

Boiler Accessories  
By Dick Thomas

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## TECHNICAL TALK SUMMARY FOR FEBRUARY 2004

Dick Thomas was our speaker for this month. He discussed a number of hints and suggestions on building and running steam locomotives.

### Boiler Accessories

#### Water Gage

This very important boiler fitting must be installed on its boiler keeping two things in mind. First, the bottom of the glass, that is, the last visible portion must be above the crown sheet. For 1 ½ scale boilers the amount should be between ¾ and ¾ inches. One-inch scale boilers should have between ½ and ¾ of an inch. Notice that these distances provide a safety margin.

The other point is where to connect the top of the water gage. While the steam turret may seem like a good spot because of its accessibility, it is a very poor place. As appliances connected to the turret are turned on, the water level in the glass will rise because of the slight drop in pressure in the turret. Conversely, as the appliances are turned off, the water level in the glass will drop. To prevent that erratic water movement, connect the top of the water gage directly into the top of the boiler.

Dick suggested that boiler tests include a check of the water gage position relative to the crown sheet to see if the installation meets the above safety criteria.

#### Hydro Test

When having your boiler pressure checked, offer to operate the hand pump for the boiler inspector. Not only does this allow the tester to concentrate on the boiler, but also it gives you control to prevent over-pressurizing and consequent damage to appliances like the pressure gage. Dick went so far as to suggest adding a stop valve to protect the pressure gage. However, he was quick to point out that the stop valve must not have an ordinary handle to prevent it from being inadvertently closed. Obviously, the stop valve must be open any time the boiler is under operating pressure.

Installing a stop valve in the cylinder steam line to prevent leakage past the throttle makes it easier to maintain pressure in the boiler during a hydro test.

While on the subject of boiler checking, Dick suggested that the water legs above the mud ring be checked for sediment build-up as part of the boiler test. Of course, this can only be done if there are washout plugs installed around the mud ring. Therefore, if you are currently constructing a boiler, make sure that enough wash out plugs are fitted to enable a good inspection of the area above the mud ring.

### Building Tips

#### Lubrication

A common way to lubricate axle box bearings is to drill in from the ends of the axle to a cross-hole to the bearing. This works fine provided access can be had to the ends of all axles. This likely is not the case for the first axle whose ends are covered by the crosshead and/or main rod. In this case, drill the leading axlebox for a grease fitting.

If air brakes are planned, make certain that the air pump installed is of adequate capacity. Dick related an incident in which he was descending a long grade and ran out of air before reaching the bottom. The engine in question had a steam operated air pump that was not up to the task. One solution is to use steam on the engine brakes and air on the tender (and other cars) with air supplied by a battery operated auto tire compressor.

Also, use small sized piping to reduce the clearance volume. Unnecessarily large diameter pipes and fittings reduce the effective air capacity of the system.

### Piping

Although the use of Teflon™ tape is convenient way to seal large pipes, the tape has a way of getting inside the small pipes and clogging small orifices. Dick likes to use joint compound instead. He recommends screwing the pipe fittings together until two threads are engaged then applying the compound sparingly to the remaining threads.

### Re-Railing Fixtures

Before considering the construction of the frames completed, plan how the locomotive will be set back on the rails after a derailment. The addition of some sort of cross member, both front and rear, will reduce the likelihood of some eager helper from applying a crowbar to the cylinder drain cocks! Dick has found that sliding a piece of sheet steel under the wheels after the frame is lifted facilitates guiding the wheels to the rails.

Helpful onlookers need to be watched carefully when moving a locomotive, say out of a roundhouse, because they reach for the nearest thing on the locomotive which is usually some delicate detail. Dick told of such an occasion in which the "helper" accidentally ripped off a section of handrail only to hand it to Dick with the comment, "Wasn't fastened very well, was it?"

### Prior to First Steam Up

Before machining any cast components that will be in the steam path, make certain that all core sand and other debris are blown out. A trip to the local car wash is a handy way to do that. After all machining is done, pipe up to all steam appliances, but don't connect them up. Fire the boiler and blow down all valves, fittings, and pipes to clear out all dirt, chips, and other scraps. Failing to do so will result in clogged injectors, steam pumps, and any other appliances with small orifices.

## Running Tips

### Blow Down

While some steam operators like to completely blow down their boiler directly from operating pressure, good practice recommends that the boiler be allowed to cool down until the pressure is at least ½ of the operating pressure before a complete blow-down. Then, before putting a steam locomotive away after a run it's a good idea to drain all water from boiler accessories and the cylinders. Damage from freezing and rusting can thereby be avoided. This can be done by running all steam operated devices with compressed air while everything is still hot.

### Are You Covered?

Steam is up, the train is connected and you are ready to roll. But if you are visiting a new track did you think to inquire about the insurance carried at the track? Without belaboring the issue of

what a litigious society we live in, Dick suggested that all miniature steam locomotive operators be aware of and understand the potential legal issues should anyone make a personal injury claim.

Thanks to Dick for sharing his experiences based on running and building many steam locomotives.