

**110-04-031****Examination Of A Fractured LPG Tank Hinge Stub Shaft**

A fractured stub shaft weld was submitted for analysis. The samples included the shaft itself and the plate to which it was welded. The stub shaft reportedly served as a hinge to attach a pivoting LPG tank to a lift truck. We understand that the weld fractured when the driver operated the lift truck without latching or securing the LPG tank. The material specification essentially describes weldable, low carbon steels with minimum yield strengths of 33 ksi (230 N/mm<sup>2</sup>) and 36 ksi (250 N/mm<sup>2</sup>), respectively.

**120-04-075**

Three fractured knives were submitted for analysis. We were told that the knives were removed from the same mill. We understand the mill is located in a coastal area. The knives were reportedly manufactured from cold rolled, heat treated, and ground Chipper tool steel. We were told that knives manufactured from cold rolled bar had been introduced several months ago and had provided satisfactory service in numerous mills. To date, failures have been observed in only one mill. Per Drawing, the knives are to be heat treated to a specified hardness of 56 to 60 Rockwell C.

**120-05-084**

A knife strip exhibiting a heavily chipped side and an acceptable side was submitted for analysis.

**157-05-005**

One Center Sleeve from a boiler feedwater pump was submitted for analysis.

The sleeve material was reportedly specified as 12-17 chromium stainless steel hardened and tempered to 375 to 425 Brinell. The sleeve reportedly acted as a bearing against a Graphalloy bushing in a 10 stage boiler feedwater pump. We understand that the pump operated at a maximum temperature of 350 °F, and that no lubricant other than boiler feedwater contacted the Graphalloy bushing/stainless steel sleeve. It was reported that a sleeve failed after 40 hours of operation in a new pump installation. A second sleeve failure occurred in a re-built pump after only 8 hours of operation. The sample submitted for analysis was removed from this second pump.

**172-04-015****Preliminary Analysis Of Failed And Coated Brazed Carbide Inserts****178-04-016**

**Analysis of Cracked Shear Blades.**

Four fabricated, but not used shear blade assemblies, three used and failed shear blade assemblies, and six shear blade castings were submitted for analysis. It was reported that the shear blades are used to trim hot thermite welds on rails. The shear blades reportedly exhibited premature cracking and chipping. We understand that the shear blades represent a mature design and that a reduction in service life has been observed in recent components.

**178-04-017**

Two fractured pistons were submitted for failure analysis.

**180-04-004**

Examination of the cracked knife blades

**180-04-007**

Five fractured pliers jaws were submitted for metallurgical analysis. We were specifically asked to determine the reason for the observed differences in torque loads required for fracture.

**BISK-2007**

A pressure vessel was located in a pulp and paper mill and failed after only 2 months in service. This particular vessel was a very large and expensive part, and was intended for long-term use. A small sample of the vessel was provided for analysis.

**TROL-2007**

A line of steel rotor caps produced by casting have been cracking with seemingly frequent occurrence.

**REGI-2010**

A steel bolt used as part of a truck suspension/turning mechanism is consistently fracturing under the head.