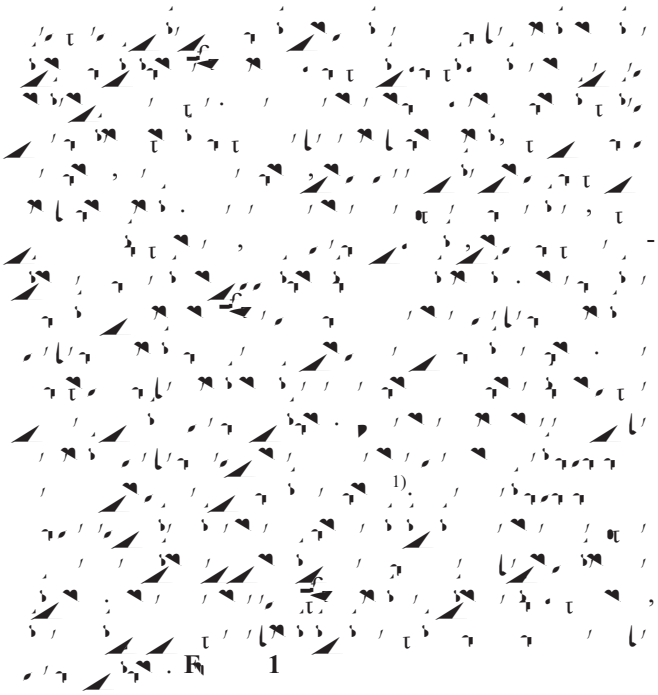
Abstract:

When linepipes are installed in permafrost ground or seismic regions, where ground movement is likely to impose larger strain, they must have deformability sufficient to prevent local buckling and girth weld fractures. The pipes also require an external coating for corrosion resistance. During coatings, however, the heat imposed to the pipes can cause strain-aged hardening, which in terns increases the yield strength and yield ratio (Y/T). Thus, there is a strong demand for a high-strength, high-deformability linepipe with resistance to strain-aged hardening for high-strain applications. Extensive studies have been conducted to develop high-strength linepipes with higher deformability. One of the key technologies for improving deformability is dual-phase microstructural control. Steel plate with bainite and martensite-austenite constituent (MA) microstructure can be obtained by applying HOP® (Heat-treatment On-line Process) subsequently after an accelerated cooling process. As an added advantage, this HOP also improves resistance to strain-aged hardening. The diffusible free C atoms in the steel can be reduced by carbide precipitation. A coating simulation test result for high deformability linepipe treated by HOP revealed excellent deformability after coating heating.



1)

. F 1

1. I

2. D -P M C HOP (H O P) M P B -MA

2.1 P

C 75%. A A 3 C C A (40) 6) A A ( ). 80 32 (813) A 5 *n*- 0.5% 1.5%

2.2

P 1 C

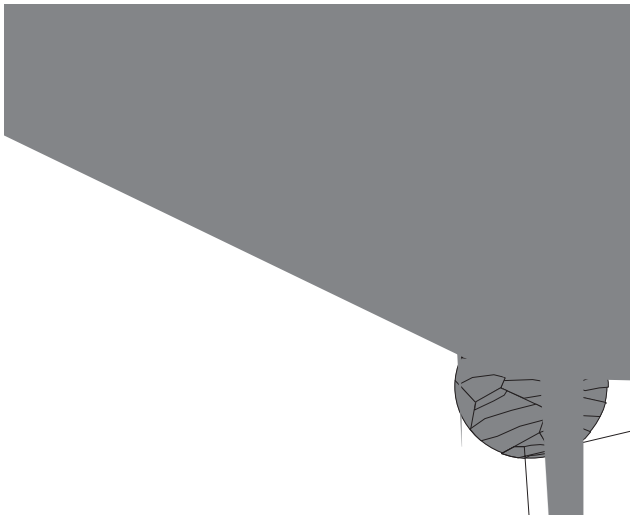
( ) C TMCP ( ) HOP

1 EM m

C A A. A 7%. **2** B 80. *Y*/*T* C A, *n*- C .

2.3 M MA F HOP (H Q P)

F 3 (ACC), ACC ACC. D



4. M P 70 100 H -D L B -MA M

4.1 M P

70 100 -

14.3 21.0