

HPS-70W High Performance Structural Steel for Highway Bridges

In 1994, the American Institute for Steel Construction (AISI) entered into a cooperative agreement with the Department of the Navy (USN) and the Federal Highway Administration (FHWA) to develop a high performance steel for highway bridges. The specific goal was to create a new steel composition having a high strength and a significantly higher toughness and corrosion resistance than was currently being used. In a remarkably short period of time, a material never before produced in the United States moved from the concept stage to the implementation stage, resulting in substantial cost savings in the first project built with it. Although this new steel (HPS-70W) has the same strength levels as the available AASHTO M270 Grade 70W steel, its unique chemical and physical properties allow the use of more economical fabrication practices. The main differences between these two steels are that in the HPS-70W steel, Carbon is almost half that of the M270 steel and Sulfur is one tenth. Because of its low carbon levels, the HPS-70W steel will eliminate preheating in the fabrication shop, and will permit an increase in fabrication productivity and allow a decrease in project delivery time. Toughness values over 200 Joules are commonly obtained with HPS-70W steel, as compared to values of 30 to 50 Joules for M270 steel. This superior toughness will eliminate the need to designate bridge elements as Fracture Critical (FC), thus reducing the design and fabrication time and improving safety and performance. Because of its high corrosion resistance, HPS-70W steel is classified as a weathering steel. Weathering steel eliminates the need for paint and corrosion protection, and can drastically reduce the initial and life cycle cost of the structure. Also, this can greatly reduce or eliminate pollution (VOC) due to paint.

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