

STEAM TURBINE TRIP SYSTEM UPGRADES

By Sydney Gross and Scott MacFarlane

In this issue we will discuss steps that need to be taken to execute a conversion to an electronic tripping system from a mechanical system.

First it needs to be defined what functions in addition to over speed will be converted from the existing systems to the new electronic system. It is critical to recognize that the governing system, low oil pressure trip, manual emergency shut down and rotor axial position systems may be inter-related and affected by the modification of the speed tripping system. A good example can be seen in Figure 1, a cross-sectional view of a governor case. In this example the oil dump valve latch is connected to the overspeed lever, low oil pressure diaphragm and the hand trip knob. In addition, the action of the oil dump valve causes the governor valve to close.

Once the system changes have been decided; we can look at the physical changes to be made to the turbine. Aside from removing the old obsolete parts there are parts that need to be added. Not only do the electronic speed sensing components need to be added, but also the removal of the obsolete parts exposes holes, passages and cavities that may need to be plugged or covered. In order to sense speed electronically, a notched wheel must be added to the rotor along with provisions to hold the speed sensors. In the example shown in Figure 1, changeover of all the systems to electronic gives one as clear a slate as can be hoped for in the retro fit world but, in this case, the existing governing system remained in-tact. Apart from maintaining the governor closing function, there are spatial considerations that go with retaining the governing system, namely working around the governor gears.

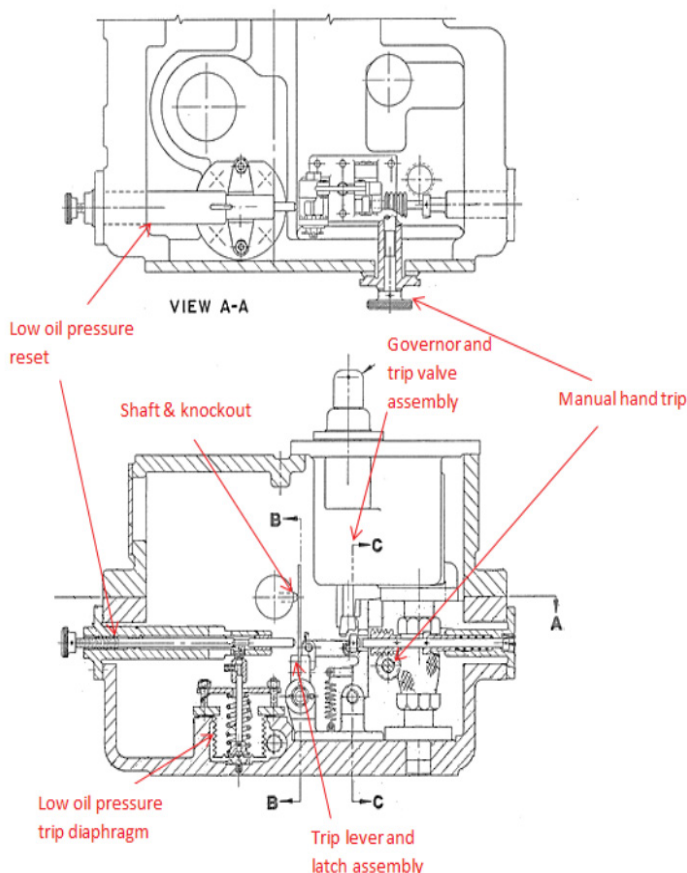


Figure 1

All of these conceptual changes need to be dimensionalized in order to make manufacturing drawings. With the machinery running, how do you get the dimensions? Much of the information comes from the published material supplied with the machine including P&IDs and control schematics. Other dimensions can be obtained from spare parts such as rotors and valves. Service records often contain valuable dimensions as well as photos that can fill in blanks.

Finally, measuring the operating machine allows for external dimensions to be obtained. Naturally, some features will have to be measured and machined at the time of the turnaround.

Aside from the control programming aspects, it is important to consider the effects of the changes to the rotor on the rotor dynamic characteristics. Typically these effects are negligible but occasionally the speed wheel modification adds enough overhung moment to require some design tweaks.

For more information:

Sydney Gross and Scott MacFarlane

Email: sgross@rotatingmachinery.com

xxxxxxxxx@rotatingmachinery.com

Tel: 484-821-0702

Headquarters

2760 Baglyos Cir.
Bethlehem, PA 18020

Houston Office

16676 Northchase Dr., Ste 400
Houston, TX 77060

rotatingmachinery.com

Tel: 484-821-0702

Parts: rms@rotatingmachinery.com



Rotating Machinery Services, Inc. | 2760 Baglyos Circle, Bethlehem, PA 18020 | Tel: 484-821-0702

Legal disclaimers text goes here. Nulparum harchic iandam, ut qui omni as adistia doluptis etum consequo te dessitati temquamet aut dolo tem volupta tiuntia aspitatur. Dust facepe volor asit liquae volo quae nos dis dolupic tem quidignat lab int, consenis sitatat emperum que dus aut volorem est enitiis et et iur atis explaut que et es doluptatium ab ipsunt enihillabore optatqui cor arum faccusae necerit lautendis quam int, occabo. Evel id ex essitat hillitatem ea simet lignatibus expel ius excerum fuga.