# CASE STUDY 74

## (SELECTION OF QUENCHING OIL AND DESIGN OF HT CYCLE FOR HIGH ALLOY AND PRECIPITATION HARDENING STEEL)

### PROFILE OF COMPANY:

A leading forging component manufacturer. Customer is a manufacturer of open die and closed die forgings, engaged in manufacturing oilfield and power transmission components in various grades like low and medium carbon steel, alloy steel, stainless steel, Inconel, 17-5PH, duplex and super duplex.

### TRIAL OBJECTIVES:

1. Establishment of Hiquench MF-W Oil for the critical Cr-Alloy Steel Grades.
2. Need to achieve the required material properties.
3. To reduce the overall crack rejections.

### OPERATING/ APPLICATION DETAILS :

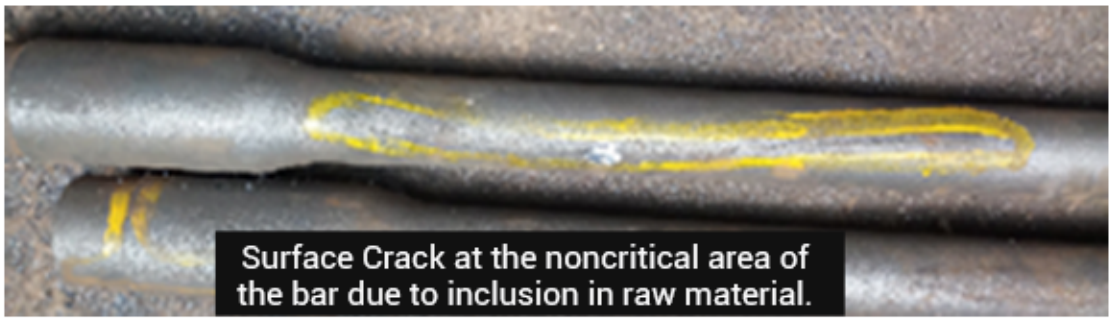
1. System: Pit Muffle Furnace/Open Quenching Tank
2. Tank Capacity: 20000 Ltrs
3. Part: Anti Roll Bars,
4. Material: Steel- 52CrMoV4
5. Application: Subsea Oilfield
6. Process: Hardening & Quenching

### OPERATING PARAMETERS:

| Parameter | Original Cycle | Modified Cycle1 | Modified Cycle2 |
|---|---|---|---|
| Preheating Temp °C | 550 | 650 | 650 |
| Hardening Temp °C | 860 | 850 | 850 |
| Oil Temp °C | 37 | 45 (Actual) | 60 (Actual) |
| Quenching Time (Min) | 20 | 20 | 10 |
| Agitation (Two Agitators) | Top & Bottom on for 20 Minutes | Top & Bottom on for 5 Minutes only | Top & Bottom on for 2 Minutes only |

In modified cycle 2, charge taken out after 10 minutes @ 185° C temperature.

### COMPONENT DETAILS



Surface Crack at the noncritical area of the bar due to inclusion in raw material.

### OBSERVATIONS & RESULTS:

Desired results achieved with modified cycle 2.

**PRODUCT RECOMMENDED: HIQUENCH MF-W**

## TRIAL CONCLUSION

As quench Hardness observed 578 BHN.( Required 477 BHN Min. )

Number of crack reduced after modified cycle 2 - to 0.5 % from 10%.