Centralized Oil Lubrication System

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Abstract - In centralized oil lubrication system (COL) the goal is to reduce friction and dissipate some of the heat generated by friction. With centralized lubrication, every bearing receives the proper lubricant in an exact amount to minimize wear and promote longer service life. Here different type of oil flow rate is wanted for the lubrication points these are all easily done with COL. This project mainly includes working of COL system in paper machine, components of COL system and the specifications of the each component, working pressure of COL system; different oil flow rates for friction points, performance enhancement were explained in detail

Keywords – centralized oil lubrication system, types of lubricants

I.INTRODUCTION

COL System stands for centralized oil lubrication system. Every moving part on a machine benefits from timely and effective lubrication to help reduce wear, minimize lubricant consumption and maximize efficiency. These benefits can be more fully realized by introducing centralized lubrication technology to deliver the right lubricant at the right time in the right quantity to the right point of use.[1,4]

All types of standard and specialized machines can run with centralized oil lubrication system .Applications encompass equipment used in a wide range of industries, including automotive, machine tool, metals, printing, paper, food and beverage, mining, chemical, plastics, hydrocarbon processing, refinery and wind energy, among many others .In all cases, centralized lubrication feeds lubricant from a central source to the points on a machine or machining system where friction occurs. The goal is reduce friction and dissipate some of the heat generate by friction. With centralized lubrication, every bearing receives the proper lubricant in an exact amount to minimize wear and promote longer life. The potentially staggering number of on-site (and sometimes hard-to-access) lubrication points makes perhaps the most compelling case for implementing centralized lubrication technology. A customer census, for example, has identified 7500 individual lubrication points for a paper mill; 5500 for an automotive assembly plant; 4000 for a steel mill; 3500 for a refinery; 2000 for cement mill; 1500 for a plastics plant; and 1000 for a frozen foods facility. Regardless of the number, centralized lubrication systems faster opportunities to improve productivity and profitability by increasing machinery uptime and keeping maintenance issues in check. ITC Paper Machine-4 COL system is shown in below.[4,9]

II.METHODS OF OIL LUBRICATIONS

Oil bath The simplest method of oil lubrication is the oil bath († fig.). The oil, which is picked up by the rotating components of the bearing, is distributed within the bearing and then

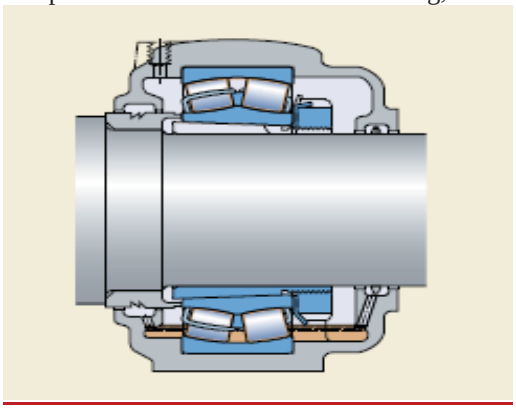


FIG.1

flows back to the oil bath. The oil level should be such that it almost reaches the centre of the lowest rolling element when the bearing is stationary

Oil pick-up ring For bearing applications where speeds and operating temperature are such that oil lubrications necessary and high reliability is required, the oil pick-up ring lubrication method is recommended(† fig.). The pick-up ring serves to bring about oil circulation. The ring hangs loosely on sleeve on the shaft on one side of the bearing and dips into the oil in the lower half of the housing. As the shaft rotates, the ring follows and transports oil from the bottom to collecting trough. The oil then flows through the bearing back into the reservoir at the bottom.SKF Plummer block housings in the SONL series are designed for the oil pick-up ring lubrication method.[5,7]

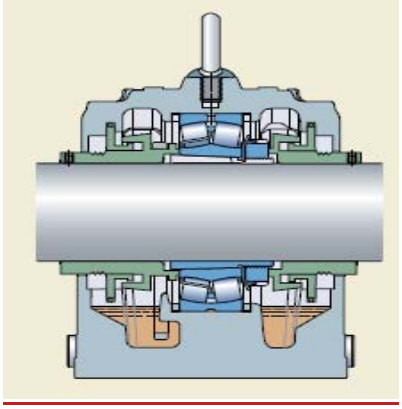


FIG.2

Oil pick-up ring

Oil mist Oil mist lubrication has not been recommended for some time due to possible
negative environmental effects .A new generation of oil mist generators permits to produce oil mist with 5 ppm oil. New designs of special seals also limit the amount of stray mist to a minimum. In case synthetic nontoxic oil is used, the environmental effects are even further reduced. Oil mist lubrication today is used in very specific applications, like the petroleum

Oil mist Circulating oil

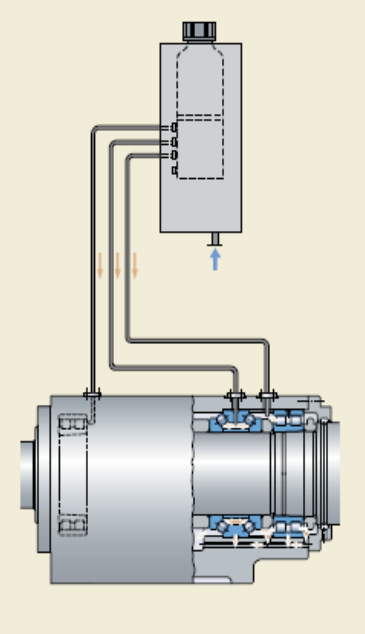


FIG.3

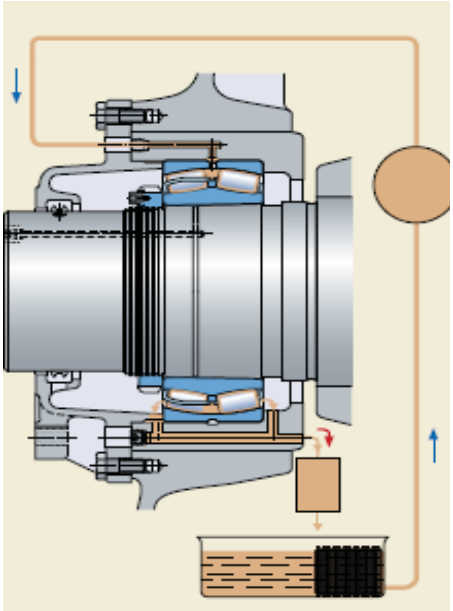


FIG.4

Circulating oil Operation at high speeds will cause the operating temperature to increase and will accelerate ageing of the oil. To avoid frequent oil changes and to achieve a fully Flooded condition, the circulating oil lubrication method is generally preferred († fig. 3&4). Circulation is usually produced with the aid of a pump. After the oil has passed \ through the bearing, it generally settles in a tank where it is filtered and, if required, cooled before being returned to the bearing. Proper filter in leads to high values for the factor hc and thus to long bearing service life

III. INSPECTION, SERVICING, TROUBLING SHOOTING

3.1 INTRODUCTION
In general terms “Maintenance” can be broken down into following three activities

3.2 INSPECTION
Action taken to maintain the status i.e., ensuring that wear margins and reserves are used up to slow a rate as possible during the services life of the equipment.

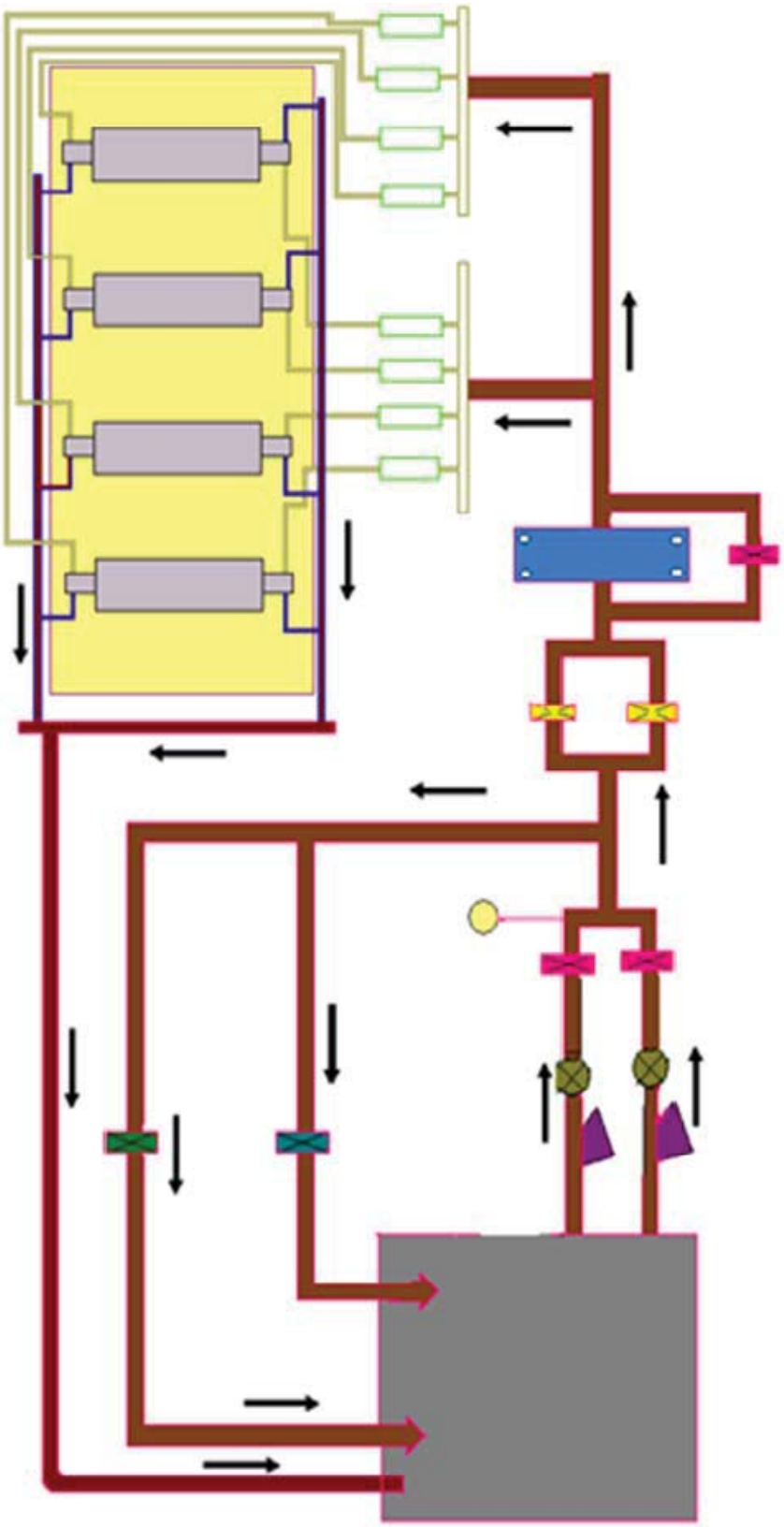
3.3 SERVICING: Action to ascertain the actual status i.e., determining how and why wears margins & reserves are being used up.

3.4 REPAIR:
Action taken to restore the status i.e., to re-establish wear margins and reserves and restore loss of performance.
With oil lubrication installations the terms “loss of wear margins and reserves” means

- Increased clearance between spools & bores
- Worm dynamic sealing elements.
- Fatigue of rolling bearing materials.
- Excessive clearance between plain bearings and shafts.
- Cavitations, damage to pumps and valves.
- Chemical changes to fluid.

3.4 COL SYSTEM IN PAPER MACHINE

The machine consists of different section which are specified : Wire and Press section, Dryer section, Coating section, Calendaring, Pope Reel.[5,9]
Dryer section:



CENTRALIZED OIL LUBRICATION SYSTEM

The wet sheet formed at wire is to be dried to form a board; the drier section uses steam to dry the web by means of direct contact between the cylinder surface and the sheet.
The dryer cylinder is a rotating cylinder of dia 1500mm and is supported by bearings on either side. The drier is driven by means of internal gears attached to each drier by forming a gear mesh through the intermediate gear pinion. As such they are eleven drier groups each group consisting of different numbers of driers and four cylinders in each group is driven by gears. Some cylinder is driven by screen friction on the cylinder surfaces for a particular drier group. To supports and to guide the screen a felt roll is arranged between each cylinder (dryer).The felt roll is also supported by means of bearings on either side. There are total 89 dryer cylinders in P.M and 194 Felt Rolls, 42 points of gear mesh and the intermediate gears supporting bearings. The amount of lubrication required is determined by based on the application of lubricants, the size of bearings, load on the bearing and the amount of heat it has to remove. Here lubricating oil is Servo system -220 the different lubricating points and the amount of flow for each point is specified in below .
The COL systems are basically designed to lubricate these dryer cylinder bearings, their internals gears and the felt rolls bearings. The block diagram of a COL system is shown in below fig.

IV.CONCLUSION

1. All types of standard and specialized machine can run with centralized lubrication system.
2. The performance of the COL system is increased by the above-suggested parameters.
3. The operation of a COL system is influenced by the conditions that are present at the place where it is installed
4. COL system is main system for the entire Paper Machin

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