

# Onshore, offshore and deep-sea pipeline repair: views from 3X Engineering

## interview

STANISLAS BOULET D'AURIA  
CEO AND FOUNDER  
3X ENGINEERING

An innovative approach, customized solutions and processability are helping composite materials to gain ground on the metal materials traditionally used in the pipeline repair sector. Stan Boulet D'Auria, founder and CEO of the Monegasque company 3X Engineering, updates us on the evolution of this sector and shares his 20 years of experience and innovation.

**JEC Composites Magazine:**  
What are 3X Engineering's lines of business?

**STAN BOULET D'AURIA :** Our main line of business is industrial maintenance in the area of temporary or permanent rehabilitation of structures. We operated mostly in the oil & gas sector, where the poor state of repair of the installations due to corrosion requires operators to find solutions for increasing the service life of their pipelines. On top of that, oil price issues make it necessary to find technical solutions that allow repairs without shutting down

production. For that, 3X Engineering has developed a range of composite products and services that enable continued efficiency, while maintaining the pressure resistance that operators require.

**JCM: What are your areas of expertise?**

**S.B.A.:** Since 1990, 3X Engineering has been specializing in pipeline rehabilitation. We've used our experience to extend our expertise to other fields, like the repair of overhead contact line structures, for example.

Through patents we've co-developed with large companies like GDF-Suez, Total and



The next step is to apply composites in the deep offshore environment

the (French railway company) SNCF, 3X has been able to prove the effectiveness of composites compared to traditional repair methods in terms of things like fast implementation, cost, or weight, and the capability to take rapid action without having to stop production.

Even though customers tend to hold on to material solutions they've used for a long time, standard steel fittings and reinforcement welds are gradually losing their reputation, due to the unsatisfactory performance and return on experience recorded over the past few decades. Our finite element analysis

While 3X Engineering was growing internationally, it focused on delivering high quality tailor-made and client-oriented solutions. Today, 3X Engineering has grown from one pipe repair systems supplier into a worldwide structure repair reference with renowned unique and high quality products and services. The company's philosophy has remained unchanged since its inception: offer the client unique, innovative, reliable products for reaching the highest quality standards.

## About 3X Engineering

After many years of research and development, 3X Engineering has been established in 1990 to create and to supply the industry with innovative maintenance systems such as pipe repair.

tools serve to simulate the repairs before and after applying the composite solutions, constituting a persuasive argument. We continually use FE analysis, confirmed by laboratory tests, in order to better understand and improve our repairs.

**JCM: Can you tell us how your sales break down for this past fiscal year?**

**S.B.A.:** In 2013, we had sales of €5.4 million, 60% of which was from pipeline repairs using our REINFORCEKIT 4D composite system; 10% using our REINFORCEKIT HEA solution for the repair of overhead contact line structures; and 30% using STOPKIT, a product that enables repairing a leak under as much as 80 bar pressure.

**JCM: Composite materials enable you to provide customized solutions. Can you explain how you approach a repair job?**

**S.B.A.:** 3X Engineering has developed a range of products that comply with the ISO 24817 and ASME PCC2 international standards. These standards, along with the properties of the composites that 3X uses, are what define the repair "design": the length and number of plies, etc. We

developed a software package for this, called REINFORCEKIT Engineering Analysis (R.E.A.), to rapidly design the repairs and establish their cost and duration.

**JCM: What challenges do you face today?**

**S.B.A.:** Today, the main obstacle to the development of composite repair is standard steel repair work. However, both the arrival of materials engineers in the market and the massive use of composite materials in the aerospace sector are contributing to change sceptical attitudes on composite repair.

**JCM: As you specialize in pipeline repair, what are your development goals in that market?**

**S.B.A.:** 3X Engineering is constantly developing its worldwide sales network through franchised outlets. Also, almost all of our products are patented. We estimate that we still have about 70% of the market to capture. Currently, 3X employs 15 people, and we plan to hire 4 or 5 more people for marketing and R&D. We optimize our products via new resins and fibres, for example, on a permanent basis. For that,



Application of REINFORCEKIT 4D on the pipe



R.E.A (Reinforcekit Engineering Analysis) for repair dimensioning: length and numbers of layers according to ISO 24817 & ASME PCC2

3X Engineering has set up a complete research laboratory with differential scanning calorimetry (DSC), a tension/compression test bench, ovens, viscosity meter, densitometer, muffle furnace, abrasion tester, etc.

We work in partnership with Total for the application of composite materials in the offshore underwater environment. A special machine was developed to help divers apply the products as efficiently as possible. The next step is to apply composites in the deep offshore environment.

**JCM: With 20 years of activity in the oil & gas sector, what are the challenges that 3X Engineering must address in the future?**

**S.B.A.:** The challenge of the next few years will be to reinforce 3X Engineering's position as one of the world's leading composite repair providers. To meet this goal, our marketing strategy lies in the combination of research, creativity and the quality of 3X products.



Heavy equipment for deepsea repair

**JCM: What role does innovation play in 3X Engineering's strategy?**

**S.B.A.:** In 2004, we were short-listed by the Monegasque Development Office for the European patent competition. Innovation is very important for us, and our guideline is to innovate constantly. That is the most effective way to guarantee our growth and protect ourselves from competitors, even if our patents have already been filed internationally. ■

More information:  
[www.3xengineering.com](http://www.3xengineering.com)