

# LocoGear

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### Frequently Asked Questions

#### What is included in the LocoGear "Kit"?

The **LocoGear** "kit" includes 77 castings necessary to build a 1-1/2" scale **Western Maryland Ry. #6** in either 7-1/2" or 7-1/4" gauge. The castings could also be used to build other prototype Shay models or a freelance.

#### Can the castings be purchased individually or just as a set?

All of the castings can be purchased individually.

#### Does LocoGear offer drawings?

**LocoGear** offers about fifty scale drawings. See **LocoGear Technical Bulletin-07** for a list of currently available scale drawings. These **LocoGear** drawings have scale dimensions. Several of the **LocoGear** scale drawings are based on prototype drawings which have been modified with scale dimensions. These may have also had some minor engineering changes made to make the model part easier to make or stronger at it's scale size. Most of the castings available from **LocoGear** have scale drawings available. Also many of the **LocoGear** scale drawings are of parts that have no prototype drawings available from either CSRM or ACHS.

#### Will I need prototype drawings?

You will need some prototype drawings and fortunately there are two sources of the proto-

type drawings available. The California State Railroad Museum and the Allen County Historical Society both have extensive Lima drawing collections and most of the **WM #6's** are between the two locations. See **LocoGear Technical Bulletin-05** for a complete list of all known prototype drawings held by both ACHS and CSRM. You can order copies of these prototype drawings directly from them. If you are not a "rivet counter", you can build this locomotive with a basic set by just scaling the prototype dimensions right off the drawings. If you want to get into rivet counting, it can also be done, but you will need most of the drawings available. I would suggest the following prototype drawings as a basic set of prototype drawings:

- 130-B-5002 Boiler**
- 214-A-5037 Front End Timber**
- 214-A-5038 Rear End Timber**
- 227-A-5003 Cab**
- 420-A-5014 Erecting Elevation**
- 430-A-5000 Erecting Sections**
- 480-A-5000 Frame Layout**
- 517-A-5002 Grate Arrangement**
- 817-A-5000 Smoke Box Arrangement**
- 837-A-5000 Fuel Bunker**
- 858-A-5000 Tender Frame**
- 884-A-5007 Tender Tank**
- 939-C-5002 Truck Plan**

### **Is technical support available?**

**LocoGear** offers two avenues of technical support.

1. We have an e-mail list for **WM#6** builders where we discuss our building projects. We ask questions and provide answers for each other. If you would like to be added to the list, please send an e-mail to [jjohnson@LocoGear.com](mailto:jjohnson@LocoGear.com). There are several people on the list whom have not yet started their locomotive.
2. **LocoGear** is publishing **LocoGear Technical Bulletins**. These 4 to 12 page booklets give step by step instructions for the machining of various parts. Each includes pictures of the part being made and also of the prototype part as well as plans of the part and any jigs or fixtures necessary to make the part. The **LocoGear Technical Bulletins** are provided free of charge to anyone requesting them.

### **Is this a good project as a first time locomotive for a beginner?**

As far as a first project, I would recommend it because the Shay is simple locomotive to build. Lima took great pains to design a simple locomotive that could be operated and maintained by crews who did not have sophisticated facilities, such as lumber and mining operations. One of the major features of this concept was the use of repetitive parts. The 77 castings in the **LocoGear** "kit" are made from only 22 patterns. Of these, there are only four unique parts. All of the other parts have 2, 3, 6, and 12 multiples needed. Just as Lima figured out about 100 years ago, there are great efficiencies at work here by repeating parts throughout the locomotive. For the model builder, they remain in effect. For example, all twelve wheels are exactly the same. So the machining of the wheels can be done in an assembly line manner. Lathe tooling can be setup to do a series of cuts and each wheel can be rotated through the process maintaining repeatability and consistency between each wheel. What I have said to other beginners is, start with the simple parts first. Gain experience with them and then move onto the more complex ones. You could get started today with just a hacksaw, file and drill press. That is all I had when I started. As time goes on, you add other equipment and skills as you need them.

### **Is this project too big for a beginner?**

I would encourage you to not be afraid of the size of this locomotive and to go ahead and get started on **WM #6**. If you compare the plans of a smaller Shay, such as the Pacific Coast Shay with those of the **WM #6**, you will see that nearly all of the parts correspond, they are just bigger on the **WM #6**. I would say that the bigger parts are easier to make by full size model builders than the smaller parts needed for a smaller Shay. The **WM#6** is one of the largest Shays ever built. It is much larger than the one you can build with Ken Schroeder's castings or by following the books by Kozo. Not that there is anything wrong with their models, just that they are of a Shays about half the weight. **WM#6** is eight feet long and will weigh about 700-800 pounds. I have spoken with several fellows who want to build a large Shay because they want to ride it, and were themselves large. In fact three or four of my customers are building the **WM #6** with a two-truck tender making it a four-truck Shay because they want to have even more room to sit! They will probably get the whole family on that tender!

### **Can the *LocoGear* castings be used for other Shay models?**

One of the things that Lima figured out about 100 years ago was that the parts used to build one Shay could be used to build a different Shay. For example, the trucks on the **WM#6** are identical to those used on the **GC&E #12** built in 1921, that was 24 years before the **WM #6** was built. Lima did this all the time.

### **What kind of iron is used in the castings and where are they made?**

The iron used in my castings is ductile iron with a Meehanite alloy in them. This is the same formula that is used in casting beds of lathes and milling machines. This is not just "Gray Iron" which is the bottom of the ladder in iron castings. **LocoGear** castings are a couple of steps up from there.

### **What should I do for a boiler?**

I plan to build my boiler out of copper and silver solder it together myself. One of the builders in England, is a coppersmith and is currently building two boilers for his and another man in Pennsylvania. There are many books available on the topic and I would recommend you look at copper before getting

too far down the road with a steel boiler.

### **What equipment should I have to build this locomotive?**

As far as equipment, I would recommend against the combo 3-in-one machines like the Smithy/Shoptask/Grizzley/etc. I think that you will find that they do many different things, but none of them well. I guess my biggest problem is the speed range is too fast. For example, if you want to cut threads, the slowest they will turn is around 150-200 rpm. This is way too fast. You want to get below about 50 rpm to do good work and be able to see what you are doing! What I have is a circa 1975 Altas/Craftsman 12"x36" lathe with the quick-change gearbox. I also have the milling attachment that I use all of the time. You will need a lathe with a swing of at least 10" or 12". I purchased mine from a live steam club member for \$800. I know I got a good deal on it, but I have seen similar ones on eBay for about \$1500. This is getting into the price range of the Smithy/Shoptask machines, but my Craftsman is much more rugged and can turn as slow as 28 rpm. I do have a friend who has a machine shop so I can do some of the heavy-duty stuff done there when he is slow. You can also probably sign up for a machine shop class at the local community college or high school and make a deal with the instructor to just work on you locomotive during class. I hope to get myself a used milling machine at some point like an old Bridgeport. Although I have seen the new Jet 8x36 milling machine for just over \$3000 new. That would do just fine on this project. Also a mill/drill would be sufficient to mill parts for this locomotive.

### **I may want to use the castings for an other project, what size are some of the key castings?**

The Cylinders on the **WM #6** were 17" dia. bore with an 18" stroke and a 9" dia. valve. Thus my casting scales to a 2.125" bore with a 2.250" stroke. The **LocoGear** casting comes with a 1.750" cylinder core hole and a 7/8" valve core hole. Thus you could machine the cylinder bore any where from 1.750" to 2.125" diameter. I have a customer who is planning to make the cylinder bore smaller with a sleeve as he feels the 2.125" will develop too much power. The cylinder casting will machine to make a total length of 3.500" so if you subtract your 1.125" piston, you could get a

2.375" stroke which is very close to what I had planned all along.

The length of the Bottom Bracket casting is 13.5" It is designed for the 2.250" stroke for the crank.

The wheel castings are just over 6.5" diameter in rough form. The **WM #6** used 48" wheels which will scale to 6" plus a 3/16" flange making a total diameter from flange tip to tip of 6.375". If you add steel tires to the wheel casting as a hub, you can get the tread diameter to between 7.5" and 8".

### **What can you tell me about the gears?**

The gear sets on **WM #6** were 20 teeth on the pinion and 49 on the bevel ring gear. Yes 49! One might ask why? Well the 49th tooth is called the "searching tooth." The purpose is to cause the wear to be even among all of the teeth on both gears in the set. Thus it would take 980 revolutions of the pinion until the same two teeth come back into contact with each other. There are no know commercially available stock gears that can just be without modification. Several of my customers have found some stock gears that appear to be close enough to the prototype that they can be modified for this purpose. Please contact me directly and I can provide these sources. Other customers including myself plan to cut the gears themselves.

### **Has anyone finished this model?**

No, the **LocoGear** castings first became available during the summer of 2000. As yet no none has finished their model. I would say that I am probably the furthest along in the process with my engine and tender frames 99% completed. I started in earnest about 1990, but spent the first several years making the casting patterns. However, there are two retired fellows in Pennsylvania who are quickly catching up to me and may finish their Shays before I do.

