Onshore Pipeline High-grade Steel for Challenge Utilization

Jan Ferino, Andrea Fonzo, Massimo Di Biagio, Giuseppe Demofonti
Centro Sviluppo Materiali SpA
Roma, Italy

Carlo Maria Spinelli,
eni S.p.A
San Donato Milanese, Mi, Italy

Spyros A. Karamanos
University of Thessaly
Volos, Greece

ABSTRACT

High pressure pipeline transportation is one of the key technologies to connect remote gas fields and deliver gas at competitive prices to consumption markets. Arctic regions will become more attractive in the near future as large gas resources are located there. Long onshore pipelines systems, characterized by high strength steels (above API 5L X80, i.e. exceeding 555 MPa Yield Strength) operated at high internal gas pressure (more than 10-12 MPa) in many cases appear to be the most convenient transportation option.

This paper highlights the latest follow up coming from a long lasting R&D program launched by eni, together with industrial/technical partners, on the exploitation of commercial available options with high grade steels for onshore application even in harsh environments. The results obtained in this R&D program can be useful for applications even for arctic onshore/offshore scenario.

KEY WORDS: Arctic Pipeline, Long Distance Pipeline, High Pressure, High Grade Steel.

INTRODUCTION

Natural gas has the chance to be one of the most important and strategic fuel sources in the years to come, even if the renewable source growth will play a fundamental role in the “next green power energy”, being the “greenest” among fossil fuels. Natural gas represents a continuous and reliable energy source on an economically viable, long term base span. Energy industries have analyzed several potential routes for gas export from giant mid-continental fields to final “end user markets” either via pipeline or LNG ships. To be economically viable these analyses include constructability and environmental impact evaluations, routes optimization, proper materials selection, optimum hydraulic diameter and wall thickness selection, as well as sizing of intermediate gas compression stations.

High pressure pipeline transportation is one of the key technologies to connect remote gas fields and to deliver gas at competitive prices to consumption markets. Several independent technical and economical evaluations have shown how natural gas pipeline transportation systems based on:
- traditional construction techniques,
- low alloy high strength C-steel (above API 5L X80),
- operating gas pressure higher than 10 MPa,
- pipeline length above thousand km,
are the only solutions to exploit “stranded gas fields”.

This solution allows pipeline projects to meet all the requirements and compete on the “gas to market” for distances greater than thousands km even for large volumes transportation. The main economic advantage of high pressure gas transportation consists in a reduced cost CAPEX (saving in construction) and OPEX (due to a reduced number of intermediate compression stations).

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