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Design of Centralized Oil Lubrication for Writing & Printing Paper Plant

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ABSTRACT

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. Centralized lubrication system feeds lubricant from a central source to the points on a machining system where friction occurs. All type of standard and specialized machine can run with centralized lubrication systems. Applications encompass equipment used in a wide range of industries, including automotive, machine tool, metals, printing, paper, food and beverage, mining, chemical, plastics, among many others .In centralized lubrication system 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. In this paper machine-6 total 749 points are lubricated by this COL system. Here different type of oil flow rate is wanted for the lubrication points these are all easily done with COL .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.

Introduction

COL System means 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. 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

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 some times 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 foster opportunities to improve productivity and profitability by increasing machinery uptime and keeping maintenance issues in check. ITC Paper Machine-6 COL system is shown in below[1,9]

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machine or machining system where friction occurs. The



Fig: Centralized lubrication technology generally falls under two broad categories. Total loss and circulating-oil-systems

In total loss systems friction points are always supplied with fresh lubricant at (oil) at specific intervals (time or machine-cycle dependent) during the lubricating cycle (such as pump run time). The lubricant is furnished in the proper quantity at friction points to allow for buildup of an adequate film of lubricant during the subsequent ideal period. Circulating-oil lubrication provide for the lubricant to flow back in to the lubricant reservoir for reuse after passing through the friction points. In this way, the lubricant carries eve more benefits as it transfer forces and damps vibrations; removes abrasion particles from friction points; stabilize the temperature of friction points; prevents corrosion

Col system in paper machine

Paper machine-6 of M/s ITC Ltd is a Writing & printing machine commissioned on 2008. M/s Metso supply the machine. The running speed of the machine is 700mpm to 900mpm with an average production varying 300Tons/day to 450Tons/day.

The machine consists of different section which are specified

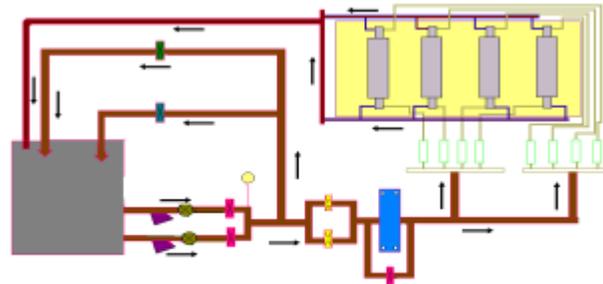
Wire and Press section, Drier section, Coating section, Calendaring, Pope Reel.

Drier section: 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 drier 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

group each group consisting of different numbers of driers and four cylinder in each group is driven by gears. Some cylinders are 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 (drier).The felt roll is also supported by means of bearings on either side.The COL system is basically designed to lubricate these drier cylinder bearings, their internals gears and the felt rolls bearings. The block diagram of a COL system is shown in below fig.

CENTRAL OIL LUBRICATION SYSTEM



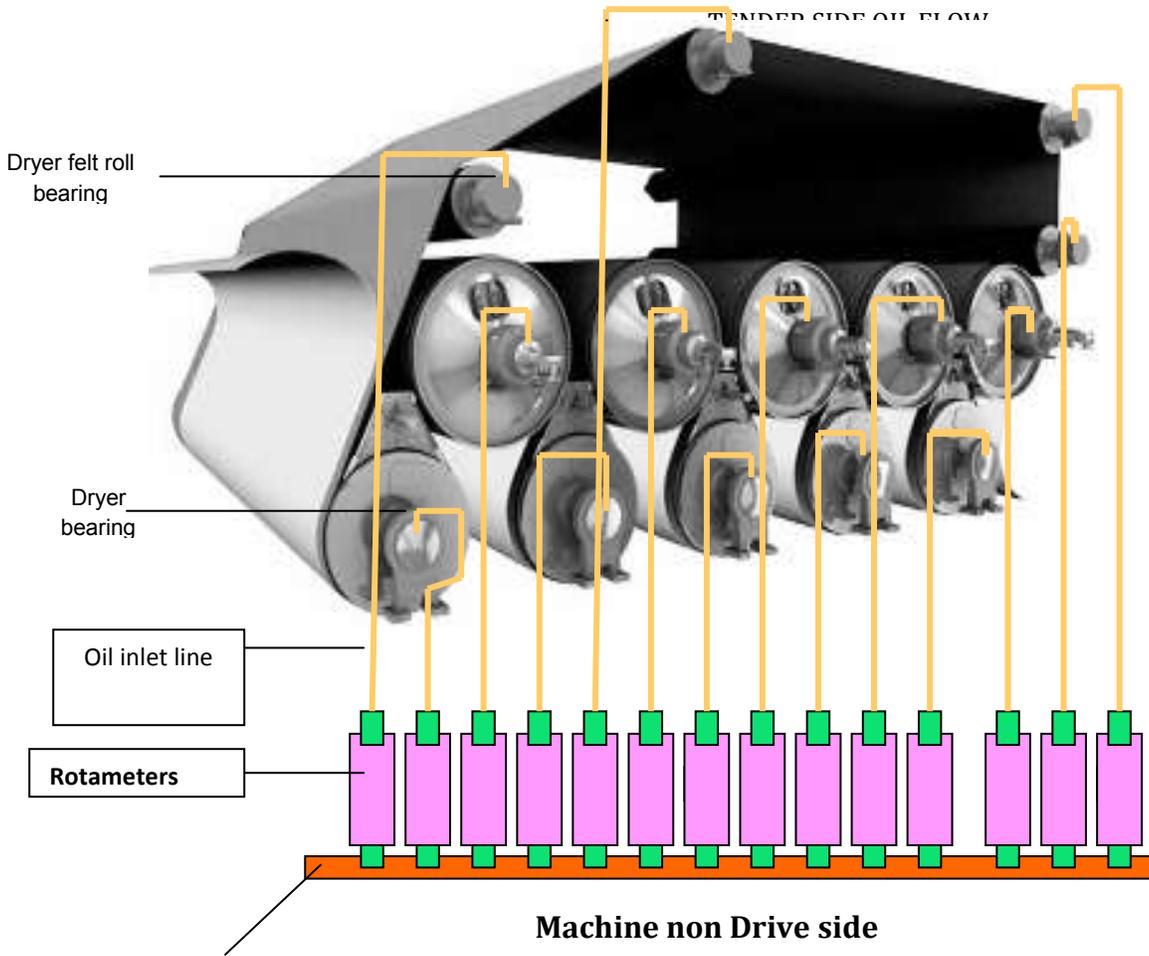
Inter locks of COL system

Hooter to be on when system pressure less than 2 kg/cm².

* When pump one is running, pressure becomes less than 2 kg/cm² pump 2 has to start automatically after 1.5 min (90sec) and Vice-versa.

* Machine is to be tripped if both the pumps fails to deliver pressure less than 2 kg/cm² after 3 (90 Sec + 90 Sec) min.

There are total 89 drier cylinders in P.M/c-6 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 Steel EP -220 Plus the different lubricating points and the amount of flow for each point is specified in below table



S. No	Lube point	No. of points	Flow/ point	Total flow(lpm)
1	Couch roll bearing	1	4.5	4.5
2	Dryer Cylinder Bearing	89	0.82	72.98
3	Dryer felt roll Bearing	194	0.11	21.34
4	Paper lead roll Bearing	1	0.2	0.2
5	MG Touch roll Bearing	1	1.5	1.5
6	Pre calendar top roll bearing	1	0.03	0.03
7	Soft calendar roll bearing	1	0.1	0.1
8	Pope reel bearing	1	5.0	5.0

Total Lubrication Points 289 Nos
 Total Tender end flow 105.63 lpm

Advantages of col system;

Centralized Oil Lubrication systems ensures the continues flow of lubrication to the point of application thus reducing the chances of no lubrication of rotating equipments to zero, which enhances the performance of the equipments. The advantages of the systems are

The control of the oil flow parameters is maintained through single point.

With centralized oil lubrication, every bearing receives the proper lubricant in an exact amount to minimize wear and promote longer service life.

The manual lubrication is completely avoided.

Conclusion

- The operation of a COL system is influenced by the conditions that are present at the place where it is installed . COL system is main system for the entire Paper Machine .

The flow of lubrication system is monitored easily.

As the system parameters are controlled through single point the maintenance of the systems becomes low.

The cleaning of the system can be done easily.

It is suitable for high temperatures application where human cannot reach.

The system enables impurities are retained back and pure oil is entered into the lubricating points.

- All types of standard and specialized machine can run with centralized lubrication system. The performance of the COL system is increased by the above-suggested parameters.

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