

Roll Failure Analysis

This is an extended abstract of a presentation at an Industry Track session on the exhibit floor of Materials Science & Technology 2008.

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Rolls represent a significant investment both by the roll user and roll manufacturer. In today's market, high demand and limited supply for rolls have resulted in manufacturing lead times that can be as high as 36 months or more for certain roll types. Therefore, it is especially important for roll users to learn how to maintain their roll inventories through a good understanding of the various problems that can develop in service. They should also learn how to prevent such problems. The purpose of this presentation is therefore to review and discuss some of the more common problems that can occur with rolls in service.

The discussion will cover service problems that can arise on most roll types: forged rolls and cast rolls, work rolls, and intermediate and back-up rolls in both hot mill and cold mill applications. Examples of some of the service problems that will be covered include surface indications (cracking), surface initiated spalling, subsurface initiated spalling,

and other common service problems. Each problem type discussed will be analyzed as follows:

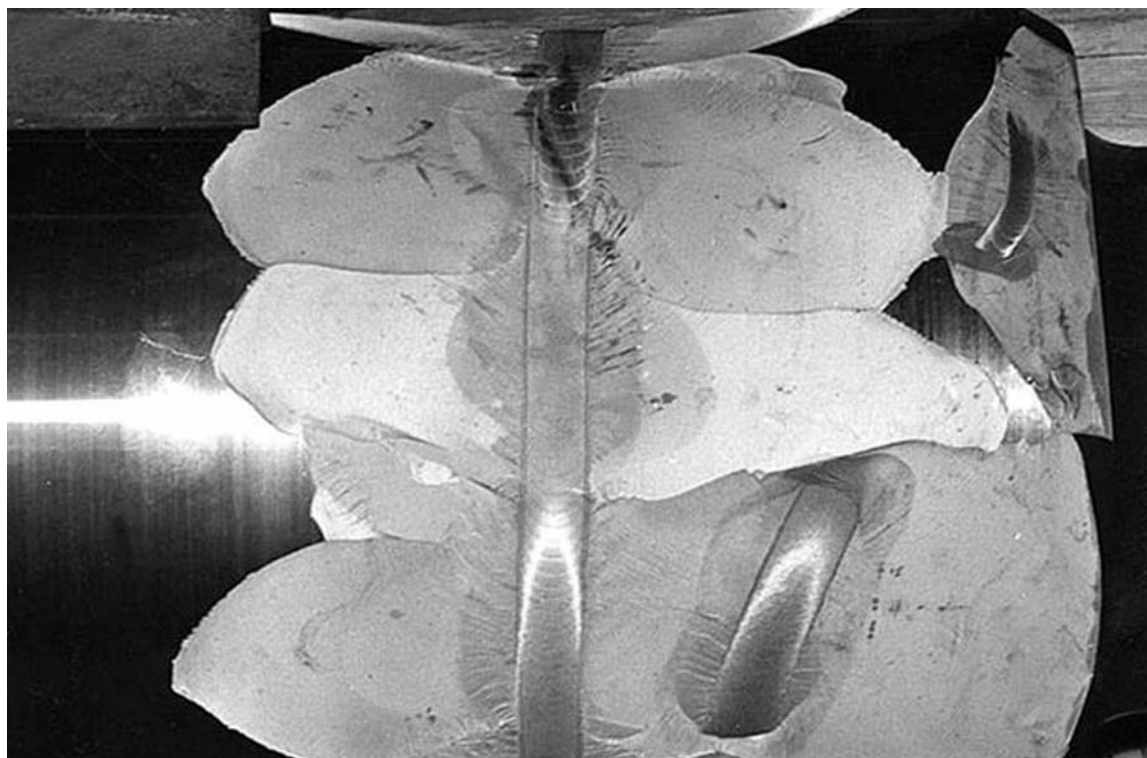
- **Characteristics:** Each problem type will be described using general characteristics. These general characteristics can then serve as a guide for proper identification of service problems.

- **Mechanisms:** How each service problem type develops will be fully detailed to help better understand the mechanisms involved in their formation.

- **Prevention:** Preventive action measures will also be recommended for each service problem type.

To achieve the maximum function from every roll throughout its service life, a good roll inspection program is essential. A discussion will therefore also be given regarding common inspection methods, including ultrasonic inspection, eddy current, dye penetrant, magnetic particle, and etch testing. Each inspection type will be described and compared to show their benefits as well as their limitations. ◆

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The Industry Track session on Roll Failure Analysis will help roll users to prevent problems such as spalling on rolls.