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DEVELOPMENT OF CAN/MIL HYW700QT STEEL. PART II: WELDING PROCEDURES AND CONCLUSIONS

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Development of CAN/MIL HYW700QT Steel. Part II:
Welding Procedures and Conclusions

by

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ABSTRACT

This project consisted of the acquisition of a Canadian know-how for the production and the welding of an HY100 type steel, dubbed CAN/MIL HYW700QT. The project was started in June 1988 and ended in July 1994. the main contractor, MIL Davie Inc. had the CAN/MIL HYW700QT made, rolled, and heat treated in three separate Canadian steelmaker's facilities.

The experimental steel was characterized with regard to it's hardenability and cold cracking susceptibility. The extensive mechanical testing performed showed that the steel had the high level of toughness required for pressure hull applications. The other mechanical properties met or exceeded the American military requirements for HY100 grade steel plates.

The filler materials hygroscopic behaviour, in relation to the diffusible hydrogen content of the resulting welds, was assessed. Valuable information about moisture pickup, the moisture retention effect, shelf life of opened containers, and the ability to reclaim by baking, several filler materials was collected.

Finally, welding procedures using GMAW, MCAW, SAW and FCAW processes were developed and qualified. The SMAW procedures, developed with one particular MIL E11018M electrode, did not pass the final qualification test, the DREA/DL developed Underwater Monoblast Explosion Bulge Test.