied with a brush or airbrush. More on this in the advance method instructions on the next page.
10. Reassemble your custom minifig.

The advanced decal application varies from the basic by using a chemical kit that improves the adhesion and contouring of these types of decals. These kits help make the decal backing disappear when applied properly, thus making the design appear painted on rather than applied. The kits can be found at many hobby stores or online (Micromark www.micromark.com). The kit components can be ordered individually as well (Internet Trains www.internettrains.com/bamopa.html). These application kits contain a mild acid solution that can not be shipped internationally. Therefore you will need to locate supplies in your own country. As for chemical kits the information on Micromark's Website is accurate: http://www.ares-server.com/Ares/Ares.asp?MerchantID=RET01229&Action=Catalog&Type=Product&ID=82400. It displays the same application with and without the use of the kit for comparison purposes. The two kits I recommend are from Badger and Microscale, both of which contain the two key solutions: decal setting solution and decal softening solution.

Advanced Waterslide Decal Application Instructions:

Step One: Apply the decal

Apply the decal as described in the basic instructions in the previous pages. In brief: cut the decal out of the sheet as close to the printing as possible so as to reduce the size of the film on which it is printed. Dip the decal (do not soak it) into a cup of distilled water and place it on your worktable (printed side up) for one minute. This should be sufficient time for the decal to loosen from the backing paper without dissolving too much of the adhesive on the back of the decal film. Using a soft brush, apply distilled water to the surface of the model where the decal will be applied. Next, gently slide the decal off the backing paper and into position on the model. Use a wet cotton swab (wet with distilled water) to gently move the decal into exact position, working out any large air bubbles that may have been trapped. Do not exert much force or the decal may wrinkle or tear. Apply decal setting solution with a paint brush to the decal surface and let it dry. Application of the decal setting solution strengthens the bond between the decal and the surface.

Step Two: Soften the decal

To make it look as though the decal has been printed directly on the surface of the model, the decal must be softened so it will conform to the surface of the brick. Using a soft brush, gently apply decal softening (Solvent) solution to the surface of the decal. Do not touch the decal until the solution has completely dried. The decal is VERY FRAGILE at this stage and care must be used. Repeat the application of the decal softening solution until the decal has fully conformed to the surface, but be sure to allow the solution to completely dry between applications. Otherwise, you may damage the decal while it is still soft.

Step Three: Protecting Your New Figure – Application of a clear top coat

Depending on the desired finish, apply a clear top coat to the decaled area...select either clear gloss, clear satin (semi-gloss) or clear flat. Clear gloss hobby paint works well. As for overcoats some things that people use include nail polish (though it yellows in sunlight and is not recommended), Future's floor wax (sworn to by many model makers for protecting decals http://www.swannysmodels.com/TheCompleteFuture.html), spray paint, airbrush paint, and liquid overcoats. I like Badger brand of overcoats and apply it with a slightly damp (with distilled water) paint brush. I find a using a hair dryer helps to dry the overcoat quickly and gives a smooth finish, removing any air bubbles that occur. The only critical point is that you have to remove any overcoat excess before using the hair drier. Apply a second coat after the first coat has dried. I **strongly** recommend the use of a clear sealant over the top of the decal to protect your new figure.

Advanced Application: Helmets, shoulders, and domes are examples of surfaces that are aided by the use of the application kits. These complex curves make application difficult.

You can get a nice application on many of the LEGO elements without these kits (the Q-tip really helps), and if you are only making one or two customs, I would skip them. If you are planning on making this a hobby, I would get the decal setting, decal softening, and satin overcoat from Micromark's kit. The components can all be ordered independently to save a few dollars and will last a very long time. I have yet to use up my first kit and I have made many figures so it is a good investment.

Now you know how to design, print, and apply decals. See how creative you can be!

Next Time:
Minifig Customization 101 – Digital Photography

Jared Burks is a regular contributor to BrickJournal *and can be contacted at: fineclonier@gmail.com*

Designing and Creating a Custom Minifig

Article and Photos by Norbert Black, art courtesy of Sean Esty

This short article is a step-by-step look at how I go about producing one of my custom minifigs. This particular project recreates a redesign by artist Sean Esty of DC Comics' Batgirl character.

This custom requires painting new decorative patterns on LEGO elements, doing a bit of carving and also some work with fabric. At each stage, I've tried to show both what I do, and also why I do it.

Figure 1

Choosing your pieces:

The first stage in any custom project is to choose the appropriate LEGO pieces as a starting point. I choose arms, legs, etc. to get a close match in colour for whatever design I'm trying to reproduce. Figure 1 shows what I came up with in this case.

Sometimes, there will be several possible colours for one element. For instance, in Esty's drawing, the legs show bare skin, grey socks and black boots. Why did I go with yellow?

The key concern is what I call "clearance factor". Some parts of a minifig fit very closely to their neighbours: the curved surface of legs, the gripping surfaces of hands, the inside face of an arm and the sides of the torso. Any paint, stickers or decals on such surfaces are more vulnerable to scratching. Since our Batgirl has bare upper legs, I chose "skin tone" yellow leg elements.

Preparing for Paint:

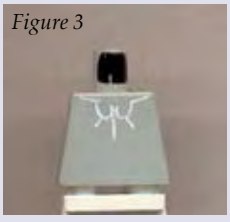
Most custom figures need to have at least some of LEGO's decorations removed from their donor elements. I use fine (500 grade) wet & dry sandpaper for this, used with lots of water. Some customizers use Brasso metal polish. This leaves a very smooth and shiny finish, but I prefer the slightly scuffed finish I get with fine wet & dry - this fine "tooth" helps paint to stick properly.

Figure 2 shows our figure disassembled, with almost all the LEGO paint removed. Note that the original lips are still there, to be used in my design. Each surface that will be painted has been given a brief rubdown with the wet & dry. All printed decorations are gently rubbed until the last of the design vanishes.

Now, I scrub everything with dishwashing detergent using an old toothbrush. Rinse with warm water, and then avoid handling things directly - oily fingerprints make it hard for paint to stick. To avoid touching them, I attach my pieces to other LEGO elements, and use these as handles while painting.

Figure 2

Figure 3



First Steps in Painting:

I use acrylic paints, mostly the relatively inexpensive "craft" brands. Feel free to use enamel paints if you choose, but they're toxic and require special thinners and solvents for cleaning. Whatever type you use, make sure you apply your paint in thin coats. Dilute the paint until you don't see brush marks as you apply it. This is the only real secret (besides patience and practice!) to painting fine detail. Be prepared to use several coats to get a smooth, evenly coloured surface.

The most eye-catching part of Batgirl's costume is the emblem on her chest, so we start our custom figure there, as shown in Figure 3. Note that I'm using a white LEGO leg assembly as a handle while painting the torso.

I begin by blocking in part of the bat - its head and wings - in white paint. I'm using white because some colours of paint (especially yellows and reds) are translucent - they show what's underneath them. To get a bright yellow bat symbol over my light grey LEGO plastic, I need a white bat to sit under the final layer of yellow paint.

I focus on getting the "skeleton" of the symbol correct - the ears, the line of the wing tops, the tip of the tail and the points on the bottom of the wings. If all of these are in the right place relative to each other, I can join them up with curves and/or straight lines and get the overall shape correct. Figure 3 shows that skeleton finished, while Figure 4 gives us a bat with some meat on its bones!


Figure 4

If you make a mistake, freshly-applied acrylic paint can be scraped off without fuss. Use a toothpick or something similar to remove any wobbly or out-of-place lines, and try again. For accurate work, it always helps to support the hand you use to hold your LEGO element against a desk or something. That way, you only have to control one shaky hand, not two!

Adding Detail:


Figure 5

It's often the smaller details of a design that make a custom minifig look good. The trick is to blend your original inspiration with a "LEGO-like" appearance. As a creator, think carefully about what shapes and colours you use. Take time to study how LEGO does things.

As an example of the importance of colour and shape, look at Figure 5. I've added a pair of "shadows" to suggest Batgirl's breasts (as well as a coat of yellow on her bat symbol). Esty's original figure is quite curvy, but still fairly subtle. Rather than bold black lines, I use small arcs in two shades of grey - a narrower dark one in the centre of each arc of medium grey.

Figure 6 shows another useful technique: blacklining.

I've painted a very fine black line around the yellow bat symbol. This division line helps make the symbol stand out from its background. We're used to seeing such lines in cartoons and comic characters, and they work well on custom LEGO figures for the same reason: they sharpen the boundaries between colours.


Figure 6

Going Around Corners:

Now that we've seen the torso completed, we'll turn our attention to the minifig's hips. Because Esty's Batgirl wears her belt very low, I chose to paint it on the hips element rather than along the bottom edge of the torso. Figures 7 through 10 show how this was done.


Figure 7


Figure 8


Figure 9


Figure 10

The steps here should look familiar. I start with the key part of a design (the buckle, Figure 7), add in the rest (Figure 8) and then cover a white undercoat in yellow (Figure 10). Note that I'm using once again a handle piece - in this case a white torso element.

Note that Figure 9 shows something rather unusual on a minifig: decoration on the sides of a hip element. In fact, the "belt" is painted all the way around the element - around its corners, so to speak. It takes a bit of extra care to get things to match up at the corners, but not much.

Complex Painting, Step by Step

Here's another run of images, this time of our figure's legs, mounted on streetlight elements for ease of handling:
What I want to show you here is the way I build up multi-part decoration on a LEGO element. Our Batgirl needs boots, stockings, bows

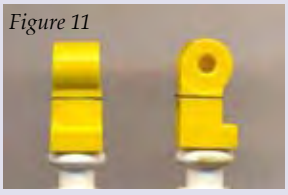


Figure 11

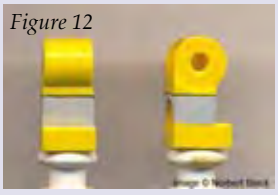


Figure 12

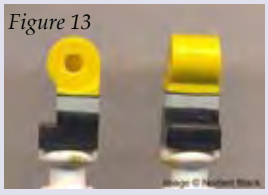


Figure 13


Figure 14

and a belt pouch painted on her leg elements. That's a lot of painting, but by choosing the order in which it's done, I can make things easier for myself and get a better-looking result. It's worth noting that minifigs have very short legs proportionately, so most costume designs get rather compressed in this area. I will need to think about both adapting Esty's drawing AND applying paint - tricky!

I start by painting a fine black line to mark the top of Batgirl's stockings (Figure 11). There's leg showing in the drawing between the bottom of the black trunks and the top of the stockings, so I make sure there's a bit of space between my painted line and the bottom of the curved area of the leg element. All the other design decisions for the figure's legs depend on where this crucial line is placed. That's why it gets done first.

Once I know where the top of the stockings is, I can paint them in with a grey paint which matches LEGO light grey (Figure 12). I use a custom mix of black and white paints with just a touch of yellow added. After the stockings, I paint the boots in black (Figure 13). They're high boots in the drawing, so I don't leave much grey stocking showing.

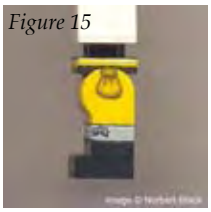


Figure 15

Figure 14 shows some final detail added to the legs. I've painted a narrow very light grey line at the top of the stockings as a highlight. I also touch up the black "stocking top" line anywhere it's been accidentally overpainted with grey. Finally, a bit of black and dark grey paint adds those ultra-stylish bows! I paint them in black first, and then add the dark grey almost up to the edge of the black, leaving black division lines and shadows showing. Finally, our leg elements are reunited with the hips element to form a finished leg assembly (Figure 15). Note that the left leg element has a pouch painted on it, using ochre, brown and black. It's a different shape than the bows, but the same technique is used - black first, then brown, then ochre. I leave the yellow part in the pouch centre unpainted plastic.

Final Painting Steps:


Figure 16


Figure 17

If our custom figure has complex legs, its arms are really pretty easy!

The only thing noteworthy here is that I've used light grey arm elements and painted the black gloves, rather than choosing black elements and painting grey sleeves. Why? Black paint covers better than light grey does, so I need fewer coats. This means there's less paint on the inner surface of the arms - one of those "clearance factor" areas mentioned above.

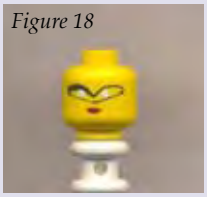


Figure 18


Figure 19

There's more tricky work in the head and mask, but the techniques are the same as we used for the torso. I start by adding white dots in the correct places for the eyes. Note that the original LEGO lips are still in place. I chose this particular head element to get that style of small, dark red lips.

Once I know where the eyes will be, I can sketch in the outline of Batgirl's mask (Figure 18). This time, I place one side better than the other, so you can see I have to work through several attempts to get both sides of the mask outline matching in shape! Don't anyone ever believe I get everything right the first time...

Finally, though, I have the outline correct. Black lines are added to give me the shape of the mask's eye holes (around my original white dots). Now I fill colour inside the lines (Figure 19) in black for the mask and in white for the eyes. And that's our painting complete!


Figure 20

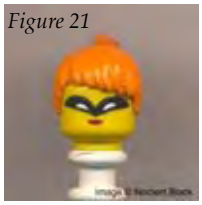


Figure 21

Changing the Shape of a LEGO Element - a Mild Customization:

The Batgirl drawing shows her with orange hair in a ponytail. Easy, right? Add a ponytail hair element (Figure 20), and we're done!

Well, not quite... The Esty design shows that Batgirl parts her hair on the right side, so I take a sharp modelling knife and gently carve away a bit of the hairline on one side. Using a fine rat-tail file, I recreate a scalloped profile on the new hairline (Figure 21). This made my customized element look a little more LEGO-like, since the original piece had this kind of edge. This is another one of those touches that don't take a lot of work or time, but which make your custom minifigs look more impressive.

Varnish For Protection:

To protect my work, I always add a couple of thin coats of satin acrylic polyurethane floor varnish. Acrylic paint is fairly soft, even when dry, and custom pieces should be able to take some handling. The varnish will protect your work. Remember, use only thin coats of varnish (thinned slightly with water if necessary) and let them dry thoroughly (at least 24 hours) before handling.

Here's our custom after varnishing (Figure 22 and 23).

Notice that it's slightly shiny now. I think "satin" varnish looks more LEGO-like than the high-gloss type, but feel free to use whichever you think looks best.

I generally varnish an element once it's had the last bit of paint added. So, for instance, I varnish arms and torsos before joining them back together. Ditto with legs and hips. Before adding a varnish coat, give your paint a few hours to dry, and remember, LET EVERYTHING DRY before you touch it again! If you rush, you can ruin your work by scratching something that would have eventually been strong and safe.

Figure 22

Figure 23

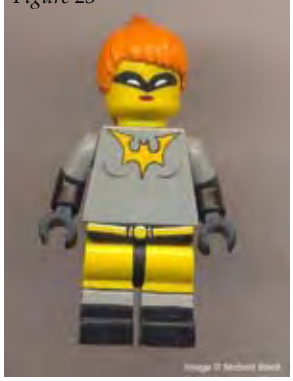


Figure 24

A Custom Fabric Cape:

Our Batgirl needs only one thing to complete her outfit - a cape. Fortunately, it's quite easy to create capes, skirts and other cloth elements for your minifigs. Go to a fabric store and find the bolts of polyester "broadcloth". It's a thin, inexpensive, finely-woven fabric that comes in a rainbow of colours. Properly treated, it looks just like the cloth LEGO uses for making capes.

To treat the cloth, you take some acrylic matte medium and dilute it 50% with water. Take a good-sized brush and paint the mixture onto a small swatch of broadcloth, working it well in to the fabric. You want the cloth wet but not dripping. Leave a strip along one edge dry, and hang the fabric somewhere to dry. Use clothes pegs to hold the dry strip.

Once the treated cloth is dry, you can cut it with sharp scissors and it won't unravel. You can even paint designs on treated fabric, if necessary. For our Batgirl project, no painting is needed. Her cape is a very light grey, and I was able to buy broadcloth in that shade. The Esty drawing shows Batgirl's cape covering her shoulders, so I used a custom "3-hole" cape template of my own to cut out a piece of fabric (Figure 24) with cuticle scissors.

The cape's centre hole is placed over the torso's neck, and then the left and right holes placed in their turn. The figure's head is then added. The effect is that the custom cape cover's the minifig's shoulders

A Final Fashion Show:

And there we have it - a custom minifig which I think duplicates the look of Sean Esty's original drawing but also appears quite LEGO-like. Here's a trio of shots of the completed figure:

Although the final product looks quite elaborate, I hope I've convinced you that the steps along the way are a lot less frightening. With some practice, some patience, and a willingness to try, almost anyone can do custom work that they'd be proud of. Remember, the biggest (and scariest) step in any creative process is the first one. Make that, and you're already ahead of all those people who say they can't!

I've tried to show you the techniques I find easy to use, and which give good results. There are certainly other approaches, however. For anyone interested in the topic, I'd recommend a look around Isaac "Redbean" Yue's fine site at http://www.minifigcustomizationnetwork.com.

Sources for Materials:

acrylic craft paints: craft supplies stores, artist supplies stores, some large department stores; hobby and gaming shops have a more expensive version that's essentially the same thing

artist's acrylic matte medium: craft supplies stores, artist supplies stores

cuticle scissors: drug stores, department stores

polyester broadcloth: fabric stores, some large department stores

modelling knife: hobby shops

rat-tail file: hobby shops

satin polyurethane floor varnish: hardware stores, some large department stores

wet and dry sandpaper: hardware stores, some large department stores

Norbert Black (born 1961), is a proud (although occasionally bemused...) Canadian who lives in Ottawa. In the past few years, he has earned a living as a military historian, an artist, a teacher, a software developer and a senior technical writer. Mostly, though, he putters along making Small Nifty Things and occasionally writing immensely long emails to his friends. Some of his other Lego work can be seen at http://www.brickshelf.com/cgi-bin/gallery.cgi?m=nhblack Anyone who'd like to chat about minifig customization is welcome to contact him at norbert_howard_black@hotmail.com

Building: Mindstorms

Railroad Crossing

Article, Art, Design and Programming by Geoff Gray

This article describes a fairly simple Mindstorms RCX project you can build for use with a train layout. The project walks you through the design and programming of a railroad crossing gate that automatically detects a train coming by and lowers itself until the train has passed. The project is designed to work regardless of which direction the train is coming, and accounts for possible gaps in the train cars. I use a freeware programming language called NQC, and connect to the RCX using a program called BricxCC (see the "Programs" sidebar for more information on these).

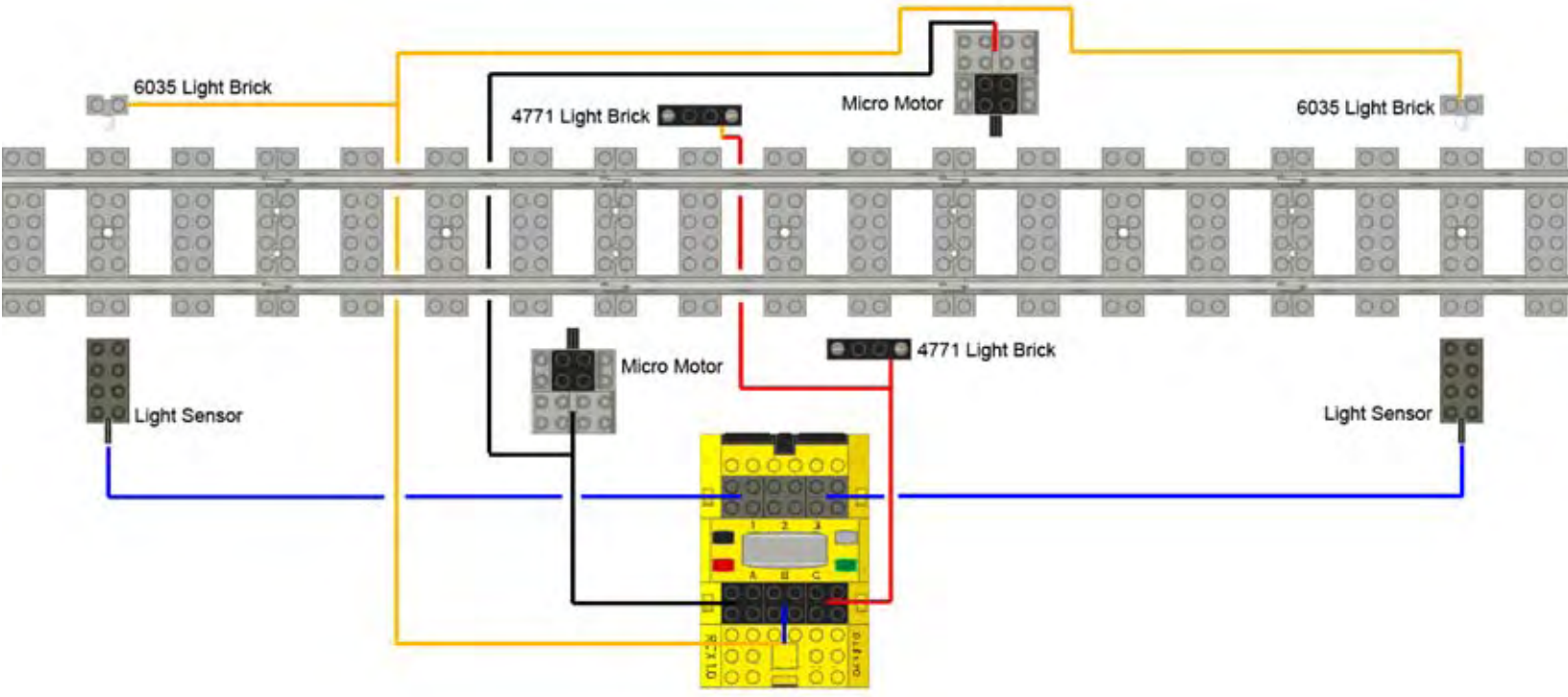
When designing a project, the first thing is to layout the scope of the project. Outline (on paper or in your head) exactly what you want the project to do, and at what time). For my project, we had the following scope:

- *There should be 2 sensors for detecting the train; one on either side of the crossing, and each about 6-12 inches down the track (see figure 1).*
- *When a train crosses in front of one sensor, the RCX should lower the gates and turn on the flashers. They should stay on until the train has passed the second sensor.*
- *After the train has passed the other sensor, the gates should go up, and the flashers stop.*

This seemed like a simple design, so I decided to move on. The next step was to determine what sensors to use. I chose to use light sensors because we do not know exactly how wide each train car coming by might be. Using the BricxCC, I tested the readings a sensor gave and determined that ambient light was making the sensor fairly useless since the range of readings was too wide. To compensate for this, I added a light brick on the far side of the track for each sensor. This caused the readings from the sensors to be much more stable.

I needed to determine what readings would be used to signal the train's passing. Since the train would pass between the sensor and the light, I would look for a reading of "dark" to indicate that a train was coming. Once my program read either sensor going dark, I would go into a routine to read the other sensor. As soon as that sensor went dark, I knew that the train was passing by it. I would then wait until that second sensor went back to "light," which would indicate that the train had passed completely by, and we could raise the gates and turn off the lights.

The only other part of the design I needed to consider was how to deal with gaps in train cars (see figure 2). These gaps would create false readings for the end of the train. The best way to handle these was to create a routine similar to a "contact bounce" routine



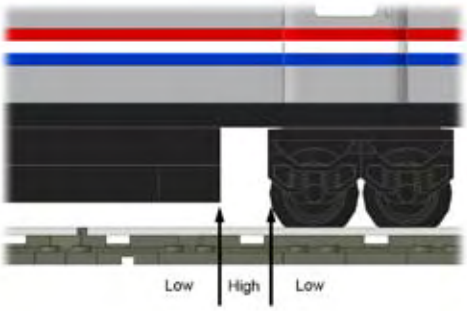


Figure 2

used in electronic inputs that read external switches (such as the circuits in computer keyboards). The idea is that as soon as you detect a reading change, you take a series of readings, waiting for the input to settle down. That way you can tell if the reading is truly a change or just a "blip" in the system.

Let's look into the actual program itself. I will break down the analysis by the different routines. Notice that there are a lot of comment lines. I always put extra lines in to help me remember what I am doing and to help break the code into readable chunks. The first part of the code is setting up a bunch of definable labels that will allow me to "tweak" the performance of the application quickly.

These five entries define what is attached to the various ports of the RCX.

```
#define INPUT1    SENSOR_1
#define INPUT3    SENSOR_3
#define MOTOR     OUT_A
#define CROSSING_LIGHTS OUT_B
#define SENSOR_HELPER_LIGHTS OUT_C
```

These three entries define sensor threshold, the length of time the motor needs to run to raise and lower the gate, and the length of time used between sensor polls during the bounce back routine.

```
// 20 =~ 2 seconds
#define BOUNCE_TIME 20
// 100 = 1 second
#define MOTOR_TIME 100
#define LIGHT_CHANGE_VALUE 46
```

The next part of the program I will cover is the main routine. It appears at the end of the program because of the way the compiler for NQC works, but logically it is where the program begins execution.

This part of the program is required for any program that will run on an RCX unit. The NQC program can be used for any of the LEGO robotics units, but when programming the RCX, it must know what type of sensor is used on any port. Here we define that input ports 1 and 3 will both have light sensors attached.

```
#ifdef __RCX
     // RCX needs to be told what kind of sensor is used
     SetSensor(INPUT1, SENSOR_LIGHT);
     SetSensor(INPUT3, SENSOR_LIGHT);
#endif
```

Next is the main routine. The first line turns on the light bricks across from the sensors. After that we wait for 0.4 seconds. This is to allow the lights to turn on and for the sensors to adjust to the light.

```
On(SENSOR_HELPER_LIGHTS);
Wait(40);
```

Now we enter an endless loop (we will let the program run forever. We can turn it off at anytime by stopping the RCX). The first statement inside the endless loop is another 0.4 second wait that exists to allow the system to settle after every pass of a train. Then we use the "until" keyword to wait until either sensor changes to dark, indicating that a train is passing. As soon as we detect a change, we then look to see if sensor 1 or sensor 3 saw the change. This will tell us which control routine we need to run. We call the routine, and then when it is done and we start the whole process over.

Programs

There are a number of freeware programming languages available for the LEGO Mindstorms computers.The key to choosing which one to use is deciding what style of programming you are used to. The following is a list of some languages available:

The Official LEGO Mindstorms SDK web site:
http://mindstorms.LEGO.com/sdk2/?domainredir=www.LEGO-mindstorms.com

NQC ("Not Quite C"):
http://bricxcc.sourceforge.net/nqc/

Bricx Command Center (an interface for communicating with all manners of Mindstorms computers):
http://bricxcc.sourceforge.net/

leJOS (Java for the RCX):
http://lejos.sourceforge.net/

Visual C++ Interface:
http://www.kyb.tuebingen.mpg.de/bu/people/berger/mindstorms.html

Web Portal to dozens of other sites and languages:
http://www.crynwr.com/LEGO-robotics/

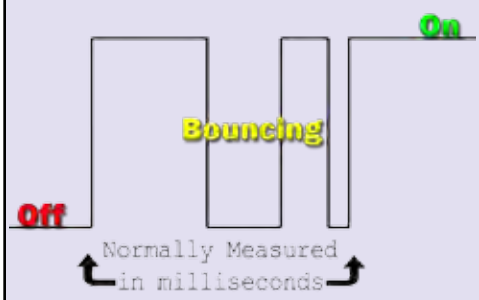
Web Site to purchase custom Mindstorms sensors and controls:
http://www.hitechnic.com/

Contact Bouncing Explained

Most mechanical input devices for electronics involve some sort of a switch that contains a piece of metal that is pushed down to touch another piece of metal, thereby closing the circuit and turning "on" the switch. However, there is an inherent problem with such a switch. The metal piece that moves to make contact is flexible, and will therefore "bounce" against the second piece, causing the contact to be made and broken several times before the switch piece finally comes to rest. The time for this is usually measured in milliseconds, so for light switches, this bouncing really doesn't matter. However, if the switch is used to signal electronics, the bouncing time looks like the switch is flipped on and off several times.

It is possible to work around this either with physical hardware, or with software routines. In a robotics lab I worked on in college, I simply looked at the input for the switch to signal that it had changed, and then waited 10 milliseconds for the switch to "settle" into the new position. That way, false readings were ignored.

I did the exact same thing for the Railroad Crossing, except I measured the contact bounce in terms of seconds instead of milliseconds.



The full source code for this project can be found at http://www.brickjournal.com

```
while(1)
{
Wait(40);
until((INPUT1 < LIGHT_CHANGE_VALUE) || (INPUT3 < LIGHT_
CHANGE_VALUE));
if(INPUT1 < LIGHT_CHANGE_VALUE) Button1Routine(); else
Button3Routine();
}
```

The following is the follow up routine for Sensor 1 detecting the train. The routine for Sensor 3 is identical except that you reverse the sensors listed in the routine. The first 4 lines setup the bounce back variable, turn on the blinking lights, set the direction for the gate motor, and turn it on long enough to lower the gate.

```
// -- Button1 follow-up routine
void Button1Routine()
{
      int x = 0;
      On(CROSSING_LIGHTS);
      SetDirection(MOTOR, OUT_FWD);
      OnFor (MOTOR, MOTOR_TIME);
```

Now that we have the gate down, we need to wait for the other sensor to detect the train. We wait until the sensor goes dark. The very next line waits for the sensor to go light (the train reached the sensor, then the train passed the sensor).

```
      until(INPUT3 < LIGHT_CHANGE_VALUE);
      until(INPUT3 > LIGHT_CHANGE_VALUE);
```

Now we enter our bounce back routine. The heart of the routine is the "if" statement. We check the status of the second sensor. If it is still bright, we increase the value of x by 1, wait 0.1 seconds, and then loop through again. If, however, the sensor goes dark again (indicating we had a "bounce back") we reset the value of x, forcing the count to start over. This routine will keep running until we keep the sensor bright for 20 passes consecutively.

```
      while (x < BOUNCE_TIME)
      {
            if(INPUT3 < LIGHT_CHANGE_VALUE) x=0; else
x=x+1;
            Wait(10);
      }
```

Once the "while" loop exits, we know the train has passed and we raise the gate and turn off the blinkers.

```
      SetDirection(MOTOR, OUT_REV);
      OnFor (MOTOR, MOTOR_TIME);
      Off(CROSSING_LIGHTS);
```

This ends the follow up routine, and our program goes back to the main loop and waits for the next train to pass.

Stikfas are a toy line from Singapore; a toy line that is an interesting combination between action figures and model kits. Originally billed as "customizable action figures," the kits were meant to be painted and sculpted (which many people do, as seen on websites like The Stikfas Customizers Guild (http://www.stikcustomizers.com) and The Stikfas Workshop (http://stikfasworkshop.tripod.com). The Stikfas figure size (3 1/4 inches) was designed to be in scale with a popular line of Japanese car and motorcycle models kits, and the figures' hands will grip the standard handle of a LEGO accessory (like a sword or lightsabre hilt, or the popular megaphone). The figures are also very poseable, due to their unique ball-joint design. This makes them easy to put together (and take apart) without the need for glue.

But the popularity of the Stikfas figure design took hold, and a lot of Stikfas fans (or "Stik-fans," as the Stickfas website calls them!) leave their figures "as is," using only the pieces and parts provided, as well as the included sticker sheets. The Stikfas company surely realized this, because they released figure sets of all sorts of characters and themes beyond the original soldier sets. Some kinds of characters they produced have also been made by LEGO, such as samurai, ninjas, spacemen, pirates, knights, police, fire fighters, and now even vikings. But Stikfas made some even more innovative sets which many AFOLs would love to see in LEGO sets, like Romans, generic superheroes and villains, fairies, angels, devils, bikers, gangsters and even rock stars! The sets come with a large number of props, weapons and tools (some AFOLS would certainly like it if LEGO made similar items). There is always a sense of humour with the extra items; for example, the nurse figure comes with saws and oversized syringes, the robot comes with a teddy bear, and the fairy comes with a giant mallet. The sticker sheets continue the humourous appeal, as they come with eyes and mouths in all sorts of expressions, plus other decorations, like tattoos, scars and (quite often) band-aids! And, like a mini-figure, there are no noses!

One set allows you to make dozens, if not hundreds, of figure combinations. You could easily buy an army of samurai and make sure no two look the same. You can even buy single figure blister packs with no accessories, because, with the amount of items included in the regular packs, you'll have enough left over to give to the lone figures.

Putting a Stikfas figure together is relatively easy, albeit time consuming. The parts are on a spur, like a typical model kit. You will want to cut the pieces off the spurs, rather than simply twisting them off. I also then sand down any remaining parts on the pieces >>

This new column plans to take a look at some of the toys out there that are "Not Quite LEGO." No, we're not talking about MegaBloks, but the toys that are sometimes similar to LEGO, or may be of interest to LEGO fans in general!

This issue: Stikfas®

Article and photos by Greg Hyland

left over from the spur. The assembly instructions (provided on a postcard in older packs, on a poster in newer packs) are pretty straightforward, starting with the torso, and adding the head, arms and legs. There are three main male body designs, the "Alpha Male," the "G2 Alpha Male," and the "Omega Male" (which is slightly larger and more 'muscular'). However, the "G2 Alpha Male" has elbow and knee joints that allow more realistic flexibility; these figures, I find, take more time to assemble.

Once the body is assembled, you can decide which accessories you want to use. There is always an assortment of items for the figures to hold, but some figures come with things that will clip on their bodies, like armor or head gear, while others have soft plastic "clothing" items like cloaks, capes, skirts and even a trench coat. Next, you can decide which, if any, stickers you want to apply. Some people like the look of the figures without any of the stickers, and I actually only use the eye stickers on the heads... unless there is a sticker that is just too cool to ignore! The one problem with the stickers is that sometimes they don't stick very well, especially on the cylindrical parts.

Some packs give you a choice of different coloured body parts. Certain packs also come with other whole figures that will need assembly –a dog, an octopus, etc.! Larger Deluxe Packs come with horses, dragons and motorcycles.

All in all, a Stikfas figure is a cool toy to put together. Whether you pick up just one or two, or end up with an army of them, you will find they are fun to collect and play with.

Stikfas can be found at most good comic shops or specialty toy stores, and can be easily ordered on-line through the Stickfas website (http://www.stikfas.com). A search on eBay will also come up with dozens of results. The Packs can range from $7-$20.

TOP FIVE STIKFAS SETS YOU NEED!

Beta Female Warrior with Dragon
This pack was the first appearance of a female Stikfa figure, and she is as tough as any of the male figures! While she is well armed and armored, the coolest thing is the dragon that she comes with. The dragon is huge, with an almost 14 inch wing span, and measures almost 13 inches head to tail. Both the neck and tail are segmented, allowing for maximum posability, and the wings are made of three pieces each, again allowing for many poses. Even the dragon's jaw is hinged. The pack also comes with a saddle so the Female Warrior can ride the dragon.

Omega Male Armored Knight with Stallion

This is the extra beefy Omega Male figure, who comes with a lot of armor and weapons... too many weapons for him to carry them all! He even comes with two different styles of helmet. The stallion is great; it is composed of many pieces allowing for much posabilty—even the ears move! This is one tough looking knight, and you almost want to get two of these sets for the knights to fight each other (I did!).

Alpha Male Spaceman

The Stikfas designers seem to have a real love of "retro" design with robot and spacemen (something I sometimes wish for in LEGO), which is why I love the Spaceman. The clear dome helmet clinches it for me! Plus there are some interesting accessories, like rocket boots and giant claw hands. And if you look closely, you'll see that the controls on his belt buckle are really an old Nintendo game pad!

Alpha Male Samurai Warrior

I think this has to be my favorite figure. I'm not even a big fan of Samurai, but this one won me over. The look of the armor is simple, but very effective. Plus, he comes with all the weapons any samurai could want, from katanas and swords, to a long bow with arrows.

Mechana Segmented Robot

Possibly the most poseable figure in the line, if not ever! Again, the "retro space" design continues, with a nod to the robot in Hayao Miyazaki's 'Castle in the Sky,' and even a little bit of the Iron Giant. The robot's arms are made of four large jointed balls, and the hands each have articulated fingers (which are great, but a real pain to put together). This allows him to hold the cool retro space gun. Plus, for some reason, the robot comes with a teddy bear, which, to me, conjures images of unseen Miyazaki-esque films!

HONOURABLE MENTION

Beta Female Fairy

Give her a machine gun from one of your other army sets, and how can you resist her?

Alpha Male with Motorcycle

With the provided stickers, you can make him into Paul Sr. from American Chopper!

Original Alpha Male Phantom

Made with clear plastic! Who wouldn't want an all-clear plastic mini-figure? The problem was that the plastic was sort of fragile and the parts broke easily. It was re-released with a glow-in-the-dark body.

Alpha Male Pirate with Skeleton

I'm not too thrilled with the pirate (besides, how can you beat a LEGO mini-fig pirate?), but the skeleton is awesome!

**Actually, there are three male body designs—the "Omega Male" which is slightly larger and more 'muscular.'*

Greg Hyland is an illustrator that had worked for LEGO for over four years, and is the co-creator of the AFOLs comic book. His most recent work can be seen in the comics on the boxes of the LEGO Batman line. His weekly on-line comic, Lethargic Lad, can be seen at http://www.lethargiclad.com

Last Word

And another issue is done!

This was a fun issue to do (even if it took a bit longer to do than I thought)!

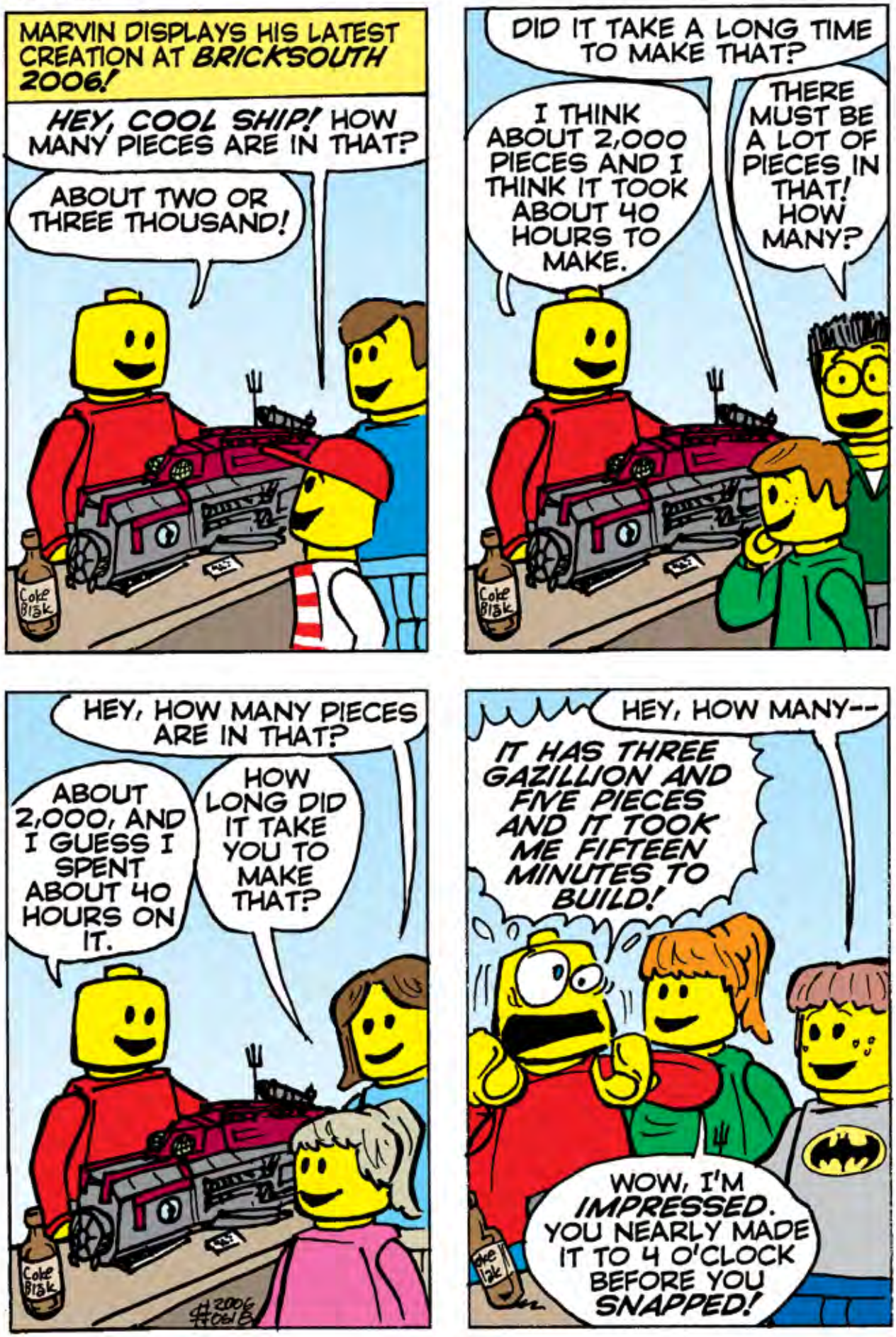
The next issue looks to be even better - it will be the events and year-end issue! Expect reports from BrickFest and many other events, and many other building articles!

And be ready for a couple of surprises and announcements!

See you then,

Joe

by **Greg Hyland**



NOT YOUR TYPICAL BRICKS.

If you have seen THE engraved Brick Badges at BrickFest™ and other LEGO conventions, you have seen the work of Tommy Armstrong, the Brick Engraver. He can engrave names and line art directly to a brick, making it a unique item for things like keychains, badges, and models.

A new innovation from Tommy is WoodStitches®, where a wood veneer is bonded to LEGO® elements. These elements can be used with other LEGO bricks and also to create beautiful mosaics (such as the one at left) and desk nameplates.

If you're interested in seeing the wide assortment of brick engravings and finishes that Tommy offers, you can go to **www.brickengraver.com** and browse through his catalog.

You'll see that his work is not typical.

And neither are his bricks.