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Because No One Likes Sand in their Crack...

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May 6, 2014, 4:37 pm
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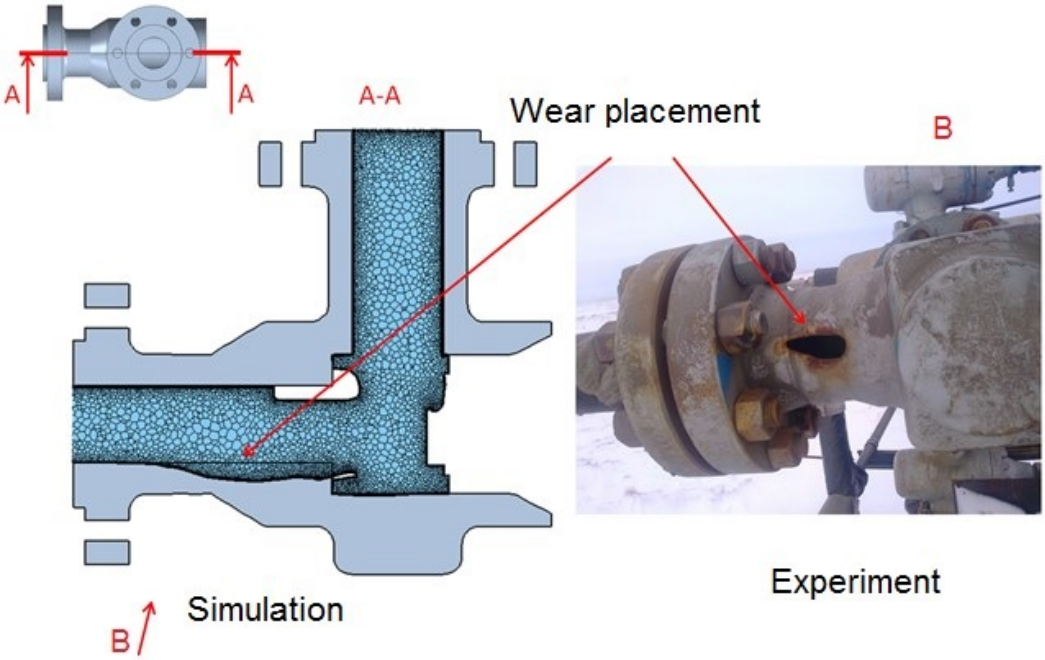
If it was possible that *anything* could be 100% pure, drawing gas out of the ground could be a piece of cake. Gas, unadulterated by any other substance could travel easily through the pipes without damaging a bit of the structure designed for its capture. Unfortunately, this isn't how the world works.

All three states of matter are represented in the process of extracting natural gas from the earth - solids (sand) and liquid (water) come along for the ride. This wrecks havoc on the pipeline, especially at T-junctions and choke valves. Sand banging against flow obstructions causes corrosion which ultimately leads to economic and production losses.

If you went to the STAR Global Conference in Vienna a couple months ago, you would have had the chance to catch Dr. Andrey Kudryavtsev's presentation, "Numerical Analysis Of Erosion Of Gas-Pipeline Elements," where he addresses this exact problem. Using STAR-CCM+ software, he created a multiphase Lagrangian flow model to simulate the flow of the gas, sand and water. While over 200 variences of such factors as particle diameter, silicate concentration, and water/gas concentrations were used, this simulation was simplified easier with the use of a java macro set up for each case.

By running these simulations, one is able to accurately predict where the erosion will take place and henceforth allows one to plan for a more thorough maintenance program in those areas.

The particulars of this simulation (as well as a download of Dr. Andrey Kudryavtsev's presentation) can be found here [1], in a recent article published by Engineering.com.



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[1] http://www.engineering.com/DesignSoftware/DesignSoftwareArticles/ArticleID/7408/CFD-Analysis-of-Particle-Impingement-Causing-Pipe-Erosion.aspx