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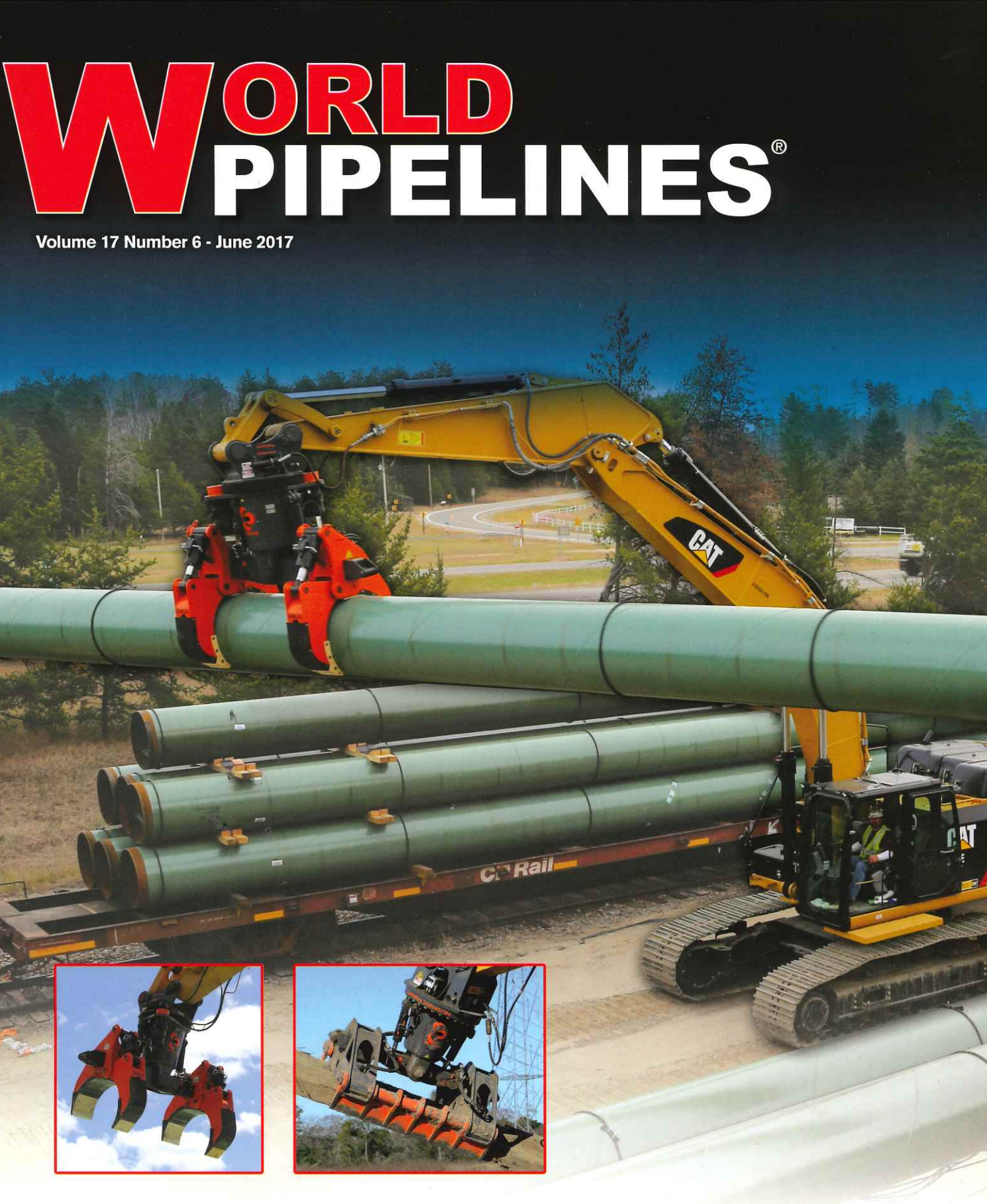

Giuseppe Ratti and Luigi Di Vincenzo, Bonatti, Mexico, recall the integrated pipeline and compressor solutions that were provided on a number of Mexican pipeline projects.

Mastering the MEXICAN MARKET

In 2012, Bonatti disembarked in Mexico to carry out a US$50 million project. By the end of 2016, the company had accumulated revenues of over US$800 million. From the beginning of its operations in Mexico, the Italian oil and gas contractor has laid more than 1000 km of large diameter pipeline (24 in., 30 in., 42 in. and 48 in.). Acting as an engineering, procurement and construction (EPC) contractor, the company completed the EPC works of two major compressor stations (30 MW and 60 MW), which were completed within budget and within or ahead of schedule. This success led Bonatti's main clients – including TransCanada and IEnova (Sempra Energy) – to confirm their trust in the company by awarding more than 700 km of pipelines (16 in., 24 in., 36 in. and 42 in.), as well as a 33 MW compressor station.

Bonatti's ability to succeed in the challenging Mexican market mainly stems from the company's capability of offering a fully-fledged service that ranges from the feasibility study to the commissioning and start-up, while providing reliable and efficient solutions for both pipelines and plants. Indeed, Bonatti is one of the few players in Mexico that excelled in the execution of compressor and metering facilities as well as pipelines, thus offering its clients a single point of contact solution.

Through an opportune blend of international and local talent, Bonatti managed to step up an effective organisation in Mexico. The organisation relied on the human, technical and financial resources required to self-perform the vast majority of the activities, and to rigorously supervise the execution of every project. This capability, combined with the solid support from the headquarters in Parma (Italy), turned out to be fundamental in the execution of complex fast track EPC projects.

Los Ramones I

The Los Ramones I pipeline project aids Mexico in meeting local demand through importing gas from the US. The pipeline is a key milestone for Mexico's ambitious infrastructure investment plan as well as being Bonatti's largest project in the country. The successful and timely completion of the project demonstrated Bonatti's ability to execute complex EPC projects within challenging schedules.

Figure 1. Cranes at work on the Frontera compressor station site.

Figure 2. Aerial view of the Ramones compressor station.

The project was divided into two phases:

- Phase one: EPC of 117 km of 48 in. pipeline and two major metering facilities.
- Phase two: an upgrade of the operating system through the installation of six Solar Titan 130 turbocompressor and auxiliary systems.

Phase one, awarded in September 2013, started commercial operations in November 2014, despite an extremely limited window of availability for construction (nine months for the pipeline and six months for the surface facilities). The schedule for phase two required a quick delivery for a project, for which the typical delivery time is 18 months. The contract was awarded in late December 2014 and EPC activities kicked off immediately. Once the activities connected with operating the system were initiated, the project grew in complexity. By November 2015, less than a year after kick off, the compressor stations were in operation, thus making Bonatti the only contractor that complied with the schedule of the whole Ramones project. The project was made up of 950 km of 42 in. and 48 in. pipelines, as well as five compressor stations that were allocated to three different contractors.

For Bonatti, 'fast track' never means disregarding the quality of work, safety or security of its personnel, and compliance with the highest environmental standards is always assured. In fact, the project fully complied with the local applicable norms and the highest international standards, while achieving 3 million man hours without any lost time incidents.

Additionally, working in the project area – spanning the Nuevo Leon and Tamaulipas states in the proximity of one of the most active sections of the Mexican/US border – presented severe security concerns. Due to the importance of the Los Ramones I project for the Mexican infrastructure plan, the government provided military support. However, additional security measures were required and by leveraging a strict co-operation with the client and the Mexican army, Bonatti developed an extremely effective security plan and strove in guaranteeing its enforcement. Registering no security accidents across more than two years in the area with a peak of 1500 employees has been an extremely rewarding achievement.

Tuxpan-Tula pipeline project

The Tuxpan-Tula project is a clear example of the market's appreciation of Bonatti's ability to deliver integrated compressor stations and pipeline solutions, while assisting clients from the project definition phase. Following Bonatti's performance on TransCanada's El Oro-Mazatlán pipeline (430 km, 24 in.) and its experience in major compressor stations and complex pipelines, TransCanada asked Bonatti to work on the Tuxpan-Tula pipeline project (263 km of 36 in. pipeline and a 33 MW compressor station) with an agreement of exclusivity. TransCanada studied, developed and optimised the project with Bonatti's support from the earliest stages up until the award of the contract by Mexico's Comisión Federal

de Electricidad; the project off-taker. TransCanada and Bonatti jointly defined the system's philosophy, the pipeline route (with particular regard to an extremely complex 40 km mountain section) and the compressor station location, which had to be built in an area that presents severe geotechnical challenges.

Due to soil characteristics within the project area (Cañada Rica), considerable piling activities were required. Despite these challenges and the intense rains that occurred during the first months of construction, progress on the activities is currently well ahead of schedule. A considerable effort towards maximising the contribution of the offsite prefabrication and civil works is the main driver of this performance.

The crucial role played by integration

Integrating EPC services and a sound co-operation with the client and suppliers are key to Bonatti's approach and success.

In particular, constructability efforts have been instrumental in complying with the schedule and the client's requirements of the two compressor stations included in the Los Ramones I pipeline project. The engineering was carefully revised by the construction experts at an earlier stage in order to foresee any criticality and to adapt the documents if required. Similarly, changes in the design with an impact on procurement have been immediately shared with the dedicated department, thus guaranteeing the timely arrival of the materials onsite. Additionally, a constant interaction with both the client and the suppliers have been crucial in allowing for a smooth development on these activities. In one particular case, the compressor and the microturbine suppliers helped Bonatti to considerably compress the commissioning period of the system, thus achieving the demanding completion target. Interestingly, notwithstanding the tight schedule, Bonatti strived to provide agile and innovative solutions. For example, the compressor stations installed are the first ones in Mexico to be powered with microturbines.

A continuous co-ordination between the EPC contractors on the Cañada Rica compressor station allowed for a particularly smooth progress of the project. Indeed, through a combined planning effort and a one team approach with the client and suppliers, Bonatti managed to synchronise the preparation works with the equipment delivery. This, as a result, minimised double handling and optimised cost, time and risk mitigation.

The centrality of self-performance and direct control

Bonatti's main competitive advantage is the combination of high quality engineering and procurement activities with state-of-the-art direct execution. Bonatti counts on all human and technical means required to direct and self-perform the required construction activities, including welding, civil works, painting, torqueing and commissioning. Subcontracts are limited to specialised activities, such as non-destructive testing and instruments testing. Subcontracts are also focused on complying with the country's local content policy on optimising internal resources allocation.

The combination of internal engineering and procurement capabilities, high level international experience and the capability to directly execute construction activities makes Bonatti a unique solution provider for emergency interventions.

The importance of local content

Over 90% of Bonatti's workforce in the country is Mexican. The engineering team, capable of developing basic and detailed engineering for pipelines and all related surface facilities, is made up of 40 Mexican professionals and headed by a top class qualified Mexican engineer. Similarly, virtually all the health, safety and environment, as well as quality assurance/quality control organisations, are staffed with local personnel, from the manager to the inspector. The company has built up close knit teams integrated by Mexican and international talent, who consistently deliver complex projects within schedule and budget, and in full compliance with client and legal requirements.

Additionally, in order to maximise the positive impact of the work on the local economy, Bonatti focuses on getting local subcontractors involved. The beneficial effect of

Figure 3. Aerial view of the Frontera compressor station.

Figure 4. Construction activities at the Ramones compressor station site.

participating in the project is not limited to the economic benefit of the contract itself; Bonatti provides continuous training to its subcontractors' personnel, with particular regard to compliance with quality and safety requirements, in turn, enabling the subcontractors' alignment with international standards. Additionally, the compliance with these requirements opens opportunities for subcontractors to provide services to international operators that will enter the Mexican oil and gas market, as the energy reform continues its pace of implementation.

The key contribution of efficient logistics and presence throughout the country

By executing several major projects in different Mexican states, Bonatti established a strong network of suppliers and subcontractors, and developed a remarkable capability to efficiently recruit personnel throughout the country. By leveraging such a presence, Bonatti is able to operate in any region of the country and can optimise resources among projects. Furthermore, this understanding of the market makes Bonatti a reliable solution for clients that are willing to evaluate potential opportunities.

Building on these strengths, Bonatti executed an emergency intervention on the Los Ramones II-Sur pipeline project that resulted in the record-breaking mobilisation of 300 people and 100 pieces of heavy equipment within a week, executing more than US$30 million of work in three months. Thanks to Bonatti's contribution, the client managed to complete the section of the project on schedule, thus overcoming the considerable delay due to the poor performance of a previous contractor.

Bonatti decided to further increase its commitment with Mexico by enlarging its specialised equipment fleet in the country. Hence, reaching a value of US$60 million and setting up a permanent logistic base capable of providing advanced maintenance services to the aforementioned equipment, as well as nationwide operational support.

Conclusion

Bonatti grew at an extremely high pace in the Mexican market by taking advantage of the opportunities offered by an industry that is currently undergoing a transformation, and a market that consistently grows in energy demand. When these conditions were coupled with the company's ability to effectively deliver integrated pipeline and compressor solutions, its EPC projects resulted in tremendous success. Additionally, through a winning blend of expatriate and local talent, Bonatti set up an efficient and effective structure that proved to be extremely responsive. The Mexican market appreciated Bonatti's integrated value proposition and its ability to tackle a variety of issues, ranging from a major EPC project to an emergency intervention. Finally, as the energy reform continues its implementation, Mexico continues to be a highly attractive market in the EPC segment, and Bonatti is committed to supporting the country in meeting its energy requirements in a more efficient and sustainable manner.