

Casting Defect Analysis in Printing Machine Cylinders

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Abstract — This paper deals with casting defects in offset printing press cylinder and their remedies. A printing press is a mechanical device for applying pressure to an inked surface resting upon a medium (such as paper or cloth), thereby transferring an image. Sand inclusion is one of the most frequent causes of casting rejection. It is often difficult to diagnose, as these defects generally occur at widely varying positions and are therefore very difficult to attribute to a local cause. Areas of sand are often torn away by the metal stream and then float to the surface of the casting because they cannot be wetted by the molten metal. Sand inclusions frequently appear in association with CO blowholes and slag particles. Sand inclusions can also be trapped under the casting surface in combination with metal oxides and slags, and only become visible during machining. If a loose section of sand is washed away from one part of the mould, metallic protuberances will occur here and have to be removed. In this paper sand inclusions were closely studied and two methods were proposed such as a gating system and mixing of sands. By the implementation of these two techniques fifty percentage reduction in rejection rate was achieved.

Keywords— Castings, casting defect, sand inclusions, gating system, sprue, gating system design.

I. INTRODUCTION

Foundry industry is considered as the mother industry for all types of industrial, agricultural and consumer products. The development in this industry is therefore found to have far reaching effects on the production in all other sectors. Though the casting processes are based on techniques that are age old and amazingly simple in principle, considering the effectiveness of result achieved the metal casting industries have become the key industry in the world today

II. LITERATURE REVIEW

Offset printing is a commonly used printing technique where the inked image is transferred (or "offset") from a plate to a rubber blanket, then to the printing surface. When used in combination with the lithographic process, which is based on the repulsion of oil and water, the offset technique employs a flat (planographic) image carrier on which the image to be printed obtains ink from ink rollers, while the non-printing area attracts a water-based film (called "fountain solution"), keeping the non-printing areas ink-

free. Ira Washington Rubel invented the first offset printing press in 1903. Figure 1 represents how the image gets printed in the offset printing press. It consists of three types of cylinders and two types of rollers. In plate cylinder a plate is wound on which the image is imprinted. With the water roller, water is placed in the area, where there is no image. Likewise the ink roller places ink where there is no water. Thus impression of the image on the plate cylinder is transferred to the blanket cylinder and from the blanket cylinder image is printed on paper. The impression cylinder ejects the paper outside. Printing machine cylinders are basically of three types.

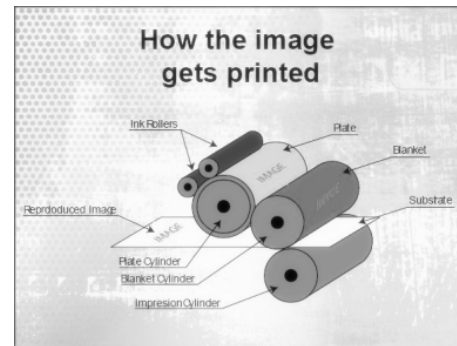


Fig 1 Schematic diagram of offset printing press

1. Plate cylinder:- This cylinder occupies the topmost position where it receives the ink to be imprinted. One half of this cylinder has certain hollow sections where plates are assembled.
2. Blanket cylinder: - It is located in the middle, just after plate cylinder. Its function is to transfer (offset) the ink it receives from plate cylinder to the paper. Its shape is similar to plate cylinder except for a broad projection head.
3. Impression cylinder: - This cylinder occupies the lower most position and located below blanket cylinder. It has outer peripheral surface for holding and transferring a sheet.

Processes involved in Casting Of Printing Machine Cylinders

Following processes generally needed for manufacturing printing machine cylinders,

1. Patternmaking