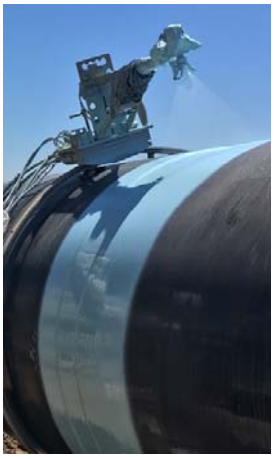
Changing our Mindset – Development of the Serimax Orbiter™ Range of coating robots

Since the 1930's pipe coating has continuously developed, in keeping with advances in material science along with measurement and analysis. Today the expectations for quality, reliability and safety have become prerequisites.

We live today with tight fiscal constraints and demands for cost reduction - unlike the past, where price was less challenged. This creates the dilemma of how a new field joint coating company like Serimax FJC (SFJC) can enter a mature market, with established dominant players.

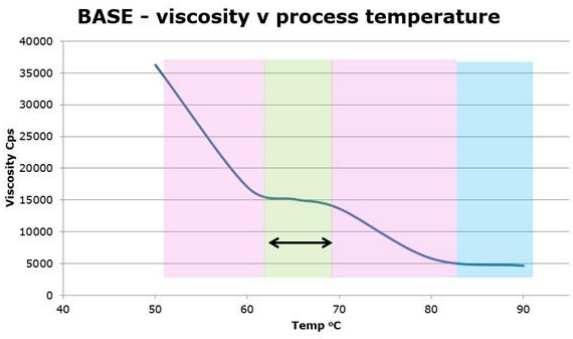
Starting out in 2014, SFJC looked at the principal costs associated with joint coating, both on and offshore. The approved protective coating systems available are well established and do not constitute the most significant part of the project cost. Therefore, to make a difference requires a fresh approach, one which satisfies the objectives of reduced cost at the same time as honouring or improving the demands for quality, reliability and safety.

To illustrate the approach taken by SFJC, the case study of the Serimax Orbiter™ development is explained. First adopting the car industry approach of LEAN manufacturing, a design specification was established covering the whole process and (specifically) machinery design. This strategy quickly identified some critical variables that required control. For example: selection, transportation and storage of blast media (grit); precise and predictable control over the speed of application for the coating system; consistent pre-heat temperatures prior to coating; and balanced process times between surface preparation, heating and coating application.



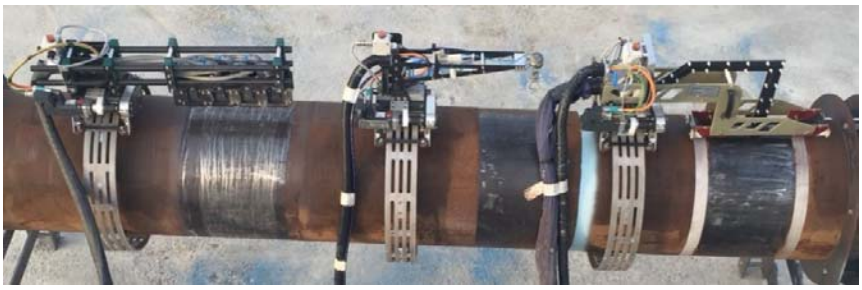
The consequence of controlling the process variables will result in high right-first-time performance. SFJC started by achieving control of the coating process, focusing initially on multi-component-liquid (MCL) systems, achieving rejects lower than 0.2% re-coat and under 5% for remedial repairs (real life data from the SCPX project).

Existing standard automated MCL spray technology comprises of large coating machines, which require lifting to the pipe joint by a 'crane', with associated extra personnel. The size of these machines, make them unreliable on big diameter pipes and on steep terrain. Another feature of the approach, requires a method of purging and flushing the reacting materials from the machine in between each joint that is coated. This adds to the waste stream and hence cost expressed as a function of excess materials, disposal of waste, transportation and increased maintenance. Further issues are associated with weight of the suspended load when extended over the edge of a bell-hole, increasing the risk of collapse.



Having identified the need for low weight machinery with predictable speed control, SFJC adapted the industry proven Serimax welding bug and band technology. This formed the basis for consistent application of the MCL system. Integration of the bug and band with the market leading Graco XM50 plural component spray machine, ensured excellent control of the mix ratio. Missing in the equation was the ability to ensure that

uniformity and evenness of the sprayed coating was predictable. This was achieved after evaluating the viscosity v. temperature curves, which provided the data necessary to gain process control, thus ensuring the spray equipment worked as required, joint after joint.



Real-life operational experience in Georgia and Azerbaijan gave an impetus to further improve, culminating in a new band or track design that further increases operational reliability by a factor of ten while at the same time reducing costs. The original pneumatic technology is now substituted for servo motors, making the Orbiter™ robot a versatile system covering not only MCL, but now FBE systems. No longer are contractors faced with extra charges for a coating machine for each pipe diameter, one Orbiter™ covers diameters 10 to over 60 inches.