

# Enhanced by automation

**Lino Civardi, CEO of LK2, and Marc Rausch, Global BD Manager pre-insulated pipes/DE market, Canusa CPS, detail how the company's fully automated system for applying heat shrinkable sleeve technologies has been utilised on a project in the Czech Republic.**

**H**eat shrinkable sleeve (HSS) technologies are the dominant field joint coating (FJC) selection in providing anti-corrosion and mechanical protection for oil and gas pipelines globally. Through focused development of innovative, high performance hot-melt adhesives and engineered outer layer backings, advanced field-applied HSS technologies offer equivalent and, in some cases enhanced coating protection compared to their factory-applied mainline coating counterparts. Today's pipelines require seamless coating solutions along their entire length, with no compromise at the field joints. With

advancements made in FJC materials, focus has more recently shifted to exert enhanced control over the coating process. Initially, this has come in the form of pre-project testing to qualify the proposed coating materials and installation process in advance of pipeline construction and coating activities.

Pre-project considerations are focused on the planning and preparation of project-specific coating application procedures, inspection and test plans, quality control programmes, and comprehensive training programmes for coating applicators. Pre-construction coating trials are also completed to confirm

**Figure 1. Automating heat shrink sleeve application during pipeline construction using induction pre-heating (right) and IntelliCOAT™ (left).**



compliance to project specifications and demonstration of readiness to commence operations. Combined implementation of pre-project and pre-construction testing has helped to create optimal conditions for quality and repeatability within the FJC process. However, within a demanding environment that necessitates the pursuit of continuous improvement, efforts to advance FJC materials and processes have not stopped there.

### Automating application of HSS

The world's first fully automated system to control the application of HSS was first introduced in early 2011. IntelliCOAT™ is a field-friendly system that provides a step change enhancement in the



Figure 2. IntelliCOAT with clamshell design preparing to wrap around a large diameter pipeline.



Figure 3. IntelliCOAT Control Panel equipped with PLC and touch-screen interface.

quality, consistency, and productivity of field-applied coatings by means of automation. Coupled with readily available 3-layer polyolefin heat shrinkable sleeve technologies offering the same level of protection as their factory coating counterparts, the automated system enables the application of a 'factory-grade' joint coating solution in a simple-to-operate format that is easily adaptable for an onshore pipeline right-of-way, spoolbase coating line or offshore construction pipelay vessel.

The patent protected system consists of a programmable logic controller (PLC) equipped control panel and a clamshell style infrared heating coil connected by rugged 'plug-and-play' umbilical cables. One control panel can operate a range of standardised heating coil sizes to suit pipeline diameters from 4 - 56 in. Application cycles can be initiated directly from the control panel or by using the remote control connected to the heating coil. Operators simply monitor cycle progress and remove the coil from the field joint at the end of the coating cycle – the IntelliCOAT® control system does the rest.

A major benefit of the IntelliCOAT system is that the requirement of open gas torch flames for installing the FJC is eliminated, therefore increasing operator safety in the FJC station, and even more so in particularly tight working quarters where space can be limited. Best practice installation techniques are automated through the IntelliCOAT system to produce high quality FJC applications that are fully repeatable from joint to joint. Installation programmes can be developed in advance of project deployment to meet specific project needs and can be qualified through comprehensive test programmes well in advance of pipeline construction activities. All installation parameters are tightly controlled and replicated throughout the duration of the project, just as they were during the qualification phase.

Precise control of the application process is managed by a PLC based control system with closed-loop feedback. Once the application programme is installed and approved, operators simply lower the IntelliCOAT coil onto the pre-positioned HSS, and the system takes care of the rest. That ensures that the same top-quality result achieved during the first application of the day is the same as the result achieved at the end of the day.

When called into action, the heating coil's instantaneous response delivers intense heat to the centre of the joint to begin the FJC application cycle. At the end of the cycle, the heating coil quickly dissipates heat, making the system safe to lift off of the pipe surface to transport to the next joint or to prepare for the next installation sequence. Only standard personal protective equipment is required.

IntelliCOAT is designed to have few moving parts and few consumable/wear items to maintain or replace over the course of a project. The system is suitably equipped for operation in the harshest of environments with ambient temperatures ranging from below -30°C to 55°C and can withstand the rugged handling associated with onshore and offshore pipeline construction. Individual components are standardised across the IntelliCOAT family of equipment, so any spare parts can be quickly substituted in a plug-and-play fashion in the unlikely event that repairs are needed. The robust design of the IntelliCOAT system ensures maximum uptime and productivity while minimising risk for the construction contractor.

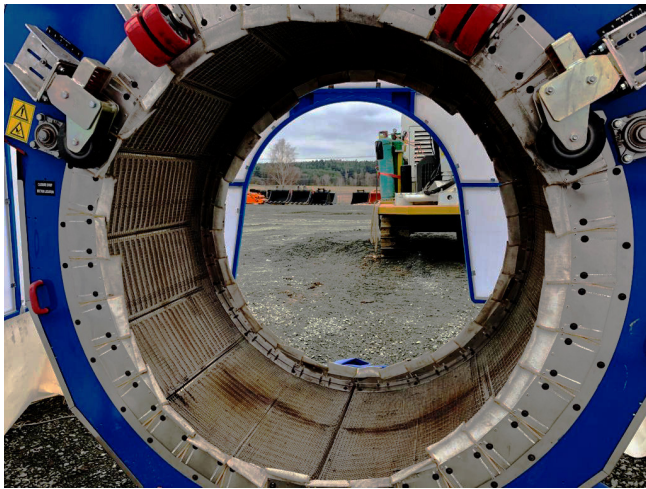


Figure 4. IntelliCOAT system's infrared heating panels.

### Bringing automation to the field – Capacity4gas

Located in Plzen, Czech Republic, construction of the Capacity4Gas pipeline project commenced in December 2019 and is an ongoing project for 2021.

Recognised for an extensive and proven track record of product performance and project excellence, through the Italian partner LK2, Canusa-CPS was selected as the supplier of the field joint coatings utilising GTS-65 heat shrinkable sleeves with IntelliCOAT equipment on a 56 in. diameter pipe. This system provides superior corrosion

protection and excellent bonding on pipelines operating up to 65°C.

In addition to supply of HSS and lease of IntelliCOAT equipment, installation training and certification for the SICIM coating team was provided by the Canusa-CPS Field Service team to give the client, Net4Gas confidence that all best practices were adhered to while ensuring high productivity rates.

The principal challenge detailed by the contractor, SICIM, was maintaining productivity in a safe manner for the duration of this project. Automation and process control were paramount to successfully deliver this project in the assigned time frame. A system which ensured consistency with every FJC installed on the pipeline minimising risks and uncertainty was essential.

The IntelliCOAT system enabled SICIM to accurately forecast the daily FJC productivity without reliance on operators to conduct any labour-intensive work steps. Application time per joint was pre-set during the qualification stage to ensure production could proceed on schedule. Utilising this system, SICIM averaged 30 joints per day and a maximum daily rate of 45 joints per day.

Further benefits to SICIM were significant manpower savings, as FJC installation on large diameter pipelines can be completed without the addition of extra labourers to install the coating over a larger surface area as would typically be required for manual applications. This project is expected to be completed in 2021 and demonstrates the operational benefits that Canusa-CPS training and certification programmes have on maintaining competency in applying field joint coatings on long duration large diameter onshore projects. 