2 High-Performance Steels in the United States

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2.1 Introduction

In 1992, the U.S. Federal Highway Administration (FHWA) initiated an effort with the American Iron and Steel Institute (AISI) and the U. S. Navy (Navy) to develop new high-performance steels (HPS) for bridges. The driving force for this project was the need to develop improved higher strength, improved weldability, higher toughness steels to improve the overall quality and fabricability of steels used in bridges in the United States. It was furthermore established that such steels should be "weathering". By this is meant the ability to perform without painting under normal atmospheric conditions. The Timeline of the HPS program is shown in Fig. 2.1.1.

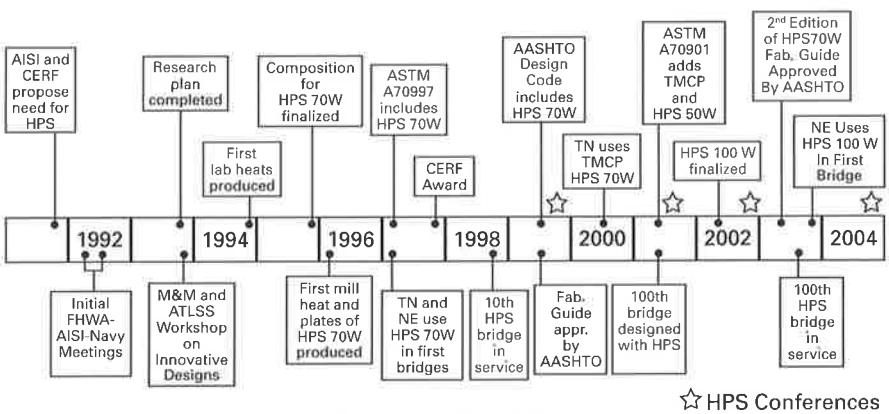

Fig. 2.1.1: HPS development timeline in the U.S.

In the United States, the principal steel specifications for bridges are American Society for Testing and Materials (ASTM) A709 and American Association of State Highway and Transportation Officials (AASHTO) M270. Currently, in these specifications, there are steel grades with minimum yield strengths (Y.S.) of 36, 50, 70, 100 ksi (250, 345, 485 and 690 MPa). These minimum yield strengths also serve as the grade identity. Furthermore, when the steel has a weathering capability, the letter "W" is at-