

P. O. BOX 801496 Houston TX 77280-1496 USA

TEL: 713-690-1256 FAX: 713-690-1257

E-mail: stylwan@msn.com

www.stylwan.com



OCTG Inspection at the Wellhead

Inspection Note 4 – rev 3 / Oct. 2002

Steve Papadimitriou – STYLWAN



The frequency of production tubing and sucker rod failures significantly impacts the economics of the well. STYLWAN experience with rod-pumping wells shows that tubing failures account for about 45% of the workovers and rod failures account for about 8%. Other well operations, like well cleanout, pump failures, FRAC etc, account for the rest.



The well maintenance program should focus on reducing the frequency of failures, not merely locating the failed joints and rods. The frequency of failures can only be reduced by:

- locating the failed rods and the rods about to fail. Understanding the mechanism of the rod failures and locating failure seeds early. *Inspection Notes 8 (Fatigue) and 9 (Dynamic loading) are applicable.*
- locating the failed tubing joints and joints about to fail. Understanding the mechanics of the tubing failures.
- positioning joints in the string to maximize their life and strategically locating rod guides. *The STYLWAN WELL PROFILE facilitates this task.*
- understanding how the environment impacts the life-cycle of the joints and rods and tracking the effectiveness of any chemical treatment. *The STYLWAN full-depth Corrosion gauge (CG) and Environment Induced Cracking (EIC) reports not only enhance the environment understanding, they are also instrumental in detecting changes in the well environment.*



All of the other Non-Destructive Evaluation (NDE) techniques and units are limited to detecting failed tubing joints and joints about to fail. Only STYLWAN correctly addresses (a) through (d) with its Three-Dimensional Finite Element Inspection (3D-FEI).



The 3D-FEI *TripSaver* is a highly portable, flexible and powerful 3D tool specifically designed to provide complete and correct inspection of Oil Country Tubular Goods (OCTG) at the wellsite. The 3D-FEI *TripSaver* determines precisely the status of the Material Under Inspection (MUI), analyzes the inspection data rapidly and generates a number of reports essential for the proper maintenance of the OCTG and the well.

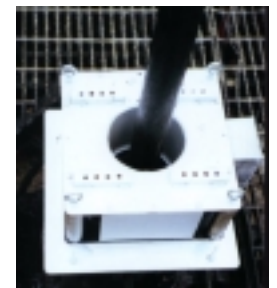
inspection equipment comparison

The wellhead inspection equipment that is currently in the field is expensive and cumbersome to use. They are based on re-packaged one-dimensional (1D) inspection technology that was developed in the late 1940s and it is still in use in the 21st century. 1D imposes, among many other limitations, strict centering and commands one form fitting sensor per material size. Although approximately 3 times as wide, 4 times as tall and 10 times as heavy as the STYLWAN inspection head, they can only inspect production tubing up to 2-7/8" or 3-1/2". Significant rig time (up to 2 hours) and the assistance of the rig crew is required for the installation and removal of the 1D inspection head in addition to the lengthy, time-consuming, calibration procedure that must be repeated often.



Shown on the right, one person can install the STYLWAN inspection head in 5 minutes or less and the automatic *TripSaver* calibration always takes 5 seconds.

For all others, the string must be free of downhole equipment like gas-lift valves, dictating a double trip. Wells with downhole electric pumps are also designated for a double trip. Only STYLWAN *TripSaver* designates **all the** wells for a **single trip** inspection. Even wells with OD tapered tubing only require a 5 seconds recalibration. Everyone else has to stop the inspection, remove the inspection head, change the sensor assembly, reinstall the inspection head and then recalibrate - a 2-hour changeover while the rig is idle. Only STYLWAN can inspect sucker rods (round, oval, semi-oval etc) at the wellsite (front page bottom picture – concentric sucker rod inspection) and only STYLWAN evaluates the sucker rod flaws as stress raisers. Again, only 5 seconds recalibration switches over from sucker rod to tubing inspection.



The STYLWAN 3D-FEI technology is highly tolerant to adversities like *OFFCENTERING* and *SENSOR LIFTOFF*. Tolerance to adversities is part of the STYLWAN 3D-FEI STANDARD ACCEPTANCE TEST which is certified by DNV (certificate # HIO-00-0077). A STYLWAN 3D-FEI system can withstand 3.5 tube diameters OFFCENTERING without loss of Detection (4% of the reading typical error resulting in high Detection reliability)! Again, all other wellhead inspection units use re-packaged 1940s 1D technology that has been proven highly sensitive to the common wellsite adversities. Some of those units are more sensitive to 0.040" of offcentering than 50% rodwear!! This sensitivity results in dubious wellsite performance, albeit unobservable on the scene. For STYLWAN, as shown above right, nothing touches the pipe... nothing, and only STYLWAN can handle tubing sizes greater than 3-1/2" (above middle) and drill pipe.

*21st century tools and inspection techniques enable STYLWAN
to offer a better inspection at a lower cost*