Grinding of M. G. cylinder in position-A step towards import substitution and optimum machine utilization

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SUMMARY

Problems had been faced at WCPM after the use of Steel doctors on the M.G. cylinder. The polished surface of the cylinder started deteriorating and the glaze of paper was badly affected at certain places. It became absolutely necessary to grind the M.G. cylinder surface. This was a job normally done by foreign experts who work with portable grinders. Since foreign parties were asking for toc much time and portable grinders were not immediately available, WCPM engineers took up the challenge and decided to carry out the job using the Dronsfield roll grinding machine which is normally used for grinding press and calender rolls. The entire machine was lifted to the M.G. cylinder level and the grinding work was successfully carried out by WCPM engineers. Since then the glaze is normal and the paper quality is quite acceptable. This job was done for the first time in India by Indian engineers and has resulted in substantial foreign exchange saving and reduced machine downtime.

WCPM has three paper machines out of which one is equipped with M.G. cylinder with pre-dryer and after-dryer. On the M.G. paper machine there is provision to make both MF and MG variety of papers. The M.G. cylinder is of 4.2 metres diameter and 3.6 metres face.

For optimum utilization of the drying capacity of M.G. cylinder, this machine is producing mainly M.G. grade whereby high production can be obtained and a variety of grades of paper and boards can be produced.

At WCPM following grades of M.G. variety of paper and boards are being produced :

1) M G Plain Kraft	60 to 250 gsm
2) M G Ribbed Kraft	50 to 90 gsm
3) M G Pink Manilla	50 to 85 gsm
4) M G White Poster	50 to 140 gsm
5) M G White Pulp Board	1 150 to 300 gsm

M.G. paper machine was commissioned in 1958 and till middle of 1981 there was no problem with the glazed side of paper. However, due to nonavailability of bronze doctor blades in M.G. cylinder, steel blades were fitted. It was then observed that the M.G. surface which was highly polished, started deteriorating and, at one stage, glaze on paper was markedly affected in certain places. M.G. White Poster and M.G. White Pulp Board, which are used for aluminium foil lamination, have great demand provided the surface is very smooth. The use of steel doctor blades spoiled the glaze in some areas as mentioned above, which affected the smoothness adversely. Patchy areas with poor glaze showed up prominently when the paper was foil laminated. Such paper and board were naturally not acceptable to the consumers for foil lamination. WCPM took up the matter very seriously and correspondence was done with various parties in India and abroad to grind the M.G cylinder surface. Normal practice is to bring a portable grinding machine and fix it on the MG. cylinder for grindirg the same. The actual grinding has so far been done under the supervision of a foreign expert. The portable

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IPPTA Vol. 20, No. 3. Sept., 1983

84

grinding machine was not available indigenously. Also foreign parties were asking for too much time to complete the grinding work. WCPM could not afford to lose the business, and as such the problem of grinding M.G. cylinder was posed before our engineers.

The suggestion came from our own engineers that the Dronsfield grinding machine which is normally used for grinding calender and press rolls can be utilized for grinding the M.G. cylinder in position.

PLANNING

Initially the requirements of the job were studied in detail by the concerned engineers. Accordingly the grinding arrangement was finalised which included the speed of M.G. cylinder during grinding, quality of grinding wheels and total grinding time needed.

Next the drawings for supporting the structures for grinding (weighing about 11 tonnes) for fixing at site and also for coolant circulation system were made. The right type of grinding wheels, diamond dressers and other materials for providing mirror finish to the M G. cylinder surface were procured.

While the above materials were being procured, the fabrication of supporting structure was started, utilizing the available structural steel in Stores, like beams, channels, angles and plates etc. The structure was so designed that its components could be reused in the future in the mill. The angle base plates for fixing of grinding machine were made by machining accurately.

After receipt of the indented materials, the machine shut down for the M.G. cylinder grinding was planned. The whole programme was planned to keep the machine down time to the minimum in order to avoid high production loss.

STRUCTURE FABRICATION, ERECTION AND GRINDING MACHINE INSTALLATION

After shutting of the machine, a few rolls, which were expected to foul the supporting structure and also the grinding machine, were removed. In the meantime, the supporting structure was shifted to site and erection of the structure was started.

The shifting and positioning work of roll grinding machine (weighing about 11 tonnes) to the height of about 9 metres was taken up under very strict supervision.

IPPTA Vol. 20, No. 3, Sept., 1983

ALIGNMENT OF GRINDING MACHINE AND GRINDING

After shifting the grinding machine, the most important aspect of this project was started, which involved operations like levelling of machine, aligning with M-G, cylinder and setting it for the actual grinding operation. Side by side the coolant circulation system was installed and its working tested.

The complete system was thoroughly checked up and rough grinding was started. The grinding cut was strictly kept under control to check chatter or hard marks on the surface. The rough grinding was continued for seven days till a level surface was achieved. Time to time inspection and dressing of grinding wheel was done.

The smooth grinding wheels were fitted for finishing the levelled surface of the cylinder. In the meantime, a new problem of blow holes on the cylinder surface was observed. The plugging of blow holes numbering about 14 was decided using a material matching to that of MG cylinder. The smooth grinding operation was resumed after plugging the blow holes.

MIRROR FINISHING AND TRIALS

The smooth grinding operation was followed by mirror finishing for which a wheel specially prepared in WCPM Workshop was mounted on the grinding machine. Constant attention was paid to the finish of grinding and so also the accuracy of grinding.

After satisfactory completion of M.G. cylinder grinding, the grinding machine and structure were dismantled and shifted. During erection and dismantling of structure, all safety precautions were observed specially the fire hazard for the other nearby machines which were in operation. Moreover, for the final finishing job, the nearby MF machine was also shut to avoid transferring any vibrations to the M.G. machine.

The entire job was completed in 12 days. Machine trials were taken and glaze on paper were found to be satisfactory. Since then the machine is running normally and all usual varieties cf M.G. papers are being manufactured.

CONCLUSIONS

i) This job was carried out for the first time in India by Indian engineers and has resulted in direct foreign exchange saving of about Rs. 2 lakhs.

85

ii) Machine down time was reduced from 1 month to about 12 days. This resulted in minimum disruption of the manufacture of quality papers.

It is suggested for proper maintenance of the M.G. cylinder surface that care should be taken to avoid any rough patches on the cylinder because these tend to grow in size due to moisture present in the environment and scraping due to doctor blades.

ACKNOWLEDGEMENT

The authors wish to record their gratitude to the Management of the West Coast Paper Mills Ltd.,

for permission to publish this paper. In particular, they wish to acknowledge the constant encouragement and help received from the following during the execution of the job of M.G. cylinder grinding.

1.	Shri S.N.	Somani —	Constituted	Attorney

- 2. Shri B.K. Darak General Manager (Admn.)
- 3. Shri B.P. Biyani Dy. General Manager Tech.

86