

# 6th CONCAWE pipeline seminar

## *COPEX 2002: a focus on pipeline management*

In April 2002, CONCAWE hosted its 6th Oil Pipeline Operators Experience Exchange seminar 'COPEX 2002' in Brussels. The event, which is held approximately every four years, attracted an enthusiastic audience of nearly 100 representatives from pipeline operating companies from all over Europe. This year, the delegates heard a range of contributions covering a variety of topics related to pipeline safety management, particularly covering risk assessment, leak detection and the latest developments in intelligence pigging.

The keynote paper described the conclusions from the results of CONCAWE's collection of statistics on pipeline leaks. These statistics now cover 30 years and demonstrate a continuing reduction in the amount of oil spilled per year. This is now down to very low levels despite the fact that the average age of pipelines in Europe is increasing. These results were described in the last issue of the *CONCAWE Review* and the detailed analysis is available in CONCAWE report 1/02. In the next paragraphs we give a short summary of the content of the technical papers presented. Readers interested in obtaining copies of the full papers are invited to contact CONCAWE.

The development of technical standards for pipelines and pipeline fittings in the International Standards Organization, and the efforts of major pipeline companies to 'benchmark' their performance against other similar pipelines, are topical issues that were covered by a number of papers. This has reached the stage where a first pilot round has been completed and the process is now open for other pipeline companies to join.

An example of how risk-based methods can be used to identify which parts of a pipeline require attention was the subject of another paper. The risk factors were calculated using statistics from the US Department of Transport in preference to those produced by CONCAWE. Compared to Europe, the pipeline system in the USA is much larger and there have been more than ten times as

many incidents recorded there. The statistical sample population is therefore larger, whereas the incidents recorded in Europe are too few for a statistically significant analysis of all the factors involved. A pipeline is broken down into 50 m lengths and the risks for each segment calculated in relation to factors such as road or rail crossings, proximity to houses, geological factors, etc. It is then possible to see whether preventive risk reduction measures or emergency response measures are required.

Supervisory Control and Data Acquisition systems are in almost universal use for the operational control of pipelines, and one paper covered the experience of a particular operator in upgrading his system. Although the existing system was working well and was well understood by the pipeline operator, the hardware was becoming outdated and not suitable for further expansion. The decision was taken to replace the hardware and continue to use the software, even though the hardware had not been designed with this particular software in mind. This gave the opportunity for a discussion on the doubtful merits of frequent 'improvements' to established software.

A series of papers was dedicated to the analysis of pipeline failure mechanisms and the preventive methods to detect them before failure actually occurs:



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- Stress Corrosion Cracking was identified in 1997 in a refined product pipeline in France. Since then, research carried out by the whole French pipeline industry has resulted in a much better understanding of the phenomenon and of ways to detect it. This research has been used to develop routine management techniques so that affected pipelines can be operated safely.
- AC current-induced corrosion is a little-known or understood source of corrosion which can occur when buried pipelines run close to high voltage cables and can result in serious corrosion rates of more than 1 mm per year. It can easily be confused with other corrosion mechanisms.
- Metal fatigue is caused by the swings in pressure on the pipeline. A paper described a method of determining the risk of failure for a pipeline and identifying those sections most at risk.
- Theft or attempted theft from pipelines has been a consistent feature of operations, particularly in Eastern Europe, over a number of years and a major cause of incidents. A recent case in Italy unfortunately led to the death of the perpetrator. One presentation described the measures being taken in Hungary to address this problem. Between 1992 and 1999, the Hungarian system was attacked more than 100 times. Although not all of these attempts were successful, the value of fuel lost was substantial. Even more expensive was the cost of clearing up the spilt oil. To counter this threat, a sophisticated leak detection system has been installed. This not only detects leaks, but also pin-points the position of the leak which facilitates rapid intervention. As a result, the number of attempted thefts has now decreased dramatically.

Intelligence pigging is becoming more common. One paper described its application to a major crude oil pipeline over some 15 years. The large quantity of pipeline data collected is stored in a 'Pipe Data System' which has an entry for every section of pipe (currently totalling 67,400), fitting, etc. in the system. As well as the intelligence pig results, this includes data on the materials used in the construction of the pipe, weld inspections, etc. Over the years, some 25 intelligence pig runs have been



*26-inch pig trap with intelligence pig for crack detection measurement*

conducted. These have revealed some 7500 'defects' of which 32 were identified as potentially critical. Of these, the 10 most serious have been investigated by excavating the pipeline. Comparison of the real findings with the results of the intelligence pigging allowed the company to agree with the authorities that a hydrotest was not necessary, that there was no need to carry out verification digs at river crossings and that the throughput of the pipeline could be increased.

A second paper described the development of a transverse magnetic flux leakage intelligence pig. Axial cracks in pipes are important as the pipeline tends to be stressed in this direction. Unfortunately, conventional pigs work best in the longitudinal direction and are not good at identifying such cracks. This 'transverse' pig overcomes this problem and has been used successfully on a French pipeline system.

Another paper described an acoustic method for detecting leaks which has been applied to an ethylene system. Finally, there was a paper on the development of reliability-based design methodologies, which is a new method for determining the wall thickness and steel strength required for new pipelines.

The seminar provided a day and a half of focus on many aspects of pipeline management as well as an opportunity for delegates to network and exchange information informally. All who attended felt that the seminar was a great success and looked forward to the next seminar in 2006.