

BAIER® RAIL SINGLE-BOLT TANK CAR MANWAY SYSTEM – A MODERN SOLUTION FOR THE RAILWAY TANK CAR INDUSTRY

Introduction

The Baier® Single-Bolt Manway System is an innovative new approach for sealing a tank car manway. This patented system is fundamentally different from all other traditional manway designs. This new approach to sealing is created by the single bolt and strongback arm design that facilitates using an O-ring seal. This replaces the compression seal used with multi-bolt manways and flat gaskets. Instead, the single bolt drives a cover with an O-ring into the sealing cylinder on the nozzle. There are no damaged eyebolts, torquing procedures, or unequal loading. The operator can create a more consistent seal in one quick operation with simple hand tools. No retorquing is needed and no special sockets or tools are required.

21st Century Challenge

The need for a better tank car closure system.

Research of existing designs revealed fundamental deficiencies in traditional eyebolt manways (see fig 1), including: permanent deformation of sealing gaskets; stretched eyebolts due to over-torquing and metal fatigue; and “scalloped” stress of the cover resulting in unequal sealing and broken flanges on the cover.

Top Reported Non-Accident Release Causes for Non-Pressure Tank Cars*
U.S. and Canada: 2019

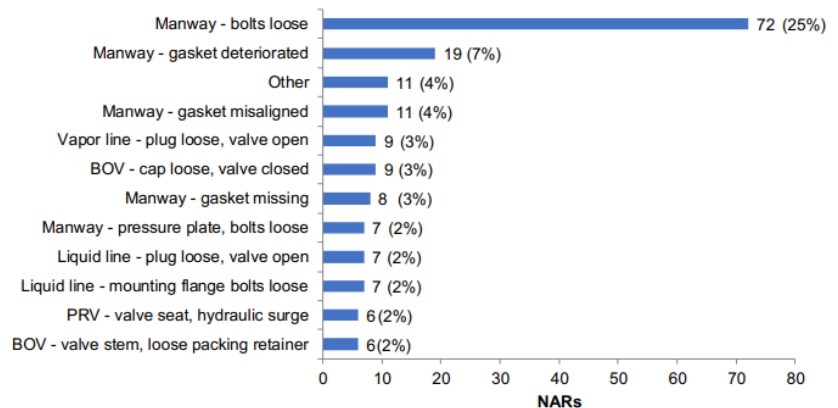


Figure 1: 2019 AAR/BOE NAR Breakdown Annual Report

21st Century Solution

Baier® Rail designed the single-bolt manway from the ground up to meet the specific demands of the tank car industry and solve the common causes of NAR's. Rather than using materials to solve the need for a more consistent seal, Baier Rail rethought the manway concept and came up with a modern solution that increased efficiency, decreased overall costs, and most importantly, reduced NAR's. All while maintaining the highest production quality and meeting the rigorous regulatory standards of the AAR. The Baier® Single-Bolt Manway System is AAR approved with over 500 covers in service to date. **AAR Approval No: E152106**

Time to Seal

The single bolt design allows the operator to open or close the manway in under a minute and requires no torque measuring devices. This is all possible because of the patented encapsulated O-ring positioned between the nozzle wall and the cover shear ring. This design creates consistent and uniform compression without the inherently problematic process of compressing a flat gasket in a multi-bolt manway.

The elimination of eyebolts reduces the time necessary for an operator to retorque 6 – 8 bolts, and repeating this process up to 3 additional times, in order to follow complex procedures written to address ongoing problems with compression seals.



	BAIER RAIL Baier® Single-bolt Manway	Traditional Multi-bolt Manway
Close Manway <small>First pass</small>	1 min*	3 min
Retorque Time	None	6-10 min
Retorque Delay <small>Allowing gasket to set</small>	None	Variable Up to 24 hours*
Replacing Gasket <small>Per 10 round trips</small>	1X*	10X*
<small>* Figures will depend upon type of cargo and operating procedure</small>		

Safety First Design

Traditional manway covers with eyebolt closures may present operational hazards, such as the physical strain of time bent over torquing and re-torquing cover bolts, dealing with frozen bolts and loosening stuck covers, as well as commodity exposure from NAR's. The Baier® Single-Bolt Manway System design promotes environmental and operator safety.

- A** Visible positive close indicator: If the cap is down and the seal pin is inserted, the cover is fully closed. Vibration will not loosen the cover.
- B** O-ring sealing system that is designed to prevent cargo or vapor leakage. A containment groove secures the O-ring in place, removing opportunity for load contamination. O-ring allows for repeated filling cycles unlike most flat gaskets.
- C** Controlled and uniform venting that allows the operator to gradually adjust the flow of vapors past the cover and seal while maintaining a protected and controlled release.
- D** Built in spring assist for ease of use. Reduces weight for operator to approximately 30lbs.

Less Maintenance

The system is designed for easier operation and lower maintenance compared to existing manway designs.

One standard Teflon® encapsulated O-ring works for almost all commodities and lasts for more shipping cycles without replacement vs. flat gaskets. In addition, there are no torn or overtorqued gaskets as the O-ring is never mechanically pinched or compressed with proper use.

A single robust threaded central ram bolt replaces 6 or 8 threaded eyebolts, eliminating the maintenance process of checking and replacing damage/worn eyebolts, nuts, washers, and button head rods.



Photos courtesy of railroads.dot.gov



Cost of Ownership

TIME = \$\$

The Baier® Single-Bolt Manway System makes quick work of your loading and unloading operations, saving both time and money.

MAINTENANCE = \$\$

This simple but effective design involves no standard threaded eyebolts; only one ram bolt to open and close with zero retorquing and use of standard tools

SERVICE INTERRUPTIONS = \$\$

Baier's Single-Bolt Manway System is designed to help reduce or eliminate NAR fines, mobile repair costs, and logistical interruptions.

For additional details on operations and features of this manway, please contact Salco Products.



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