PPIM 2023 Innovation Award Submission

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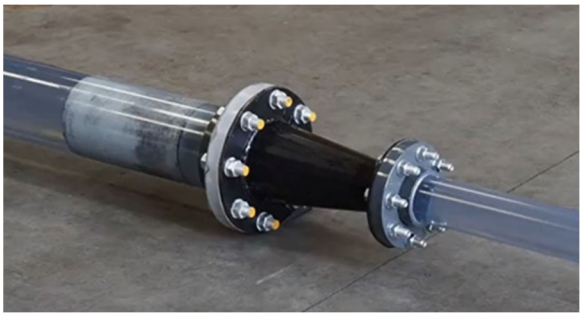
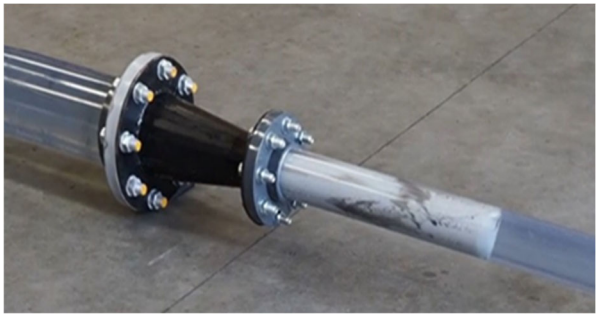
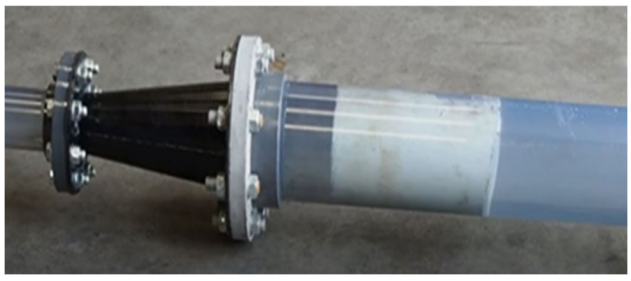
PHMSA's Mega Rule added 425,000 miles of gathering pipelines under federal jurisdiction. Unconventional shale development produced a number of large diameter gas pipelines, many of which were constructed to successfully tie end to transmission lines without being obstructive. The resultant broad mechanical restrictions prevented mechanical pig devices or even low-density foam pigs from being utilized. Solid Shape Memory (SSM) pigs were first used in the North Sea for subsea dewatering. They provided a full-bore hydraulic seal and could be propelled by gas. Unfortunately, they were not suitable for the high pressures that were now needed. A new chemistry has been developed that has built on SSM technology to provide a pressure rating of 600 bar (8700 psi) which is more than adequate for most of the gathering pipelines. This SSM pig can change diameters up to 50% and be run over long distances. If severe blockage occurs, it will just break into small flowable pieces and not get stuck. The SSM pig did not have the cleaning efficiency of mechanical brush pigs, especially when deep cleaning pits. Addressing the inefficiency of solids removal required further development. The SSM is prepared in a liquid state and poured into an appropriately sized canister form and allowed to cure. Laboratory studies found that several types of abrasives could be added during the initial mixing process to enhance the SSMs cleaning efficiency. The SSM pig can be launched through a variety of economic devices such as pressurized canisters. It has been extruded through as small of an opening as a 1" valve. It is often combined with many other remediation chemical systems where only mechanical pigs had been previously accepted.





SSM Transitioning From 6 to 3 inches



SSM Rebounding back 6 inches