The Modeler's Journal

A Free Journal for Today's Modeler

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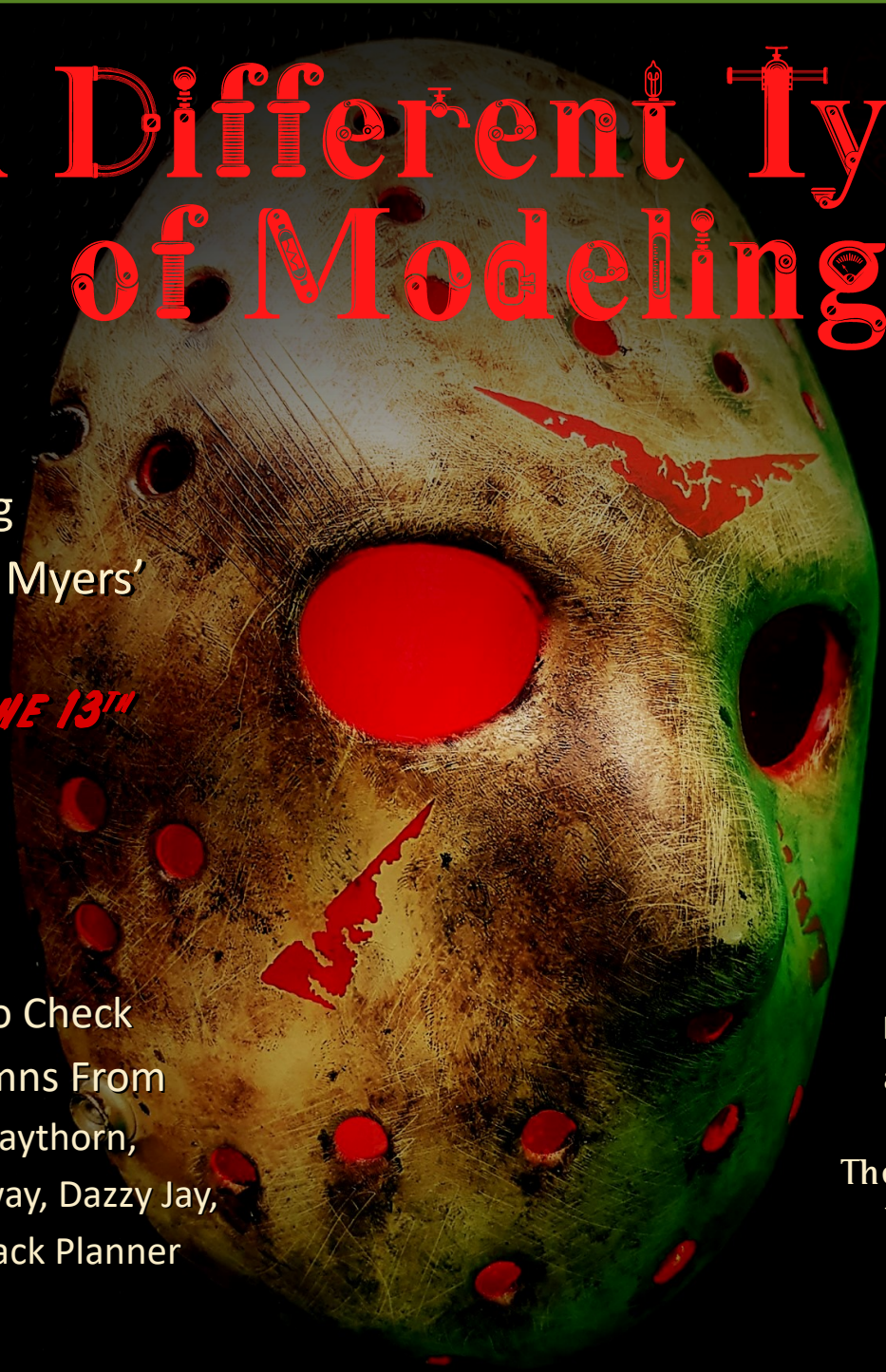
A Different Type of Modeling



Featuring Nicholas Myers' Amazing *Friday the 13th* Build!

Be Sure To Check Out Columns From Harry M. Haythorn, Jack Hykaway, Dazzy Jay, and The Track Planner

Introducing a new article series from Bill Beranek: The Anatomy of a Model Railroad

Cover Photograph Courtesy of Nicholas Myers

TMJ

Editor's Note...

One of the primary goals of this publication is to explore the various genres of model making (without limits) and showcase the incredible works of the many talented modelers around the world - and that means we have to keep an open mind about our impressions of modeling and how we define it.

With that said, in this issue of ***The Modeler's Journal***, I want to challenge the collective notion of what a model is and what exactly constitutes model making. Hence the cover title: "A Different Type of Modeling" and the featured pictorial essay "Friday the 13th" by the very talented custom desktop computer (PC) builder and "modder" Nicholas Myers of Y2K Custom PCs. Nicholas has expertly incorporated a scene from the movie *Friday the 13th* into a custom PC he built for a client. Not only that, he used real dirt, rocks, and twigs to bring authenticity to the modeled scene. I think you will find his work fascinating.

Also, starting with this issue, we are excited to bring you a new multi-part series entitled "The Anatomy of a Model Railroad," authored by Bill Beranek - The Track Planner. Follow Bill as he takes you on a journey, from start to finish, of a unique N-scale point-to-point operations-based layout that is being built by his client Jim Kalenowski. In Part 1 of this series, Bill walks us through the initial space, benchwork, and track configuration. In the next installment, Bill will focus on building the benchwork and laying the track.

Bill Beranek, in his article "Prototype vs. Freelance: A Professional Perspective," discusses the advantages and disadvantages of both prototype and freelance model railroads and how proto-freelancing can offer a unique hybrid solution by incorporating elements from both styles.

Darren Johns (aka Dazzy Jay) takes the discussion on prototype vs. freelance further and gives his take in his article "To Freelance, or Not to Freelance? – And the Inspiration for my Freelance Modeling". He provides his viewpoint on why he prefers a proto-freelancing approach and how he used his inspiration and influences to apply that approach to building his model railroad.

Harry M. Haythorn, in his article "The Triple-Stack 800 Build," shows us how he modified an existing triple-stack FEF-2 #832 into a triple-stack FEF-3 #835 by using parts from a non-running FEF-3 #844 he found online.

And finally, take a journey aboard the Al Boraq from Tangier along the coast down to Casablanca with Jack Hykaway in his article "Morocco's AL BORAQ - The Fastest Train on the Continent" and learn about how the train is proving to have been a wise investment for Morocco.

We hope you enjoy this issue.

– **JD (Loggin' Locos)**
Editor-In-Chief

Happy Halloween and happy modeling!

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The Modeler's Showcase

About the Cover

Jason's eerie glowing hockey mask from Friday the 13th movie series highlights the front of Nicholas Myers' custom-built PC.

This and much more within this issue of The Modeler's Journal.

The Workbench

The Modeler's Journal Team:

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Harry M. Haythorn - UPHS #4043
Darren Johns (Dazzy Jay)

Introducing a New Article Series

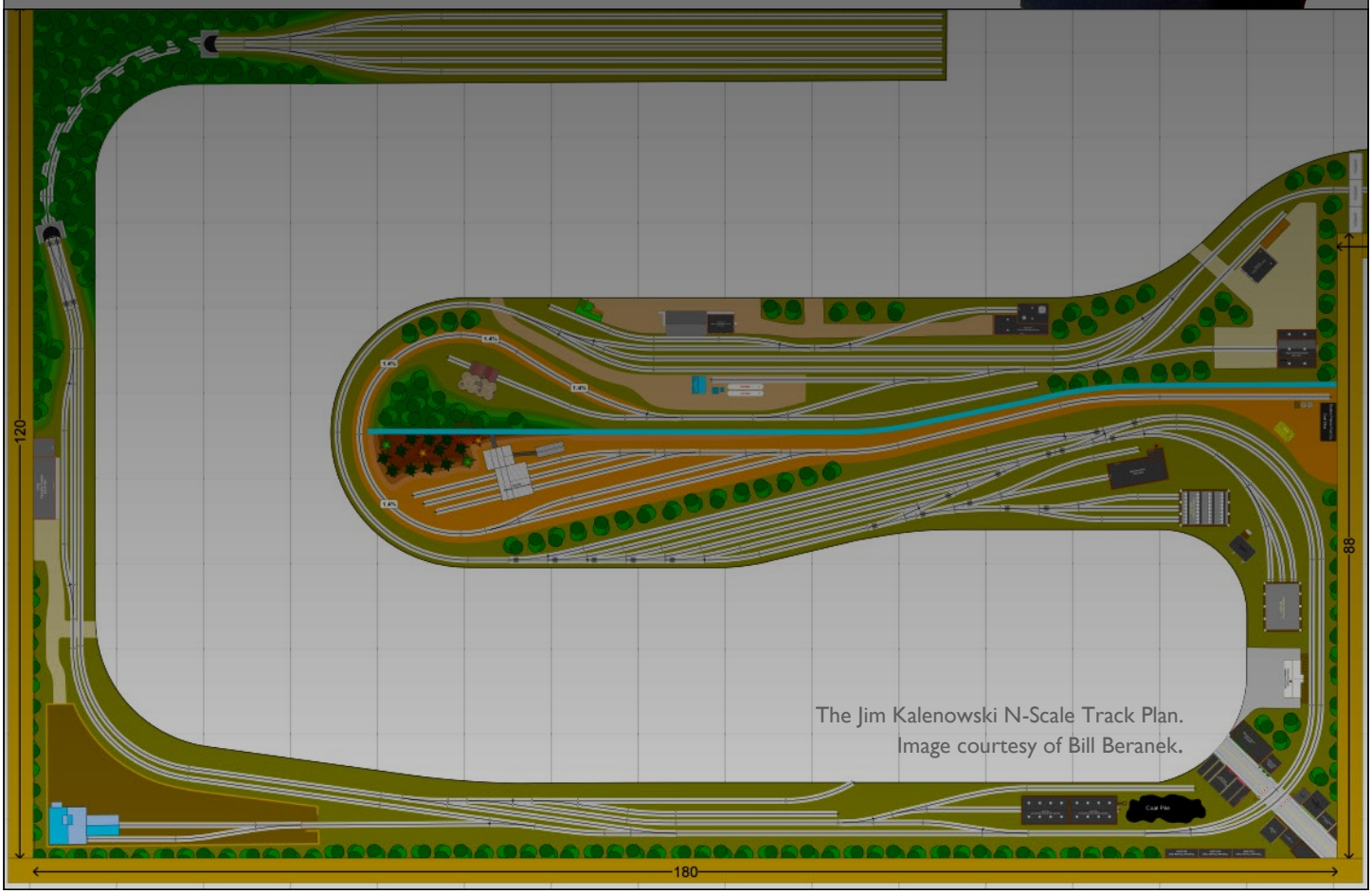
The Anatomy of a Model Railroad

By William (Bill) J. Beranek - The Track Planner

Follow along as Bill Beranek takes you from start to finish of a point-to-point N-scale layout he designed for prototypical operations. The series will be presented in a pictorial essay format with photographs of the progress and commentary covering:

- ✓ Layout Design Process
- ✓ Benchwork and Trackwork
- ✓ Control Panel and Wiring
- ✓ Facia and Backdrops
- ✓ Scenery

Starting with Part 1 in this issue of *The Modeler's Journal*.



The Jim Kalenowski N-Scale Track Plan.
Image courtesy of Bill Beranek.

A Different Type of Modeling

When we think of model making, we typically think of model cars, ships, airplanes, trains, figures, or other similar genres. We may also include in this hobby various forms of structures, landscaping, and weathering. Several questions naturally follow and should be considered:

- Is there a specific boundary to what we consider model making?
- And if so, is this boundary much more nebulous and flexible than what we believe?
- Are we able to consider other objects as being models?

For me, these questions were easy to answer when I came across the works of custom desktop computer builder and "modder" Nicholas Myers. Nicholas builds custom desktop computers and gaming systems under his Y2K Custom PCs flag. He is a computer enthusiast who has built many unique PC designs. However, his *Friday the 13th* computer build, presented over the next several pages, caught my eye because it incorporates techniques used by model makers and model train hobbyists to create landscape features such as weathered structures and objects, turf, rocks, dirt, and lighting to complete the scene. In my opinion, the work that Nicholas did falls within the boundary of model making.

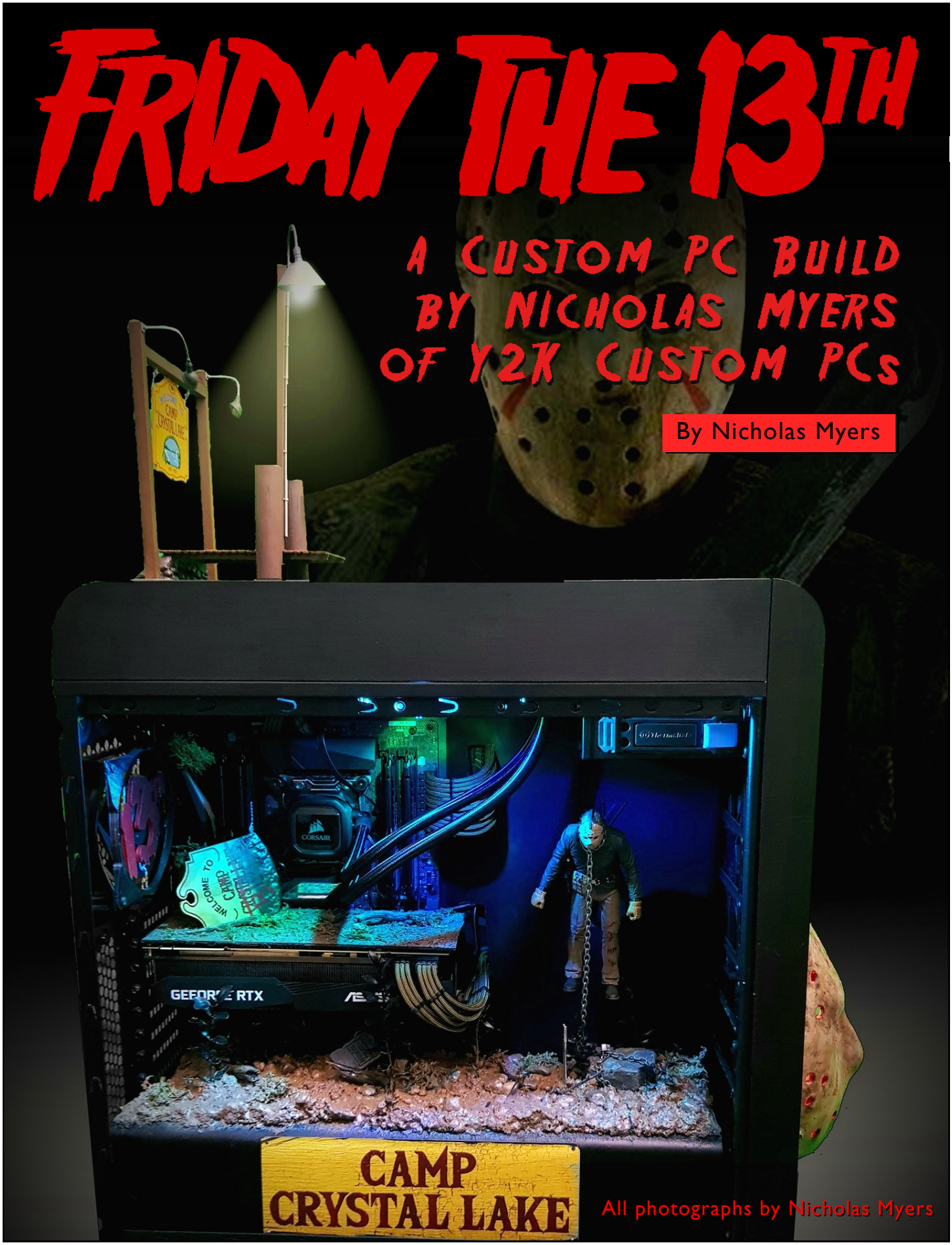
Being a computer enthusiast myself, I understand the effort and creativity it takes to not only envision the design but also to bring it to fruition. Some may not consider this modeling, but I feel that "modding" a PC, especially when utilizing techniques used in everyday modeling, naturally falls into one of its genres. For the purist, it may be a bit of a stretch, but I believe that at a minimum, this custom build meets the qualifications of at least being a different type of modeling. What do you think?

JD (Loggin' Locos)
Editor-in-Chief
The Modeler's Journal

FRIDAY THE 13TH

A CUSTOM PC BUILD BY NICHOLAS MYERS OF Y2K CUSTOM PCs

By Nicholas Myers



All photographs by Nicholas Myers

I like thinking and going outside the box on all my custom builds. When I got the original concept from a client (he wanted Freddy vs. Jason), I expressed my concerns that portraying two big themes within the limited space of a computer case would be complete chaos. Together we decided on Jason Voorhees (the main character from the *Friday the 13th* movie series).

The client had a set budget for the parts and all of the custom work. I asked him about his primary goal for this build and used my knowledge and experience to design the system and select components that would meet his goals, fulfill his computing needs, fit his budget, and would be a one-of-a-kind system.

The Concept

I had a few ideas about the concept in my head, and I bounced them off of a fantastic modder Ismael Justiniano over at KillR_MODZ (in fact, I was constantly in touch with him throughout the build and bounced many other ideas off of him just to make sure it would all perfectly work together). We were trying to think of a unique and creative idea that would work well. He thought about recreating the bottom of Camp Crystal Lake. I liked the sound of that, and I ran with it.

Now that I had the concept for the build, just naming it "JASON" would be too simplistic and weird! The name had to be recognizable, so I named it *Friday the 13th* after the movie franchise.


CAMP
CRYSTAL LAKE
COME TO
CAMP
CRYSTAL LAKE
CORSAIR
CAMP
CRYSTAL LAKE

Setting Up The Build

The first big step was finding the accent pieces to bring the scene to reality. I already knew what case I was going to use because I had worked with it in the past. The case is a Thermaltake Core V71, which is a large case with plenty of room in which to work.

The next set of materials was difficult to find. Finding a Jason figurine which was tasteful and realistic (not tacky), was a feat in and of itself. It was challenging, but I found, for lack of a better term, a *Friday the 13th* playset. The set included the Jason figurine and some accent pieces that would bring a sense of reality and eeriness to the build.

I also had to find an appropriate mask. I scoured the web to try and find a lifelike quality mask I could use. I looked all over eBay, Etsy, and OfferUp. One finally surfaced on Etsy, and I purchased it. It was expensive, but it looked so real!

Sourcing scenery materials that would artistically showcase Camp Crystal Lake was also a must. After searching for a few days, I found a kit that had everything. I was astonished - it seemed too easy! Then I looked at the cost..., but that's neither here nor there.

The second step was to take the inside of the case and make it as dark and grim as possible. I purchased some dead flat black spray


WELCOME TO
CAMP CRYSTAL LAKE
13TH
RTX

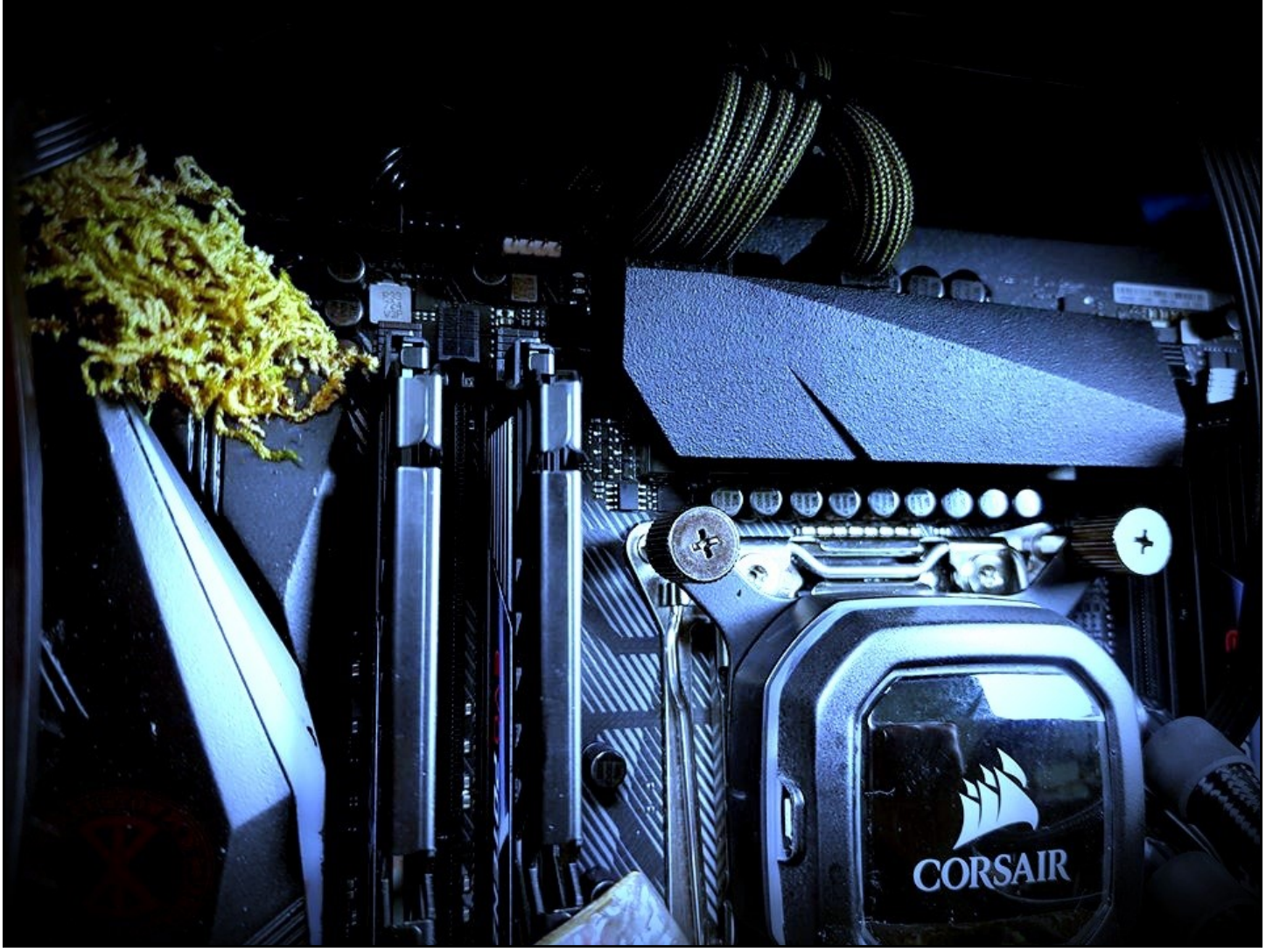
paint - this stuff has no glare or gloss at all. I disassembled the motherboard, prepped the all-in-one (AIO) CPU cooler, and the power supply shroud (where the lake bed is depicted). I also prepared some Plexiglas that I used for the backing behind the Jason figurine. Once everything was prepped, I hit all of it with a few coats of the black spray paint. Once dry, I went back over it with a dead flat clear coat just to ensure that there was a protective layer and that any possible reflections and shine would be eliminated.

Next, I sourced parts that would give the vibe and the feel of the scene, bringing it to life. I wanted to achieve an effect that when anyone looks at it, they don't just see the build, but can feel the scenery as if they are physically there. To create that effect, I needed to recreate the scene so it would capture the vision, but the scenery could not compromise the computer's performance and ease of use. This is where some research came in. I did look into modeling scenes and how to "freeze" a scene so to speak. I realized I could use real materials found in nature to build up my scene. After all, nature is its own best imitator - not plastic or other imitation parts.

I made a stop at Hobby Lobby, where I bought some Mod-Podge gloss. I wanted reflections to occur because the scene would portray an underwater environment, and everything would be slightly shinier down there. I grabbed a bunch of dirt and rocks from my backyard. I cleaned the rocks then sealed them (although, I had no particular reason for sealing them) before drenching them in clear gloss spray paint to give them a sheen. I left the dirt out for a few days which would ensure that it would be thoroughly dry. I wanted to ensure

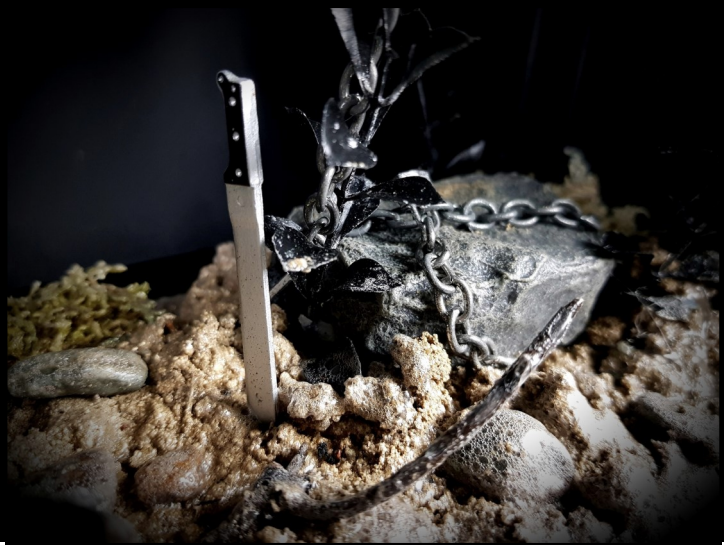
there was no moisture in the dirt whatsoever - moisture and computer components do not mix well.

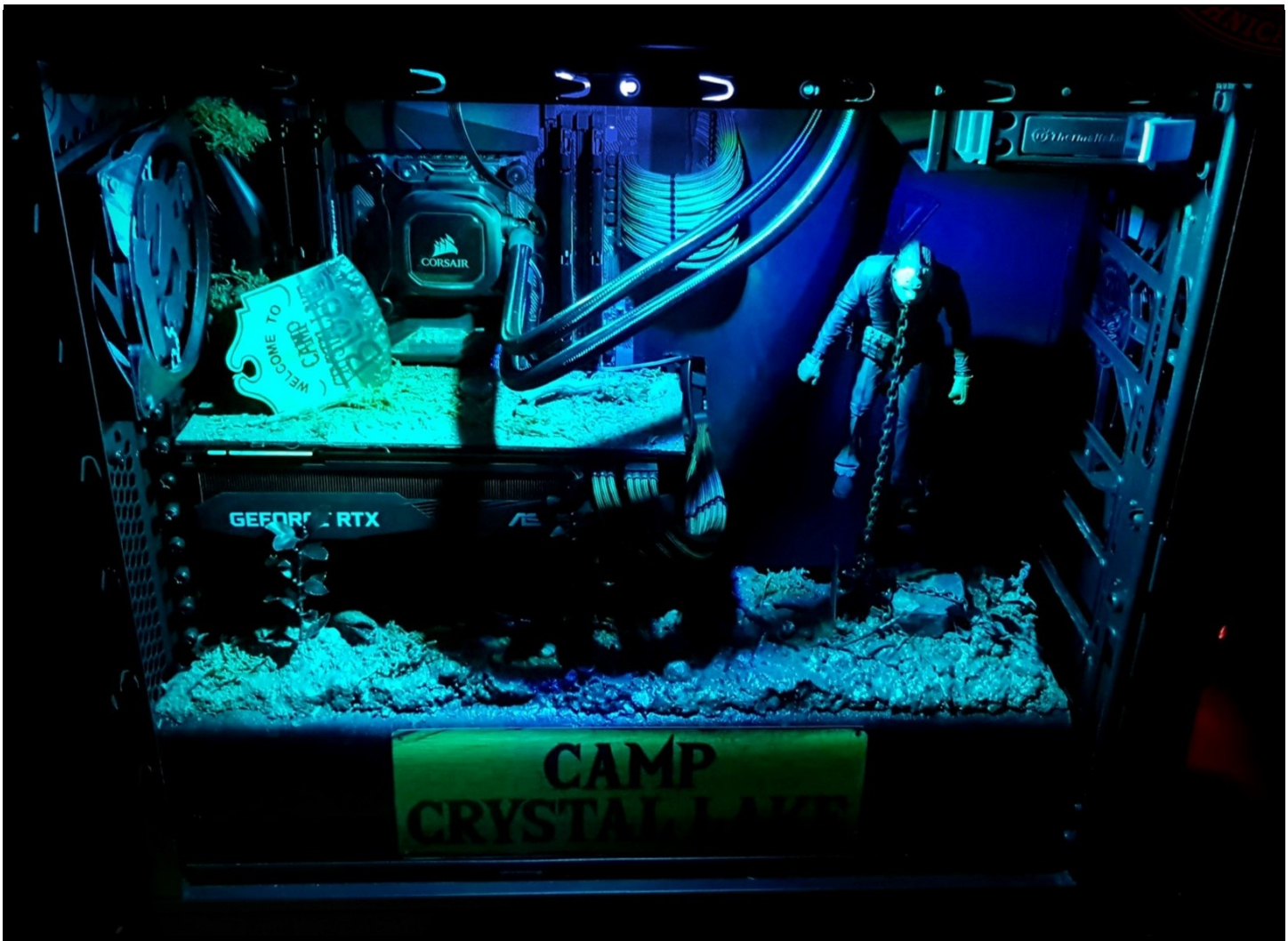
While the dirt was drying, I purchased some hobby (**real**) twigs and real moss, and the only “fake” scenic property - black plants. In my mind, I imagined that’s what one would see at the bottom of Camp Crystal Lake. I took the moss out and laid it on some cardboard and drenched it in 3M spray adhesive in an attempt to seal it and to make sure it doesn’t crumble. It worked. I then coated all the plants, moss, and twigs with several layers of clear gloss spray paint to give them a little glimmer and to seal the moss.



Above: The graphics processor (GPU) makes a partial lake bed.

Below: The base shroud is covered in dirt and debris that forms the bottom of Camp Crystal Lake.





Once the dirt was adequately dried, I started mixing it with Mod-Podge. Since this was the first time I had ever used this glue, I was winging it a little bit. Luckily, it has a pretty long setting time, so I wasn't in too much of a hurry to finish sculpting the scene. I placed the rocks into their permanent position, and once I was satisfied, I pulled them back out and added some Gorilla glue underneath just to ensure that they wouldn't move. I thoroughly secured the remaining scenery. Once I was able to set the Jason figurine, the ground, and all the accessories needed, I coated everything with a few layers of 3M adhesive just to be extra sure that everything would stay put. I applied a few coats of the gloss spray paint to give everything an underwater vibe and a final finishing touch.

Next, I worked on the mask. I wanted to incorporate the mask without it looking like an afterthought or just another add-on piece. I sanded down the mask so it would fit snug and flat against the outer case panel. I realized that it would be cool to have it glow in some fashion, but I had to do it in a way so the light would not bleed back into the case. To accomplish this, I took a piece of acrylic that had been painted black and cut it so it would fit just inside the mask. I glued a red LED strip and sealed it up with two-part epoxy glue. Sure enough, no light bleed - success!

I had Ace Brunette of Ace's 3D Prints make me a 120mm exhaust fan grill cover. The cover says "13th" in chains. I painted it red and I feel it was a perfect choice.

The Final Build

The goal of the build was to keep the scene dark, murky, and the appearance of being underwater. I disabled all the LED lighting on the motherboard, the GPU, and the AIO CPU cooler. I also used case fans that had no LED lighting on them. This way, there would be no additional lights shining other than the ones I wanted. To light the case, I found a Water Effect Kit on Amazon that appeared to be what I needed. It came with a battery pack that required eight AA batteries, which was not practical. I converted it to use a Molex plug and cable connected to the computer power supply (PSU), which provided constant power without the need for batteries.

There were no real and steadfast expectations of the final results. When you're portraying something that doesn't exist, you have no reference point and so you can only hope that it turns out reasonably well and is recognizable. When I finalized the build, I showed it to a few random people that had no knowledge whatsoever about building computers and they were instantly able to recognize the idea, the concept, and the scene from the movie. So, to me, the finished build hit the nail on the head and I was able to let out a huge sigh of relief because the amount of work I put into this build and the hours I spent consulting Ismael were not in vain.

I faced the same challenges with this build as I do all my builds because each time I am trying to do something that I have never done or seen before. There were a lot of unknowns, so I overcame them by venturing off the known path, by researching different areas to see what would work, apply what I have learned, and incorporate ideas that my peers have suggested. Like I said above, I prefer to think outside of the box!

About The Author

Nicholas Myers is a custom PC builder and modder who owns and runs Y2K Custom PCs. He has been custom-building PCs since 2014 and has been modding them since 2017.

Nicholas lives in California with his wife and three children. He served in the United States Air Force and currently works as a Cyber Security specialist for the U.S. government.

You can check out Nicholas' fantastic work on his Facebook page @Y2KCustomPCs and on Instagram at @Y2K_Custom_PCs.

JASON

Hanging Around in Camp Crystal Lake

Computer Parts

Case:	Thermaltake TT Core V71
CPU:	Intel 8700k
Motherboard:	ASUS ROG Strix X299-E Gaming
Cooling Solution:	280mm Corsair H115i All-in-One (AIO) Liquid Cooler
Memory (RAM):	32GB of GeIL EVO Potenza
Boot Drive:	Western Digital 500GB M.2 SSD
Data Drive:	Western Digital 2TB HDD
Graphics Card (GPU):	Asus RTX 2080 DUAL OC
Power Supply (PSU):	EVGA 750 watts

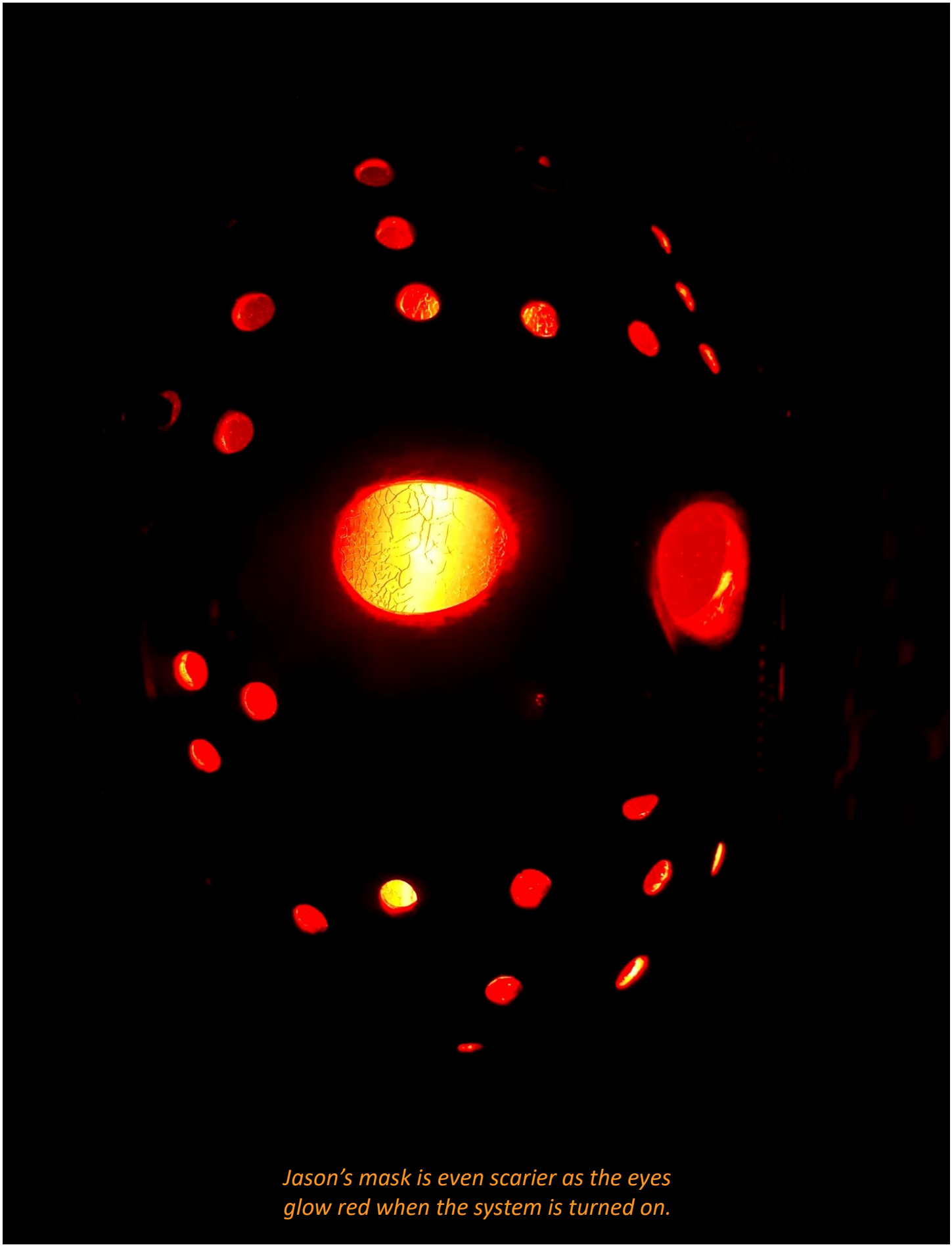
Project Supplies

Mod Podge High Gloss
3M Adhesive Spray
Clear Gloss
Water Effect Lighting Kit
Real Moss, Sticks, Rocks, and Dirt
Jason Voorhees Action Figure
Camp Crystal Lake Playset
Jason Voorhees' Hockey Mask

Blood, Sweat, and Tears

Jason is tied down to the bottom of lake Camp Crystal with a boulder and chain.

Jason's mask hangs in front of the PC case and sends chills up any user's spine, even when the system is turned off!



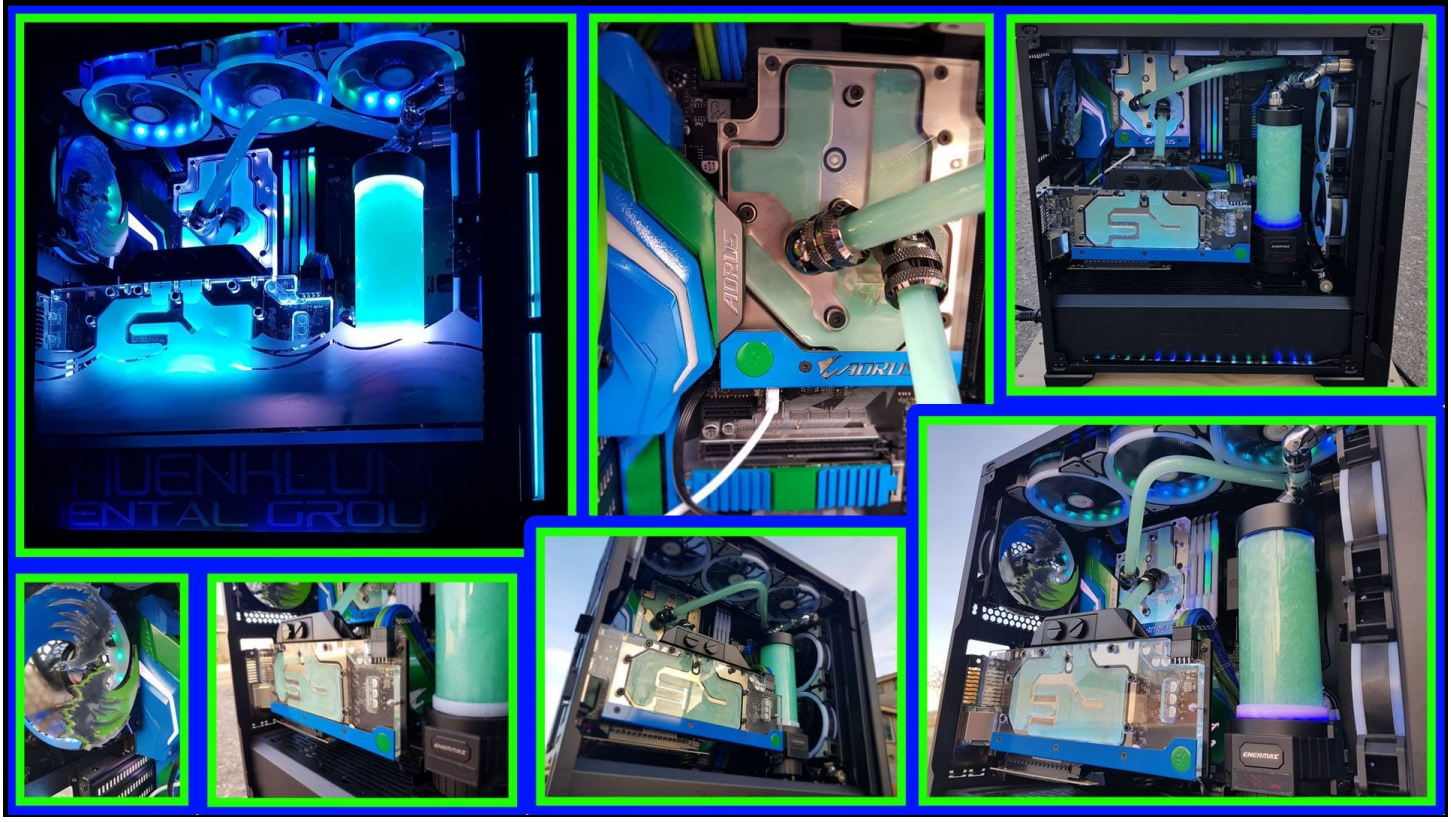
Jason's mask is even scarier as the eyes glow red when the system is turned on.

The rear "13th" 120mm exhaust fan grill cover is custom-made by Ace Brunette of Ace's 3D Prints.

Other Custom-Built Desktop Systems

By Nicholas Myers
Y2K Custom PCs

Below: The Tranquil Build

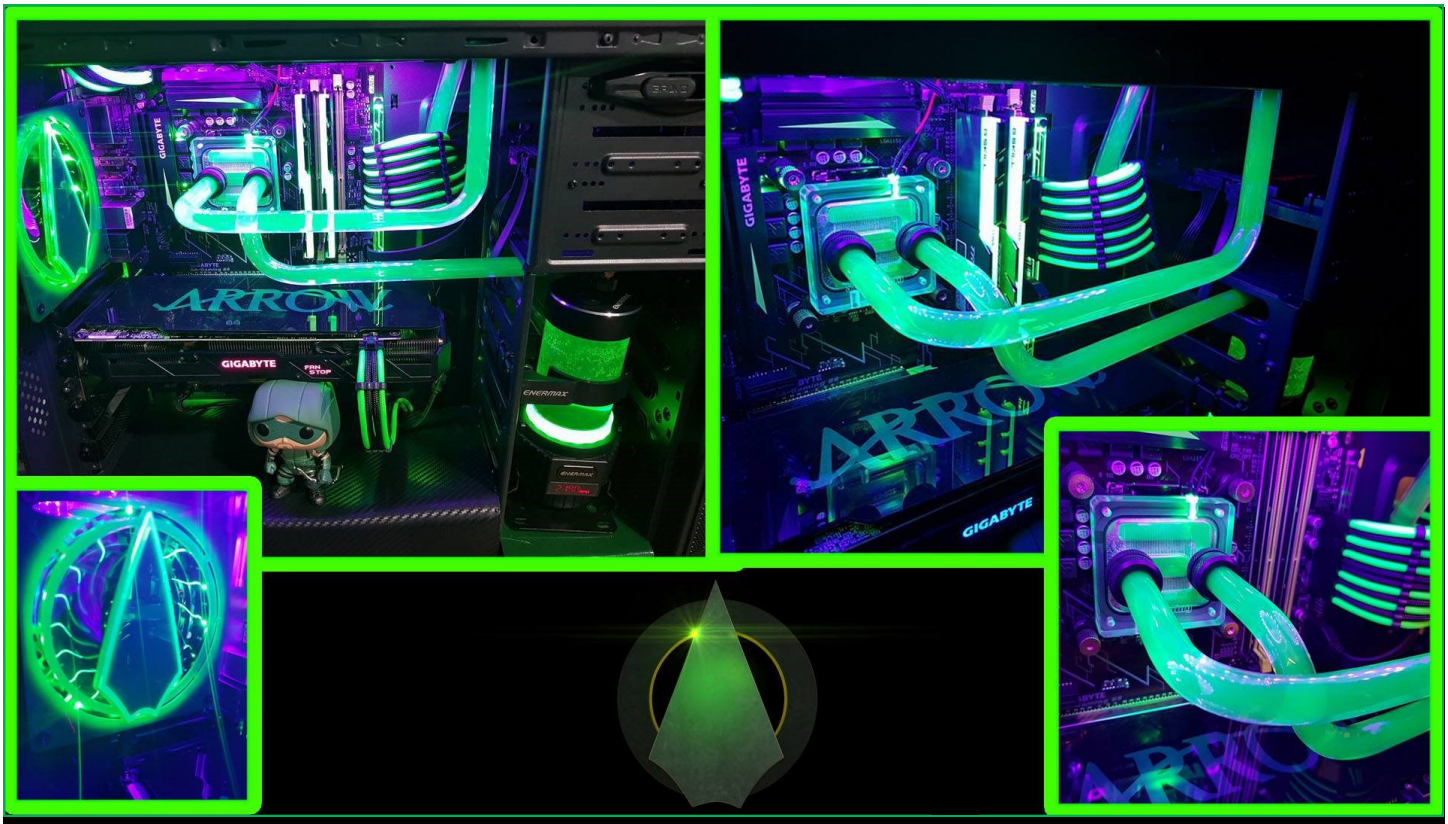


Above: The Dragon Build

Below: The Fortnite Militia Build

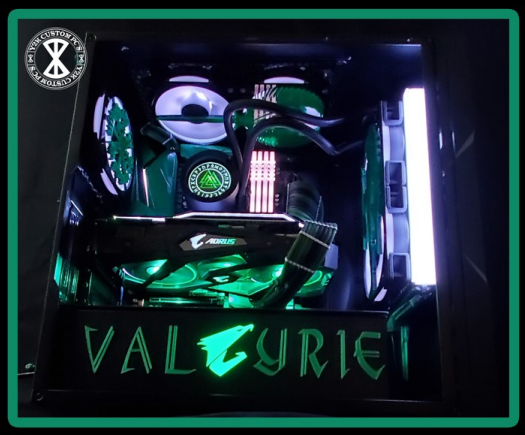
Above: The Urban Fortnite Build

Below: The Simply Purple Build



Above: The Green Arrow Build

Below: The Valkyrie Build



Build By Y2K Custom PCs

Above: The Deadpool Build

Below: The Industrial Karnage Build

A Perspective On Track Planning

By William (Bill) J. Beranek - The Track Planner

Prototype vs. Freelance

A Professional Perspective

In this issue, I will discuss the difference between designing prototype track plans versus freelance track plans from a professional's perspective. As a designer, I am not a fan of strict prototype or strict freelance layouts. I have always preferred designing a combined layout; a hybrid design called "proto-freelance."

The Believability Factor

Throughout this article, I will use the catchphrase "the believability factor." Believability has always been my main focus when designing track plans. Believability is when a visitor or an operator, after viewing or operating the layout, can walk away with the feeling that they were viewing and/or operating a real railroad.

Regardless of whether you are building a strict prototype, a freelance, or a proto-freelance layout, believability is the key.

To help create a believable layout, I think of creating a miniature transportation system. This phrase infers that your layout and railroad is just a small portion of a much larger nationwide rail system. As such, carloads are always being shipped for a purpose, and no cars are floating around the layout. Every car will have a point of origin (whether it is on or off of the layout), and a destination. Thinking bigger, despite being limited by the four walls of your layout room, often enhances the believability factor - even if you have to make up a tale of why your railroad exists!

When designing, I do think prototypically and about realistic operations. This ensures that the overall design will follow normal prototype practices, allowing the design to become more than just a model railroad. I am trying to replicate the real world in a miniature and make it fun to operate.

In my opinion, pure prototype modeling has as many disadvantages as it has advantages. Let's talk about those advantages and disadvantages.

Prototype Advantages

Even before you cut your first 2x4, building a prototype railroad requires a lot of foresight and extensive research. The internet is an indispensable tool and most proto-

type railroads have a vast amount of information available online. It might take a little searching, but you can usually find the information you need. Learning about the prototype railroad helps you significantly narrow your scope and streamline your model building, keeping you focused - we all know how easy it is to get distracted, especially in a hobby shop.

If you are faithful to the prototype, most of the important decisions have already been made. The layout's locale and the type of railroad (Class 1, bridge route, branchline, mining, logging, etc.), have already been determined. Your job is to decide how to fit the pieces together, and how to compress everything into your basement.

The Scenery is also predetermined, whether your line operates through a dense neighborhood or the wide-open plains. There is usually plenty of documentation of trackside scenes in photographs, which is incredibly useful for re-creating accurate colors for the soil, vegetation, and ballast, etc. Images can also spur ideas for small details such as wayside signs, detectors, or track switches that can be incorporated.

Rolling stock and motive power rosters are also largely decided by what a normal consist looks like in the field. Since there is a wide range of availability of equipment from the major Class 1s and many shortlines, you will encounter very few cases where you will be required to re-paint and re-decal the equipment yourself, saving you time, money, and labor. You will also save money purchasing only cars and locomotives that are used by the prototype.

Prototype Disadvantages

While having lots of information available to you may seem like a wonderful thing, becoming overloaded with it is always possible, especially for those modeling larger or more popular railroads. Determining exactly what to model, what to keep, and what not to include in your limited space, can become overwhelming.

With popular prototypes, modelers almost immediately end up trying to include too much. The information is so plentiful and there are so many compelling scenes that the modeler has a hard time determining what to include and what to leave out - the age-old "givens & druthers" dilemma. The more popular the prototype, the smaller the available space seems to get. This is a circumstance where the "believability factor" is tested.

Let us say you want to model the Union Pacific from Omaha, NE to Cheyenne, WY. Unless you have unlimited space, you are going to have a serious believability problem - it is awfully hard to effectively represent the 500 miles of sparsely-populated mainline between Omaha and Cheyenne.

However, if you instead choose to model the Union Pacific from Denver to Cheyenne - a shorter distance of approximately 100 miles - you will have less selective compression to deal with, increasing the believability of your layout. This is why, when clients want to model a prototype, I like them to think in segments of a hundred miles or less. I suggest that they choose a favorite segment of their favorite prototype. Thinking in segments helps maintain focus and eliminate the overload of information.

I have clients who think they must include large metropolitan scenes to reinforce a particular area they want to model. Unless you are specifically modeling an urban area, large city scenes are unnecessary. They eat up valuable real estate on the layout. By incorporating hidden staging yards, a layout can imply that trains are coming from or going to large metropolitan areas. If you desire the visual interest of a city scene, using cityscape photo back-drops and false -front background buildings can accomplish a similar look in a lot less space.

Instead of one large metropolitan area, consider having multiple rural scenes with a few rural towns, each with small industries. Not only can it be more interesting to have trains traveling through one or two towns, but it also gives operators the sense that they are traveling a large distance. Besides, most home layouts do not have adequate space to depict a large metropolitan scene with suburbs and industrial or core business districts with skyscrapers towering to the ceiling. Placing even just a couple of hi-rise office buildings on

> Believability is when a visitor or an operator, after viewing or operating the layout, can walk away with the feeling that they were viewing and/or operating a real railroad.

a layout, in my opinion, does not help the believability factor.

Freelance Advantages

When designing a freelance layout, you get to use your imagination. You are not bound by strict prototype practices. Here, how you build your world, how you paint or letter your rolling stock, and where your trains operate are up to you. Freelancing allows you the freedom to build whatever makes you happy. You can create and personalize the layout any way you want. You do not have to worry about placing industries in geographically correct locations along the line or how many tracks must service each industry. Heck, you could even go without industries altogether and build your layout so that it focuses on railfanning and running trains in a continuous loop.

Freelance Disadvantages

A major disadvantage of freelance modeling goes hand-in-hand with its largest advantage - there is no scope. If the modeler has trouble conceptualizing, the layout could end up looking like a hodgepodge of unrelated ideas. With this type of modeling, staying focused on a couple of ideas is especially important. It is easy to get into the mindset of wanting everything, and getting distracted. Without discipline and the ability to conceptualize, layouts usually end up with incoherent themes. Freelance modelers need to settle on one or two themes and direct their full attention in that direction.

If the freelancer is making up his or her own railroad, obviously there is no ready-to-run equipment with pre-applied decals right out of the factory. The freelancer has to come up with a railroad name, reporting mark, and a paint scheme. While this is a fun part of the hobby for many, others can find this process stressful. I have seen numerous freelance railroads end up with a mix of unmatched motive power and unrelated rolling stock which creates an incoherent theme and certainly hurts the believability factor.

Proto-Freelancing

For me, proto-freelancing is the best of both worlds. Proto-freelancing has advantages over strict prototype or freelance model railroads and many modelers have been able to combine the best of prototyping and freelancing into one coherent theme. Below are some of the elements proto-freelancing can bring to a layout.

Positive Prototype Elements

Track Configuration: When you use a prototype, the basic track configuration has already been determined for you.

Towns: I recommend using actual town names and keeping them in geographical order along the route. There is no question that using real town names will help the believability factor, especially when visitors or operators who are familiar with the area, come visit your layout.

Industries: To further reinforce authenticity, include some of the industries found on the prototype. Not all industries must be included, as there is always some compression when we scale a large stretch of track to our basements. Again, we are reinforcing plausibility.

Prototype Consists: The majority of your rolling stock should be from the region you are modeling. This further reinforces authenticity. It is okay to include a small portion of foreign road names, but the majority of the rolling stock should be from railroads in the region you are trying to replicate. In any case, your equipment should reflect the types of industries that you have along your mainline – tank cars for oil refineries, hoppers for coal or grain elevators, etc.

Staging: In my opinion, this is one of the most important elements you can include on your model railroad. Using staging creates the illusion of your layout being that small portion of a larger nationwide transportation system. Staging allows your trains to terminate "somewhere" and to originate from "somewhere" without having to visually model those terminals with large structures and large spaces. This further reinforces the believability factor.

Positive Freelance Elements

Industries: You should add some industries that are favorites of yours, even if they are not on the prototype. If done right, you will not hurt the believability factor and will surely add some enjoyment to operations.

Continuous Running Track: You should add one continuous running track, for those times when you want to sit back and watch trains roll by. Many of my designs include a continuous-run track. I can incorporate the track into the design in such a way that it goes almost unnoticed

until it is used. With that said, it is important to make sure that the continuous-run track does not affect the overall operations of the rest of the layout.

Branch Lines and Interchanges: Even if the prototype does not connect to a branch line or have any use for an interchange track, you can still include them on your proto-freelance railroad without hurting the believability factor. If you like branch line and interchange operations, by all means, include them on your railroad.

Renaming Towns: Do not be afraid to rename a town. As long as you do not alienate the town from the region it will not hurt the believability factor. An example would be, renaming a town from "Craigmont" to "Craigmont Junction" because you added an interchange track or branch line connection. The name change can reinforce the believability factor. Without even seeing the town, an operator would assume, because of the name, there is some type of interaction with another railroad.

Selective Compression

On a proto-freelance track plan, it is easier to use selective compression. On prototype model railroads it can be difficult if you are trying to model the prototype mile-for-mile.

Earlier, I talked about modeling small sections of a large railroad. If my clients have a normal 200 to 300 square feet of space, I always try to persuade them to model an area that is 65 to 75 miles long. Why? It all goes back to the believability factor.

> Staging allows your trains to terminate "somewhere" and to originate from "somewhere" without having to visually model those terminals with large structures and large spaces.

It is much more feasible to model 75 miles in an average-sized space (albeit with some serious selective compression) than attempting to replicate 300 or 400 miles. In most rural areas, towns are seven to ten miles apart. You should be able to design a plan that includes three or four rural towns, with multiple small industries along the route at key points. Doing this along with strategically-placed view-blocks gives the illusion of large distances, despite being compressed to fit in a basement.

With limited space, it is always better to use numerous small industries as opposed to modeling one or two large major industries. In my judgment, there are multiple reasons for this:

1. Having numerous small industries makes for a more interesting operating session.
2. Large industries can be difficult for new operators to understand and effectively switch out.
3. It is easier to design small vignettes on the layout as opposed to large complex industries.
4. Smaller industries will generally have less complex track work and the track will be simpler to construct.

Final Thoughts

I hope that I have convinced some modelers to seriously consider designing and building a proto-freelance railroad. I believe that these displays incorporate the best of both worlds: the "proto" keeps you focused, while the "freelance" lets you use your imagination so you can include things that are important to you.

After all, the whole reason folks get hooked on "the world's greatest hobby" is to have FUN!

About the Author

Bill Beranek - The Track Planner has over forty years in the model railroading hobby. Bill enjoys golfing, traveling, and of course designing "prototypical operations" focused track plans. He has been a member of a local 135+ member model railroad club since 2003 and has served twice as the club's president, twice as a board member, and is currently serving as the club's treasurer.

Bill is currently working on his latest triple-deck HO scale layout depicting the SP&S (Spokane, Portland & Seattle Railway) in southern Washington and the OTL (Oregon Trunk Line) on the upper level in northern Oregon in the mid-50s.

You can find out more about Bill—The Track Planner at www.thetrackplanner.com.

To Freelance, or Not to Freelance?

And the Inspiration for my Freelance Modeling.

By Darren Johns

Some may say that prototype modeling is the only way to go, no ifs, buts, or maybes. I have heard some stories of modelers being ostracized by other modelers because of their freelance railroad views. I am sure that freelancers are guilty of this too.

So what modeling options do we have? For me, there are three distinct options:

1. **Prototype Modeling:** Accurate reproduction of trains, structures, and topography for a specific location, railroad(s), and time frame/era.
2. **Freelancing:** Full artistic freedom to the modeler, including trains, structures, topography, locations, and railroad(s).
3. **Proto-freelancing:** Modeling some aspects of the real-world railroad(s), including trains, structures, and the topography of the prototype railroad(s). Some artistic freedom can be taken with this option.

I am all for prototype modeling, but this is not how I model. Prototype modeling has many advantages, especially when researching a given location or railway, etc. For example, the modeler has real places and location names, station names, rolling stock, and locomotives to add to their railroad. History books, libraries, and historical societies are great modeling resources for researching your niche/prototype in the hobby. I can appreciate that modelers get as much enjoyment out of the research aspect as they do building and running their model railroad empires. I too love to read historical literature about my local railroads of yesteryear. However, prototype modeling could also be seen as having its limitations. For example, what parts should be modeled given the lack of space? It can be very tempting to model many different aspects and objects as they exist, that it becomes difficult to decide exactly what to model and what to leave out. Leaving something out would make the scene not accurate to the prototype.

From my point of view and personal modeling needs, freelance modeling has its advantages over prototype modeling. One can use any rolling stock, locomotives, structures, and track arrangements, etc. I have since heard of a new term that probably describes my modeling more accurately - it is "proto-freelancing".

My railway, the 'Fallen Log Railway' runs predominately Eras I –III European rolling stock and locomotives. However, I do run trains from my childhood South Australian Railways and the Australian and Pacific National Railways. Yes, all are very different and some would say you cannot run these trains together. Yes, they never did run on the same rails together, but this is what attracts me to "freelancing" and "proto-freelancing."

The inspiration for my freelance modeling comes from various locations and influences in my life. This is another reason I like the freelance option because I can create a little slice of my own world and create dedications to people in my life. I developed this idea from a podcast I listened to some time ago, where a guest discussed freelancing. They explained that they enjoyed naming "everything" on their railroad, but stressed that the "everything" needed to have a backstory that develops the formation of the town or location. I had never considered this before.

My industries are named after the numerous people I know or the places I have visited. Some places I have just made up by searching for business names on Google. I normally like to select a few names from places to which I have recently traveled such as Riversleigh in Queensland and Hammersley, Western Australia.

Some of the location names on my railroad are a mixture, by design, of both prototype and proto-freelance style of modeling. I use various naming conventions. I use a mixture of mashed-up family names such as Barham after my father Barry Hamilton. Barham is a small/medium-sized hamlet on a branch line. It is serviced by two small mixed freight services which depart from the Belair Yard, twice daily. Barham also has a thriving passenger service which services the township several times a day.

As Barham is the first area where I have finished most of the scenery, I started creating a backstory for it. Upon reflection, the story will start with the founder of the town Barry Hamilton who moved into the area sometime in the late 1800s. Upon settling there, he started a mission and a Lutheran church. The story will continue from there; well, you get the gist.

Lower Mitcham Station, in the real

Nickerson Landing from Carolina Craftsman Kit is coming along nicely.

world, is a little single-track station that was located across the road from my grandparent's house. Lower Mitcham on my railroad is a thriving through-way station facility that services dozens of freight and passenger trains per operating session. This is significant for me because my grandfather gave me a passion for the model railroading hobby. To honor my late grandfather, a harbor area, that is yet to be built on my railroad, will be named after him: Harold Victor Harbor.

As of late, I have been branching out into building American craftsman kits such as the kits from Carolina Craftsman Kits, Railroad Kits, and Sea Port Model Works. I am planning a YouTube series on the build of an old wharf and a light industrial area that has an American/European feel to it. The fictitious backstory to this location is that the Surveyor General (i.e. my grandfather), who had an affinity to this type of architecture, commissioned the building of this area to service the expansion of the harbor.

I couldn't write this article without mentioning my wife Nancy. She has an Alpine town named after her, pronounced "Nonsay" like the town in the Northeast part of France. This area on my layout is serviced by several freight services including a coal mine appropriately named Halwyn Coal. The passenger service that originates from Lower Mitcham once daily brings tourists and skiers to ski on the fresh powder that these alpine mountains are renowned for.

Do you get the theme here? I am making real-world connections with the fictitious miniature world I am creating and adding backstories to these locations to give my model railroad another aspect of realism. I think it is important that the backstories are somewhat believable, but at the end of the day, it is your railroad so you can do whatever pleases you. This is the beauty of proto-freelancing and the world's best hobby!

I am in the process of writing a document for the Fallen Log Railway, which will include the stories of the railroad and its influences. Some may say this is a lot of work; yes it is, but it is enjoyable to me, particularly writing it when away on holidays or when I have a spare moment away from the layout. One could say I am writing my own history books for the railroad.

Whether you are a prototype modeler, proto-freelancer, a complete freelancer, or something in between, it really doesn't matter, as long as you enjoy running trains and creating your miniature world. I am a huge proponent of supporting my fellow modelers, no matter their interests. Such diversity in our hobby will make it continue to grow and flourish in these challenging times.

Model on technicians and have a blessed one, Darren.

About the Author

Darren Johns grew up in South Australia (a state in the southern region of Australia), where he became a railfan with his grandfather from a young age of the then SAR & AN-South Australian and the Australian National Railways.

Darren has been a model railroader for 30+ years. He is currently working on his third layout - The Fallen Log Railway, which is a freelanced railroad predominately modeling Eras I - III European locomotives and rolling stock. Darren posts weekly how-to and product review videos on his YouTube channel, Model Railroad Techniques, and can often be found on Facebook @modelrailroadtechniques. His website is www.modelrailroadtechniques.com.

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HARRY'S UP-HUB

Harry M. Haythorn, UPHS #4043

The Triple-Stack 800 Build

All Photographs Courtesy of Harry M. Haythorn

Welcome to the latest installment of the UP Hub, where I will be discussing how I took a triple-stack FEF-2 and converted it to a triple-stack FEF-3. I will also discuss the other options available for modeling UP's fabulous 4-8-4s. Follow along as I walk you through the steps I took to build one of these unique machines.

The Teardown

For this build, I used parts and pieces harvested from an Athearn Genesis locomotive. Athearn did a few of the triple-stack locomotives, but they only made models for two of the four that were around in the 1950s.

I started with an FEF-2 #832 (which is already a triple-stack) and threw some parts at it to convert it into a triple-stack FEF-3 #835.

The End!

Okay, okay, you all know me better than that...

Yes, I'll go into some of the juicy details! You see, #832 is the only FEF-2 that is triple-stacked and for some odd reason, Athearn only modeled the #832 and its Two-Tone Gray sister locomotive #837. Thankfully, Athearn uses a modular system for these, and I thought I would have to swap the chassis to make the change from a drop pilot to a swing pilot. Conveniently, the triple-stack is a press-fit piece that can be swapped with a double-stack one.

Next, I stripped parts from a non-running FEF-3 #844 I found on eBay. These parts included the smoke lifters (also known as elephant ears), the smokebox cover, and the swing pilot. Except for the swing pilot - which is screwed in from the bottom, and the air compressors that have two pins that go into the frame above the front wheels of the pilot truck - all parts are press fit. The smoke lifters are held onto the boiler via a barb on the end of the supports that go into indentations on the boiler jacket and with a little upward pressure they are easily removed.

After the smoke lifters and swing-style pilot have been removed, the smokebox front is next. The #832 has a regular headlight and not the later-style MARS light addition. Again, this is a press-fit item and with a little wiggle and pressure, it pops right off.

The Transformation

Now let's put this beauty together. The first thing to do is to punch the holes for the smoke lifters with a small sharp instrument. I used a small awl to open them up, but this requires a delicate touch. Ideally,

UP #835 is boxed and ready.

the smoke lifters will stay on without needing glue when you press them into the boiler jacket. **Note:** Do not attach them to the boiler at this stage.

Next is the smokebox front/door assembly. This is relatively easy, as it is press-fit. With that being said, a small modification beyond press-fitting the smokebox front/door can ensure that the light will not leak into the smokebox and therefore will provide a brighter headlight and brighter number boards. To accomplish this, I cut a small slit in a piece of heat shrink tubing and wrapped it around the lightbulb assembly. The later models have a light tube that keeps the light directed forward.

Now that the simple stuff has been done, we can do the major work on this thing. The pilot swap from the drop-style used on the FEF-2s to the General Steel Castings' swing coupler pilot used on the FEF-3s is the most "involved" part of the conversion. This is because the pilot is held onto the frame by screws that hold the coupler box, as well as the two pins that go through the pilot from each side and are attached to the backs of the air pumps. These are press-fit but can be very stubborn to remove. After you get the pumps off, remove the screws and tilt the pilot up slightly before pulling it off. I repeated the process of removing the swing coupler pilot from the donor model and put it on #835.

The next thing to do is to put the smoke lifters on. This is the most delicate part of the build, as the pins on the lifters have to go into the holes and you have to be careful not to stretch out the holes. The best

And the transformation begins.

Left: Slowly and carefully tearing it down.

Right: The smokebox removal is next.

way to go about this is to put in the bottoms first and then put the top support stanchions into the boiler jacket. This maintains uniform pressure all across the lifters. Next up is the number change.

Lettering and Final Details

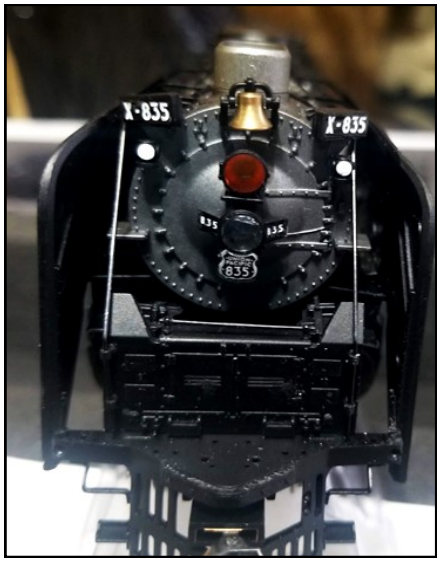
Now that the detail work is finished, I can add the lettering. The decals that I used on this loco are the Post-1939 "Modern" Era set from Microscale Decals (part number 87-15630.) This gets you the correct cab data, number board letters, the headlight number boards, a new shield with correct digits and font, as well as the tender lettering and numbers. Of course, no steam locomotive can run on its own, so I opened the cab up and added crew members. Next, I programmed the decoder and added a light dusting of weathering to the body before pressing this triple-stack into service.

Other 800 Models on the Market

For those of you out there that want to model UP 4-8-4s, here is a list of some of the most common models on the market besides the Athearn Genesis models that we discussed:

- Rivarossi produced what is probably the second most popular model of this locomotive, besides the Genesis variant. They

The light output looks a lot better using my heat shrink tubing method.



All new lettering and shields have been added.

were produced from the 1960s until 2003/2004. They also produced the Challengers and the Big Boys.

- If your budget is a little bigger, there are several models available in brass from a variety of manufacturers:
  - ✓ Overland Models is the most popular brass dealer with 29 different models of the 800-series locomotives.
  - ✓ Key Model Imports produces 14 variants.
  - ✓ Westside produces models of both the FEF-2 and the FEF-3 styles.
  - ✓ Pacific Fast Mail/United offers 15 different models.
  - ✓ Additionally, Max Grey produced two and Fujiyama produced five models of the 800 -series locomotives. These are lesser-known.

I hope you all enjoyed this look at building the triple-stack 800 and until the next time may your cab signals be green.

About the Author

Harry is a rancher in Nebraska who works with his father and grandfather to help run their 22,000-acre, 1,500-head of mother-cow, ranch.

Harry has been model railroading for over 20 years and models the Union Pacific Steam era from the 1930s to the 1960s, in central and western Nebraska.

Harry is a Sustaining Member of the Union Pacific Historical Society and a member of the UPHS Streamliner 100 club. He is a National Model Railroad Association member currently working on his Master Model Railroader Certificate.

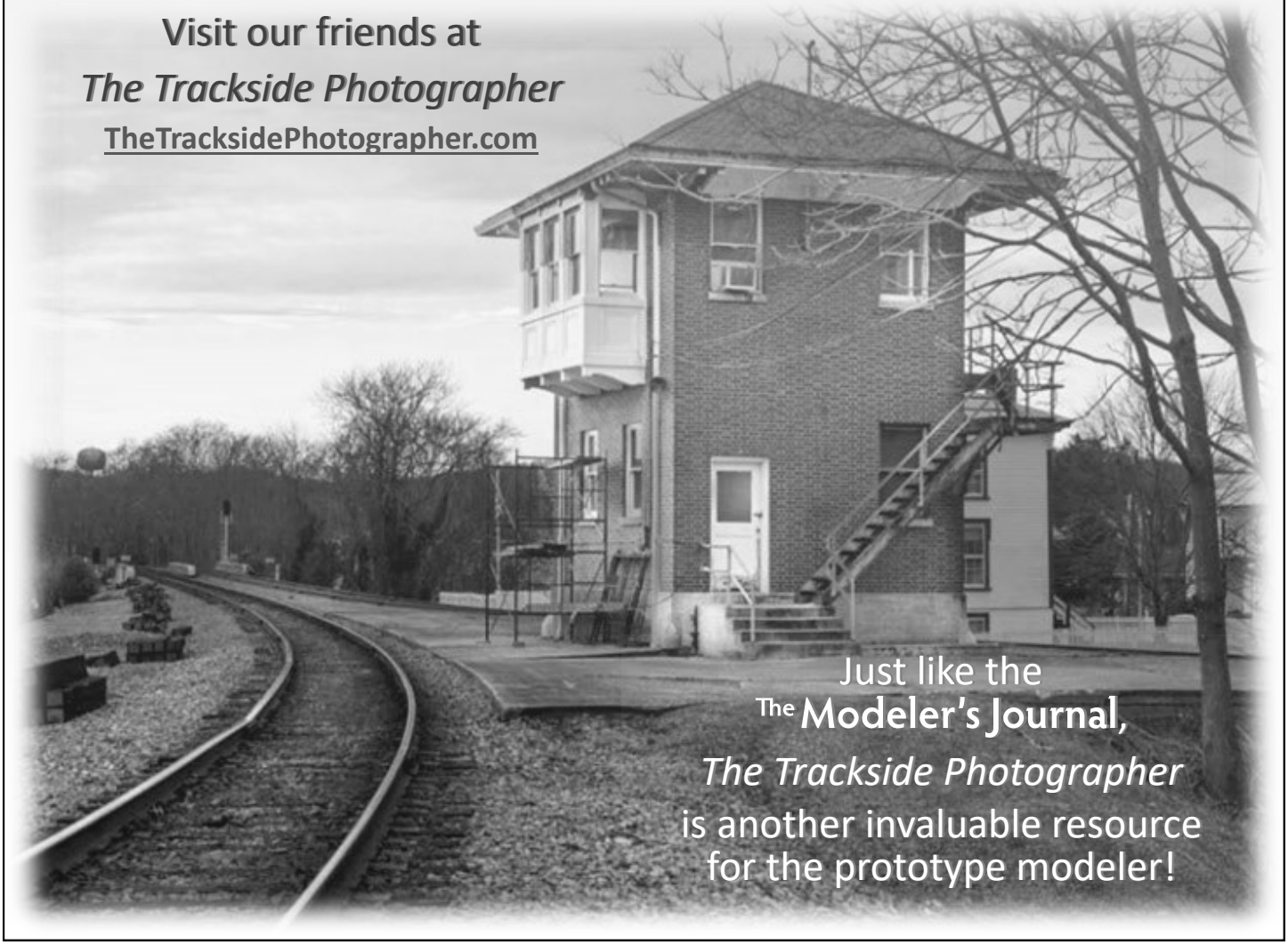
Harry regularly posts videos on his YouTube page. You can follow Harry as he works on his 7th layout at https://www.youtube.com/channel/UC6-MPHmYU3Cc2uEVfjZDIcQ.

My Overland Models' #800 takes on coal under the coal dock at North Platte on my home layout.

The Trackside Photographer

If you are looking for a wealth of interesting railroad lore along the tracks: depots, freight houses, signals, interlocking towers, bridges, trestles, shops, turntables and other trackside structures and equipment, then look no further than *The Trackside Photographer*.

Visit *The Trackside Photographer* and explore the visual and cultural landscape that the railroad moves through, with photographs of trackside structures and scenery and writing about the history of sites that are rapidly changing, or have already disappeared.



The Anatomy of a Model Railroad

Part 1

By William (Bill) J. Beranek - The Track Planner

Welcome to a new series. The title reveals the story. Over the next several issues of *The Modeler's Journal*, we are going to delve into the process of building a layout, from its birth to a fully operational railroad. When the last installment of this series is complete, the layout should be very close to completion. In each installment, we will explore the decisions and compromises made throughout the process and the importance of collaboration between the designer and the client.

This multi-article journey will not be a step-by-step "how-to" series, but rather a pictorial essay with commentary meant to reinforce the accompanying pictures (except for this first installment where I need to set up the premise of the series.) You will be able to read along to see a layout evolve from bare-bones to a finished masterpiece.

This opening installment covers the initial design process including the determination of the benchwork configuration, geographical locations, basic track alignment, and setting minimum standards, etc. Subsequent installments will cover building the benchwork, laying track, wiring the layout, installing the DCC system, adding scenery, adding industries and structures, adding details, and so on.

My client (and owner of the layout), **Jim Kalenowski**, was kind enough to give *The Modeler's Journal* permission to use his name throughout the series. My feeling is that this will bring a more personal touch to the series as we follow along with his progress. More importantly, without Jim's input and suggestions, the track plan I designed for him would not achieve its ultimate goal.

The main thing that will make this series different and unique is that the layout was designed and is being built as an N scale point-to-point transportation system. You do not see

Jim and I want to demonstrate to the community that a fully functioning prototypical transportation system in N scale can be designed and built - a model railroad that can be enjoyed for many years into the future.

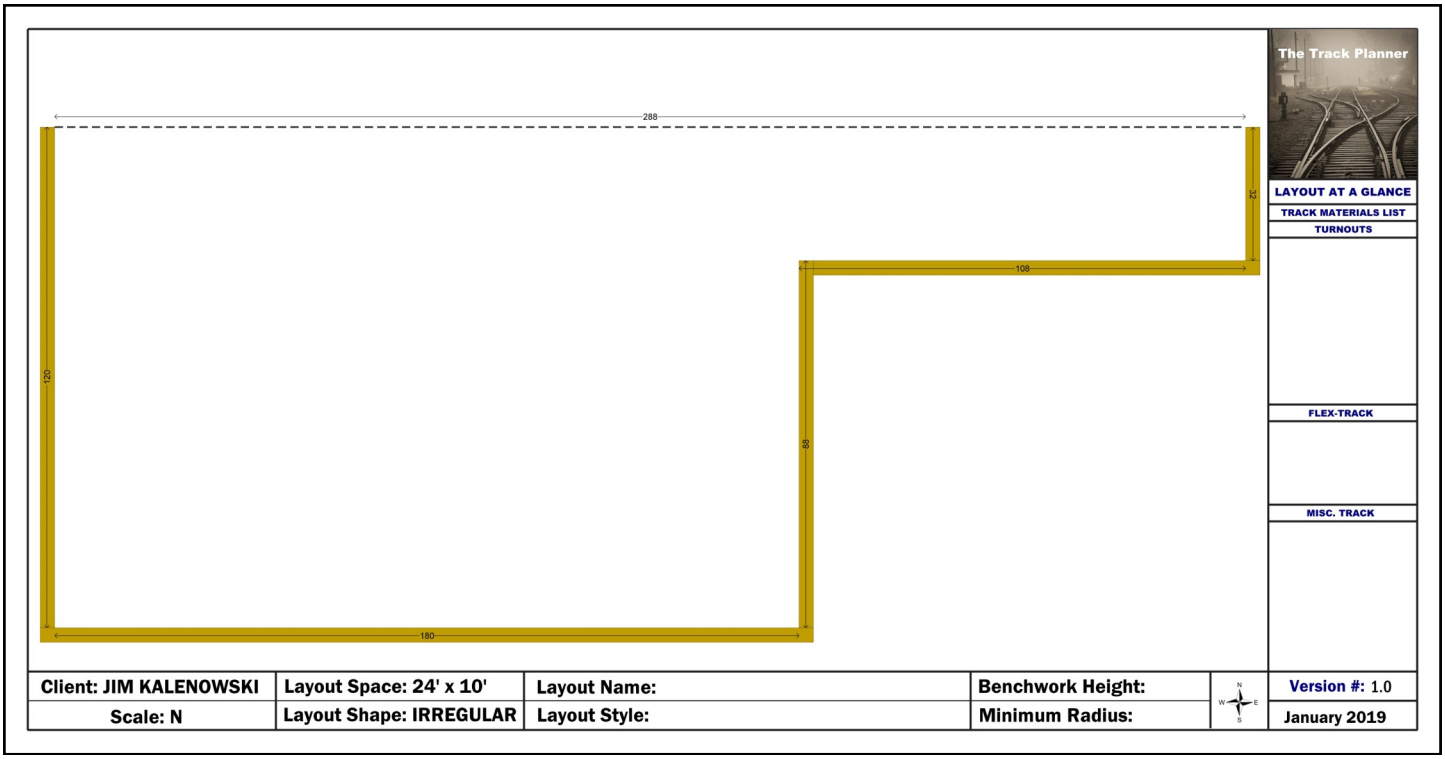


Figure 1. The main layout area is well-defined and measures 15 feet by 10 feet, which is sufficient space for a decent-sized N scale layout

many point-to-point layouts featured in magazines, and fewer yet are depicted in N scale. When the series is complete, Jim and I hope that we will have shown *The Modeler's Journal* readers what can be accomplished in N scale using today's reliable equipment and applying time-tested prototypical design elements.

Initial Client Contact

In January of 2019, Jim took the first step in his layout's progression by filling out the questionnaire on my website (www.thetrackplanner.com). The questionnaire gave me a general idea of what Jim's expectations were and kick-started the design process. Many times, clients set unrealistic goals and the questionnaire can pinpoint the areas where the client has both realistic and unrealistic goals - critical in any design process.

Jim's initial "givens", i.e. the things he wanted to include on the layout, were modest. The most important aspects for Jim were to create a model railroad that operated in a prototypical manner, has a long mainline run, and has space for some small-to-medium-sized trackside industries.

The train room is a decent size, but Jim did not want to build a large N scale empire. Having been a member of a large club layout, Jim knew of the sheer amount of time and maintenance that goes into keeping a large layout running smoothly. For that reason, we only used approximately 60% of the available room space for a more compact layout with a lot of value per square inch.

Because of Jim's interest in prototypical operations, he was initially willing to settle for a basic shelf-style switching layout. After reviewing his questionnaire and Jim's various constraints and desires, it was determined that we could design a mid-sized point-to-point railroad that would incorporate nearly all of his "givens" without being a hassle to maintain.

Jim wanted to loosely model the Lehigh Valley and Central New Jersey railroads in the 50s and 60s. This era was a good choice and was the first step in saving on space and maintenance. Modeling the 50s and 60s means most motive power would be short four-axle diesel engines, and the rolling stock would be dominated by 40-foot freight cars. Remember that this was before the days of the 80-foot freight cars, 200-car trains, and large six-axle power. Because Jim had adequate space and

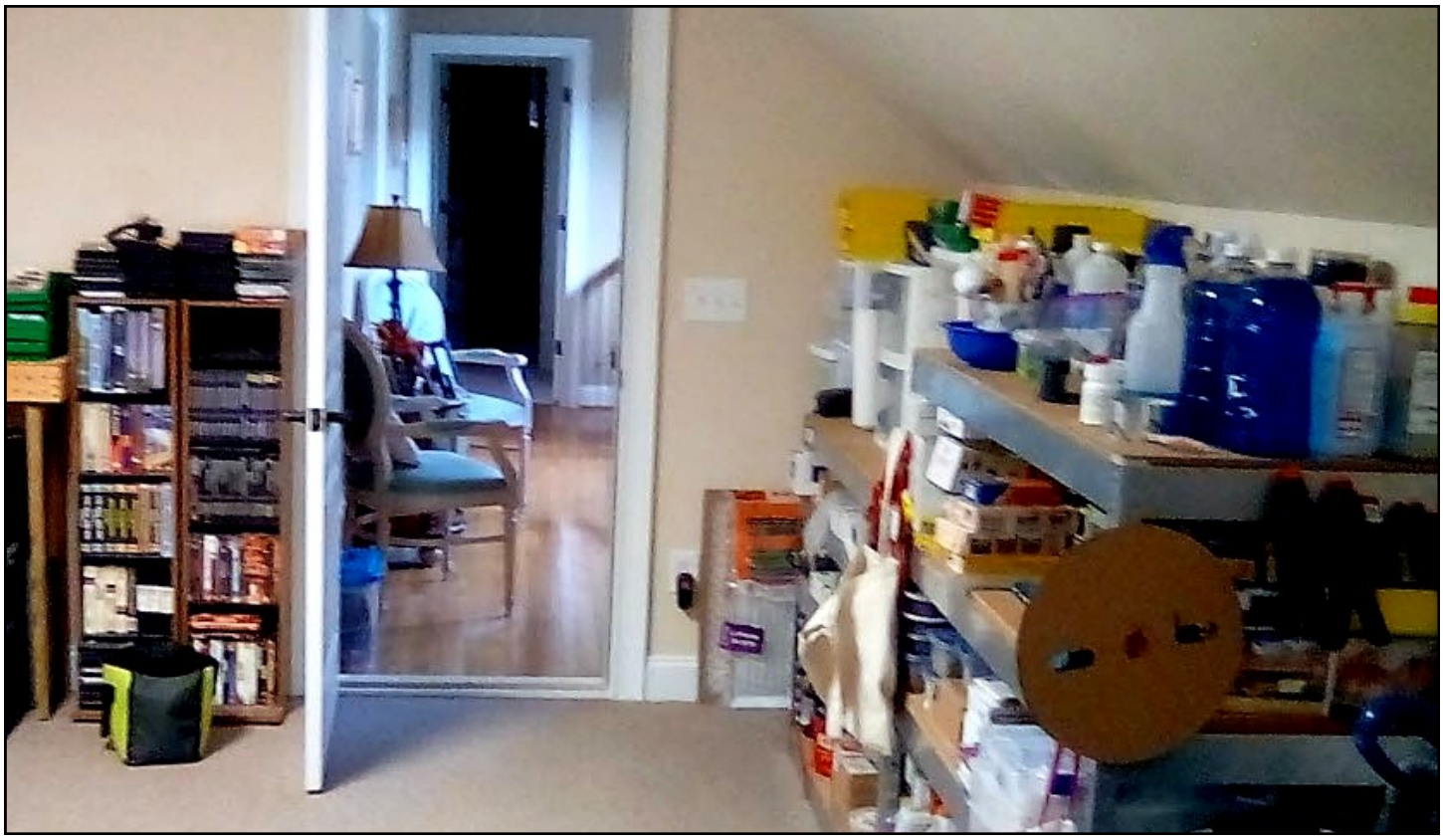


Figure 2. The staging area before Jim removed the storage shelves.

no intention of running 50-car trains, setting minimum standards for radii and grades, especially for a layout being built in N scale, was not an issue.

The Layout Space

The layout space was well-defined (see Figure 1). The main layout area measures 15 feet by 10 feet, which is sufficient space for a decent-sized N scale layout. Because we were designing a point-to-point track plan, a nine-foot by 32-inch section near the entrance to the room made for a natural stub-end staging yard (see Figure 2). **Note:** Figure 2 shows the staging area before Jim removed the storage shelves. This area will contain one of the two stub-end yards on the layout. The nine-foot length is exactly right for the consist sizes Jim envisioned for his layout.

Benchwork Configuration

Based on the room's configuration, Jim and I decided that a center peninsula surrounded by wall-mounted benchwork (see Figure 3) would work best. Jim did not want a swing gate or drop-down section to enter the layout. This was one of the most important factors in determining the final benchwork configuration.

The final configuration accomplished three things: first, it gave Jim the longest possible mainline run between staging yards without the mainline doubling back over itself; second, the view-block through the center of the peninsula created the feeling of a much larger layout since one would not be able to see the entire layout with just one scan of the room; third, with the long mainline run, Jim could create small vignette scenes along the mainline for operators to travel through and admire.

The layout could be operated by a single person or by up to four operators; thus, it is important to maintain adequate aisle widths around the hips of the peninsula. Aisle widths along the south side of the peninsula would be slightly larger since this will be the location of the main sorting yard and would be a highly-trafficked area for trains and operators.

As the benchwork configuration shows (see Figure 3), each end of the layout has visible stub-end staging. This gives Jim the additional

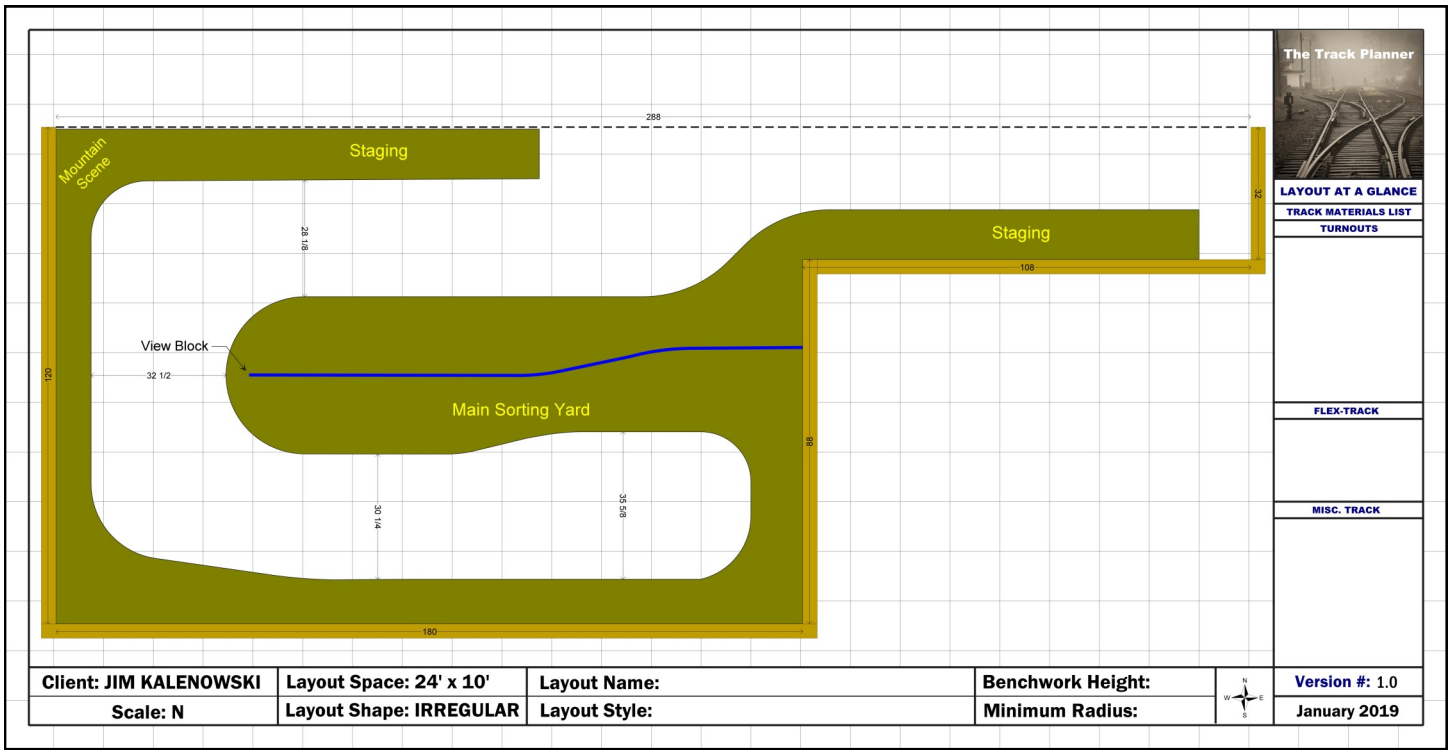
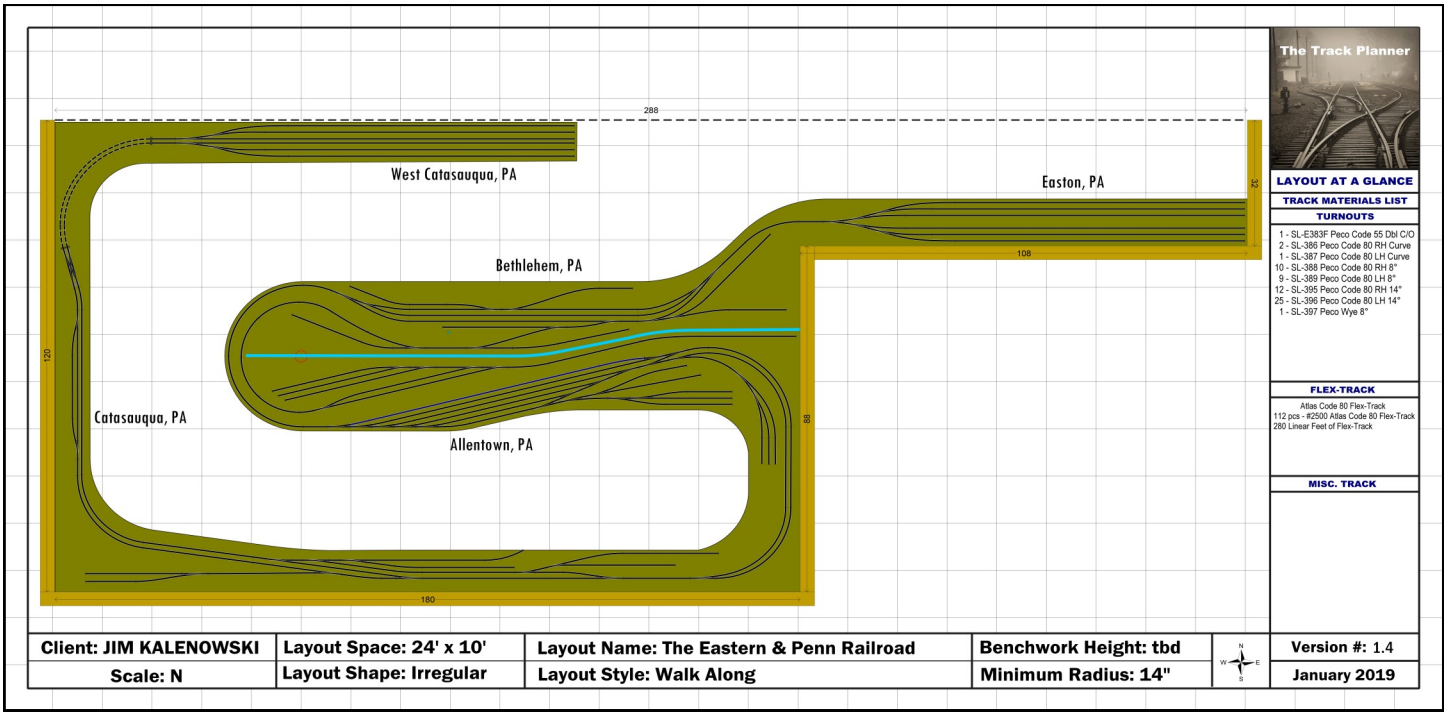


Figure 3. The benchwork design incorporates a center peninsula surrounded by wall-mounted benchwork, central "fiddle yards", and visible stub-end staging on each end of the layout.

benefit of having "fiddle yards" where he could remove rolling stock and replace it with other pieces. This option helps keep the layout looking fresh, as you do not see the same equipment with each operation.

In N scale, visible staging has a major advantage. It makes it easy to reach between the tracks to re-rail cars or to remove or add the cars to the layout. Since N scale and fat fingers

Figure 4. The track configuration is not as complex as it looks. There are no tricky switching puzzles to deal with. The design incorporates a simple single-track mainline, adequate passing sidings, and numerous run-around tracks.



don't mix at the best of times, reaching in blindly and feeling for that derailed car can seem impossible - hence, Jim's insistence for visible staging yards.

We designed a third yard - the major sorting yard - halfway in-between the two staging terminals. The yard was intentionally placed at the midpoint of the mainline run. This is an important operational design element and will be discussed in detail in a future installment of the series.

The Track Configuration

When designing track plans based on a prototype road, it is useful to include the real-world town and station names in your model, especially if your layout is focused on operations. This adds to "the believability factor", which is something I talk about in the article "Prototype vs. Freelance" found on page 28 within this issue of *The Modeler's Journal*.

To make Jim's track plan feel believable, we added five town locations representing east-central Pennsylvania (see Figure 4). The track plan is an east/west design. Easton, PA is represented by the visible staging on the eastern end of the layout. Traveling westbound on the mainline, operators will pass through Bethlehem, PA before rounding the peninsula through Allentown, PA. Next, they will travel through Catasauqua, PA, and finally into West Catasauqua, PA which is represented by the second visible staging yard at the western end of the layout. Placing towns in geographical order further enhances "the believability factor." When operators and visitors who are familiar with the area view the layout and see actual town names, it reinforces the believability.

At first, the track configuration (see Figure 4), may look complex but in reality, it is a simple single-track mainline, with adequate passing sidings and numerous run-around tracks. There are no tricky switching puzzles to deal with. The config-

Figure 5. Jim's impressive benchwork. The stub-end staging yard located at the northwest corner of the layout (at West Catasauqua, PA) can be seen on right side of photograph.

Figure 6. Another view of Jim's impressive benchwork. The peninsula portion of the workbench is clearly visible.

Figure 7. The benchwork for the stub-end staging yard on the southeastern corner of the layout (at Easton, PA) can be seen under construction.

uration of Jim's track plan was based on prototypical practices.

The Next Installment

In the next installment, we will concentrate on the benchwork and the track laying. We will cover the construction of the benchwork, the materials used, and the reason Jim decided to use a modified version of the tried and true L-girder system. Jim has built some of the most impressive benchwork that I have ever seen and as a teaser, I will give you a sneak peek at Jim's high-quality benchwork. (See Figures 5 – 7.)

We will also cover the most important part of building a well-oiled model railroad: the track laying. And Jim did an equally good job with it. We will discuss which track manufacturer Jim used and his system for laying track.

So, don't miss the next installment of "The Anatomy of a Model Railroad."

About the Author

Bill Beranek - The Track Planner has over forty years in the model railroading hobby. Bill enjoys golfing, traveling, and of course designing "prototypical operations" focused track plans. He has been a member of a local 135+ member model railroad club since 2003 and has served twice as the club's president, twice as a board member, and is currently serving as the club's treasurer.

Bill is currently working on his latest triple-deck HO scale layout depicting the SP&S (Spokane, Portland & Seattle Railway) in southern Washington and the OTL (Oregon Trunk Line) on the upper level in northern Oregon in the mid-50s.

You can find out more about Bill—The Track Planner at www.thetrackplanner.com.

Morocco's AL BORAQ

The *Fastest* Train on the Continent

By Jack Hykaway

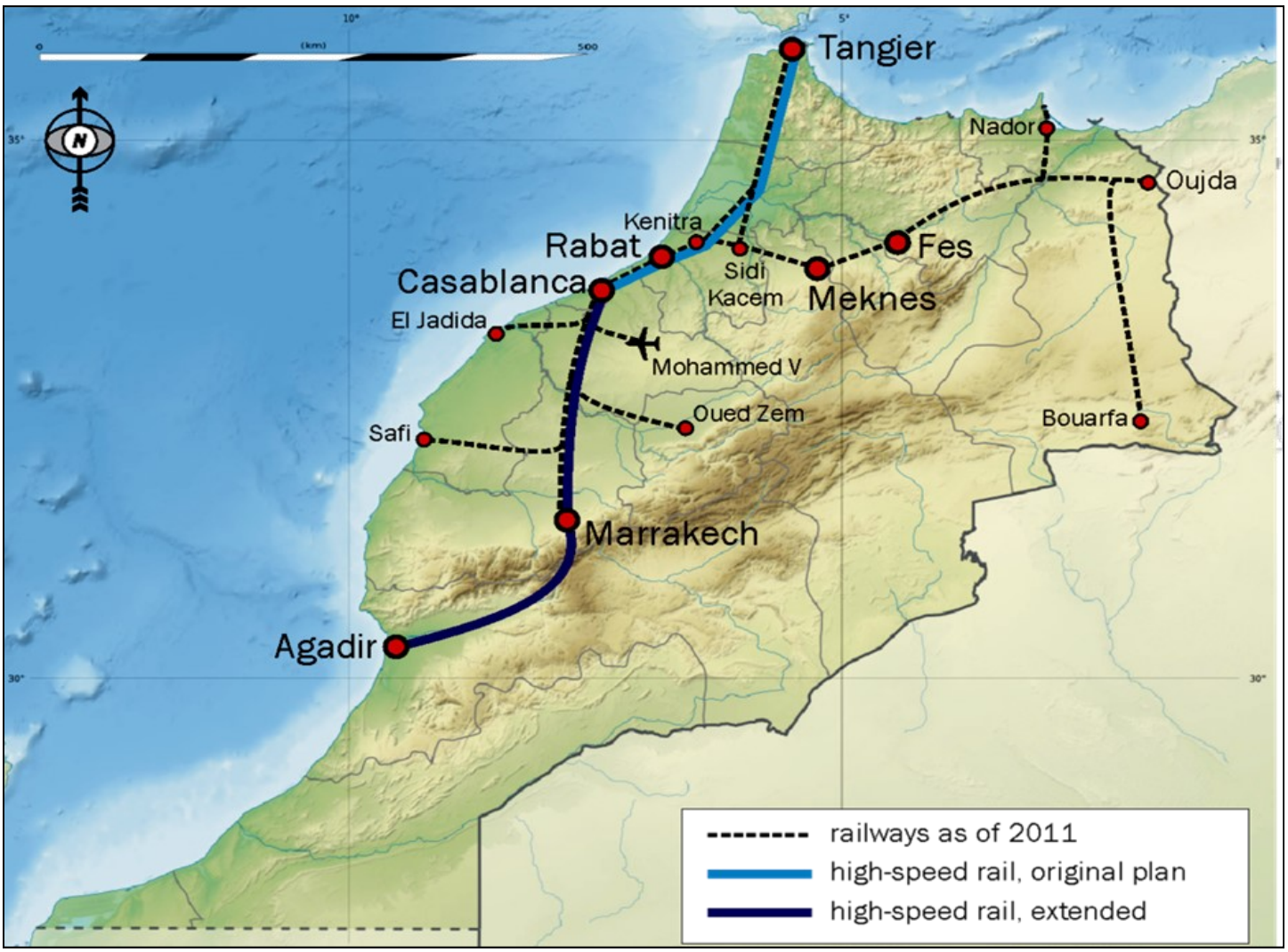
An Al Boraq trainset awaits its departure from Tangier Station.
Photo by NicholasNCE [CC BY-SA (https://creativecommons.org/licenses/by-sa/4.0).]

The route hugs the country's west coast, slicing through a belt of highly-populated centers. The bustling city of Casablanca is the current southern terminus – there are plans to extend the high-speed service farther south to Marrakech and eventually to Agadir in the future. From Casablanca, trains travel via Rabat on a conventional mainline through the country's most densely populated region. The scenery becomes more rural near Kenitra, which is 137 kilometers north of Casablanca. There, the trains diverge onto a dedicated high-speed line for the remainder of the route up to the service's northern terminus at Tangier.

The high-speed portion of the line is built to ensure safe operation at unimaginable speeds, under a 25kV 50Hz AC catenary. Trainsets operate at 320 kilometers per hour (200 MPH) along this 186-kilometer (115-mile) section, covering the distance in well under an hour. At Kenitra, the trains operate under 3kV DC electrification on conventional mainline, where they can achieve speeds of 160 kilometers per hour (100 MPH). While not as impressive as the jet-like speeds achieved on the dedicated mainline, the upgraded conventional line has helped slash travel times between Tangier and Casablanca from nearly five hours to just over two hours.

High-speed lines are constructed specifically to ensure that maximum speeds can be achieved and maintained throughout the route. As with any infrastructure used by the public, there are strict standards in place for the construction of high-speed rail lines to keep the public safe and the trains running as efficiently as possible while conforming

Current (Light Blue) Al Boraq system map, and plans for future high-speed rail connections planned for Morocco. Map by Classical geographer [CC BY-SA (https://creativecommons.org/licenses/by-sa/3.0).]



The modern station atrium at Rabat.
Photo by SpreeTom [CC BY-SA (https://creativecommons.org/licenses/by-sa/4.0).]

to any geographic obstacles as closely as possible.

Geography presents two of three major speed limiters to any railway line – hills, valleys, and undulations introduce fluctuating gradients and curvature. To control these factors and maintain the highest possible operating speeds, curve radii are limited to a minimum of 5.5 kilometers across (3.4 miles), though 7 kilometers (4.3 miles) is preferred to limit premature rail wear and wheel breakdown. Additionally, it is recommended that gradients should not exceed ±4%. This may seem like a surprisingly large figure to you, especially if you're reading from North America where railroads are built to move huge amounts of very heavy material and grades over 3% are practically impassable. The large western railroads sacrifice speed by moving more tonnage behind an assortment of powerful locomotives, often operating with a power-to-weight ratio of something near 1:1 in most areas. That's to say that the locomotives are generating one horsepower for every ton of freight being moved.

To make a long story short, a train's power is governed by how much torque it can send through its wheels. Subsequently, the train's speed is limited by its power-to-weight ratio and drag forces caused by running friction and air resistance.

Each streamlined Al Boraq trainset is made up of two power cars and eight double-deck coaches, tipping the scales at just about 400 tons. Under a 25kV catenary, the train can lay 12,440 horsepower onto the rail which ensures a staggering power-to-weight ratio of just over 31:1. Not only does this allow the train to accelerate incredibly quickly while climbing a steep gradient, but it also enables the trainset to battle the huge amount of air resistance that is introduced at 320 kilometers per hour.

To keep curvature and gradient fluctuations to a minimum, high-speed networks require a vast number of large viaducts and tunnels. This, in turn, makes these projects incredibly expensive. Funding for this ambitious project was finalized in February of 2010, when Moroccan railway operator ONCF (in French: *Office National des Chemins de Fer*) secured investment from a wide range of private and public sources. The Mo-

An Al Boraq trainset sits in Tangier, prepared for the next departure south.
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roccan government contributed DH4.8 billion, while several European sources delivered a further DH1.9 billion. The remainder of the budget (DH12.3 billion) came in the form of commercial loans, rounding out the total project budget to approximately DH19 billion (nearly $2 billion US). To keep costs from skyrocketing further, the use and capacity of the infrastructure must be optimized. Al Boraq's infrastructure budget totaled DH10 billion (just over $1 billion US) in 2018, which included costs of constructing the high-speed segment between Kenitra and Tangier, four brand-new stations, and upgrades to the existing rail corridor between Kenitra and Casablanca.

The new stations along the route are architecturally stunning, each having a unique and recognizable design. Stations feature wide, well-lit platform areas, large waiting rooms and lounges, and retail spaces inside station lobbies. They were built to very spacious standards, allowing plenty of room for future expansion, and eventually the increased ridership – the section from Tangier to Kenitra is only the first portion of Morocco's ambitious plan to invest in several high-speed routes to feed its economy and keep tourism strong.

Once the trains are out of the station and past the terminal tracks, in-cab signaling systems optimize the capacity of the high-speed line. Instead of using lineside color-light signals – which is not feasible when traveling at 320 kilometers per hour – track status is communicated to operators on in-cab displays. The Al Boraq trainsets use a well-developed and well-tested French system, which further optimizes the line's capacity and allows the trains to follow as closely as possible without compromising safety.

The capacity of any given railway depends on a variety of factors including train length, stopping distance, and operating speed. An increase in any one of these parameters will decrease the overall capacity of the line. The Al Boraq operates in areas where there are always at least two available tracks – one for traveling in each direction, a convention in the industry. Trains operate at a very high rate of speed which increases the safe-stopping distance of each trainset, and therefore reduces the capacity of the line.

The inside of an Al-Boraq first-class coach.
Photo by David Scheibler [CC BY-SA (https://creativecommons.org/licenses/by-sa/4.0).]

The maximum capacity of the line is obtained when all trains operate at the same speed, with similar stopping patterns. When this is not feasible, dispatchers must slow trains and compromise their speed and on-time performance. Comparable high-speed lines in France (Paris to Lyon) and in Japan (Tokyo to Osaka) – the most congested routes in the world – can operate trains down to four minutes apart, or 15 trains in each direction every hour. Even at that maximum capacity, a four-minute separation between trains traveling at 320 kilometers per hour (200 MPH) equates to a separation of approximately 21 kilometers (13 miles) between trains.

As of the line's opening in December of 2018, 12 Al Boraq trains were scheduled to make 28 round trips each day. Each Alstom Euroduplex trainset can carry up to 533 passengers and includes first and second-class accommodations. There is a buffet car in the middle of the train where light meals and snacks are available. Approximately two years earlier, in February 2017, testing of the trains at revenue speeds began. During the high-speed test program, an African rail speed record of 357 kilometers per hour (222 MPH) was set.

The trainsets are of a familiar design, evolving from the infamous lines and sheer speed of the TGV Duplex trainsets built by Alstom for use on French high-speed lines. The 12 Al Boraq trainsets are the third iteration of the double-decker bullet trains, and they are maintained at a special 14-hectare shop located in Tangier. The maintenance depot is operated by the *Société Marocaine de Maintenance des Rames a Grande Vitesse*, which is jointly owned by the ONCF (60%) and French national operator SNCF (40%). The ONCF relies heavily on French high-speed expertise, and their maintenance program was derived from that used in France. SNCF staff is working closely with ONCF operators, ensuring that engineering standards are upheld and maintenance is done accurately and correctly. As a part of the joint contract between the two nations, the *Institute de Formation Ferroviaire* – an engineering and operations training center – was established in Rabat to properly train the maintenance, engineering, and on-board staff. The training programs are heavily influenced by those in effect in France, building upon 30 years of French expertise in high-speed rail.

Al Boraq is proving to have been a wise investment; ridership has been consistently high since its inaugural run. Just within the first nine months of operation, the high-speed service had already moved 2.5 million passengers – an impressive number, reinforcing the need for an effective transportation link in this densely-populated corridor. The service also boasted an on-time performance of 97% during the same timeframe – impressive for a newly-introduced service where hitches and hiccups could be common. Fares are also attractive to riders, ranging from $16 US for a second-class off-peak ticket to $40 US for a peak-time first-class ticket from Tangier to Casablanca. Each fare guarantees riders a seat onboard, a perk that is not in place on all Moroccan trains.

Three years later, the service has proven its worth. It will be intriguing to watch Morocco emerge and develop as its high-speed rail network pushes new boundaries and challenges those of France, Japan, and China for the top spot.

Passengers disembark at Tangier.
Photo by Rachidourkia [CC BY-SA (https://creativecommons.org/licenses/by-sa/4.0).]

Read On:

- ONCF: https://www.oncf.ma/fr/Al-boraq
- Al Boraq Promotional Video (FRENCH): https://www.youtube.com/watch?v=0zpPGRqPL9w
- UIC: High Speed Rail – Fast Track to Sustainability: https://uic.org/IMG/pdf/uic_high_speed_2018_ph08_web.pdf
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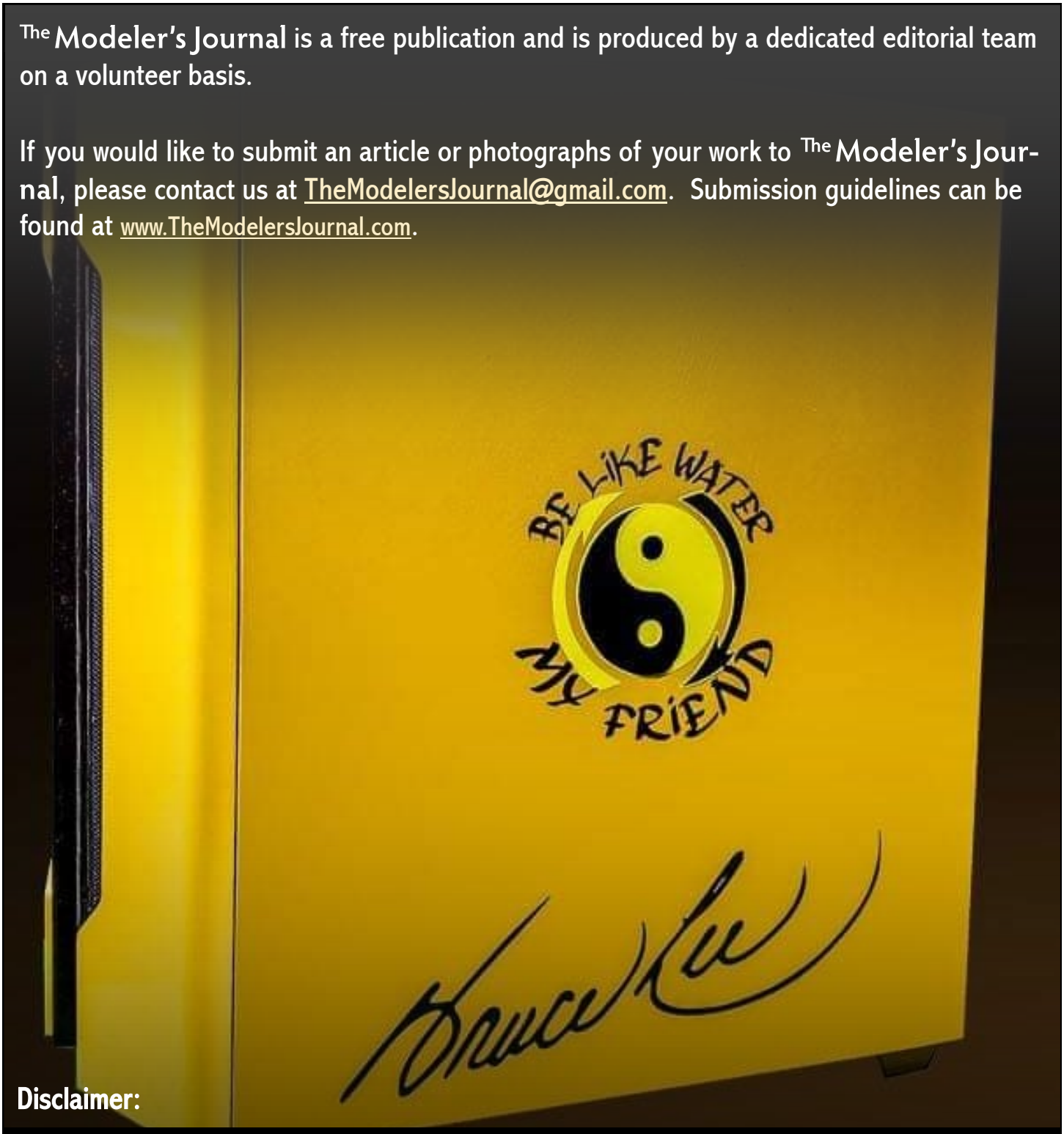

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