

Super Duplex ZERON® 100 Saves the Thames River



Specifications

UNS: S32760 **W. Nr./EN:** 1.4501 **ASTM:** A 182 (Grade F55), A 240, A 276, A 314, A 473, A 479, A 789, A 790, A 815, A 890, A 928, A 988, A 995, EN 10028-7, EN 10088-2, EN 10088-3, EN 10272, EN 10216-5, EN 10217-7
ASME: B16.5, B16.34, B16.47, B31.3, Section VIII Division 1 Case 2244-2, 2245-1, Section III Division 1 Case N-564-2, SA-240, SA-182 (Grade F55), SA-479, SA-815, SA-789, SA-790 **NACE:** ISO 15156 / MRO175 Part 3 **API:** 5LC **BSI:** PD 5500 - Enquiry Case 5500/87

Chemical Composition, %

	Ni	Cr	Mo	Mn	Cu	Si	C	N	S	P	W	Fe
MIN	6.0	24.0	3.0	—	0.5	—	—	0.2	—	—	0.5	—
MAX	8.0	26.0	4.0	1.0	1.0	1.0	0.03	0.3	0.01	0.03	1.0	balance

Case History

ZERON® 100 superduplex stainless steel, containing 7% Ni, has been used to significantly extend the life of the Thames Barrier in Greenwich, London. The barrier was originally constructed in the 1980's to prevent flooding of London at exceptionally high tides. Since it was opened in 1982 the bridge has been raised 64 times. The bridge consists of 6 piers with a raiseable barrier between each of the piers.

When activated the barrier is raised by hydraulics which involve trunnions running along a pair of tracks fastened around the barrier sides (Picture 1 opposite side). When the barrier is down the tracks are underwater. The tracks were originally carbon steel with a coating but over 20 years the combination of the estuarine water and the rolling of the wheels had removed the coating and caused severe rolling contact corrosion fatigue. A plan was formulated to replace these over a period of five years and ZERON 100 superduplex stainless steel, supplied by Rolled Alloys® (formerly Weir Materials), was chosen for the replacement based on its high corrosion resistance in seawater and its high hardness to resist wear.

Picture 1

Rusted steel tracks with frame to hold milling machine

**Picture 2**

ZERON® 100 rails welded into position

**Picture 3**

Finised ZERON® 100 rails after painting carbon steel

**Picture 4**

Machined ZERON® 100 cam welded into place

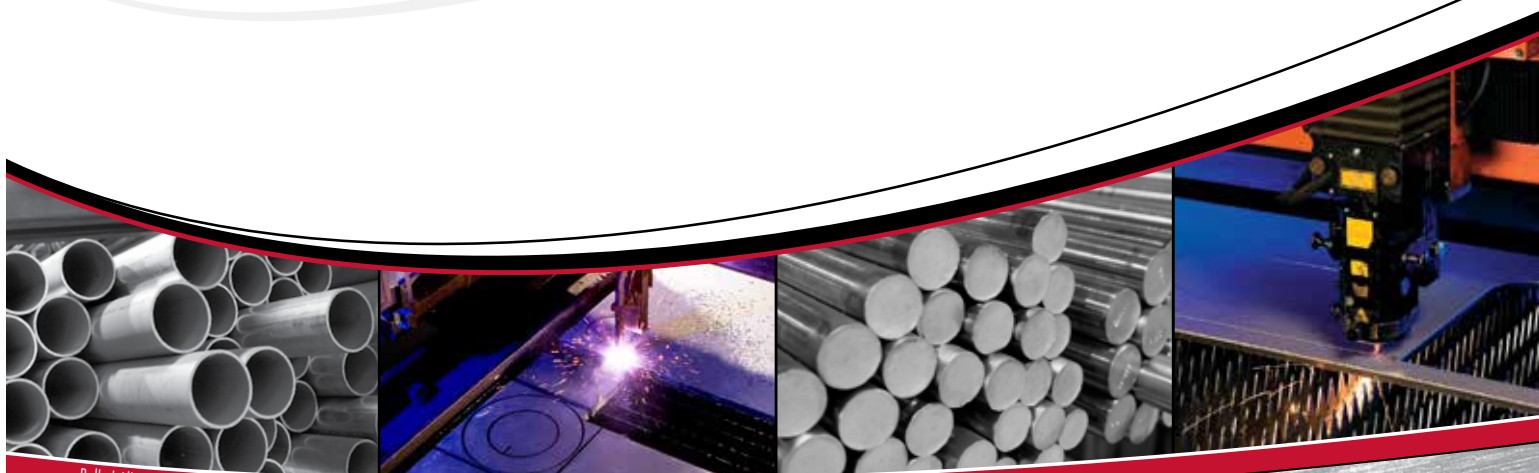


Case History, Continued

The old tracks were machined away using a milling machine fastened to a special jig between the tracks (Picture 1). The new tracks were cut from ZERON 100 plate and were 30mm thick and 70mm wide. The new tracks were manually welded to the carbon steel with SS 309L filler wire (Fe/24Cr/12 Ni). This is a commonly used filler metal for joining CRA's to carbon steel (Picture 2).

After welding, the carbon steel around the tracks was cleaned and painted with a marine grade epoxy paint to help it resist corrosion when immersed (Picture 3). The tracks included a raised section (Picture 1), which is an actuator cam, and a replacement piece was machined for each of these and welded into place after milling away the old one (Pictures 1 and 4).

The replacement tracks were installed over a period from 2002 to 2007 on all of the piers. The barrier is expected to last until at least 2080 to enable it to continue preventing London from flooding.



Rolled Alloys, RA, and ZERON are registered trademarks of Rolled Alloys



The Global Leader in Specialty Metals