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Innovative modifications in LHS and ESP controls with a view to improve reliability, availability and O&M efficiency

1.0 Introduction

Though modern engineering designs are superior, they fail frequently due to certain unique working conditions and to be evolved with due consideration to overcome. This paper deals with three modifications implemented innovatively which are very effective in enhancing the performance of the system.

1. Electrostatic precipitator rapping system modification
2. Electronic proximity switch introduction to SME machines in LHS.
3. Modification of linear heat sensing cable holder in automatic medium velocity water spray system

The above modifications were improved the reliability, availability and O&M efficiency of the system.

2.0 Electrostatic precipitator rapping system modification

In ESP, ash particles get collected in the collecting electrodes and subsequently removed by adequate period and duration of rapping and transported to vessels.

The rapping consists of EERM, CERM and GDRM and rapping frequency and duration is generated from old master controller and modified control circuit shown in Fig.1.

New rapping system enables power regulated rapping which makes effective dislodging process and energy saving during rapping period. PCR mode rapping saves approximately 17 to 20% of previous consumption energy (Fig.2).

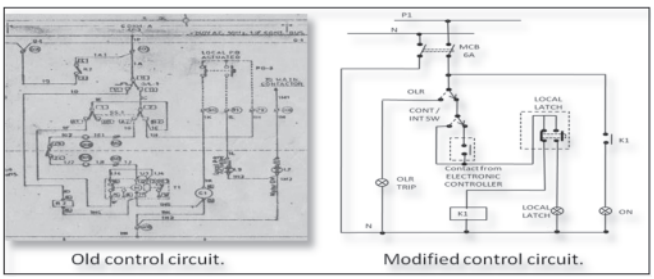

Fig.2: PCR mode rapping

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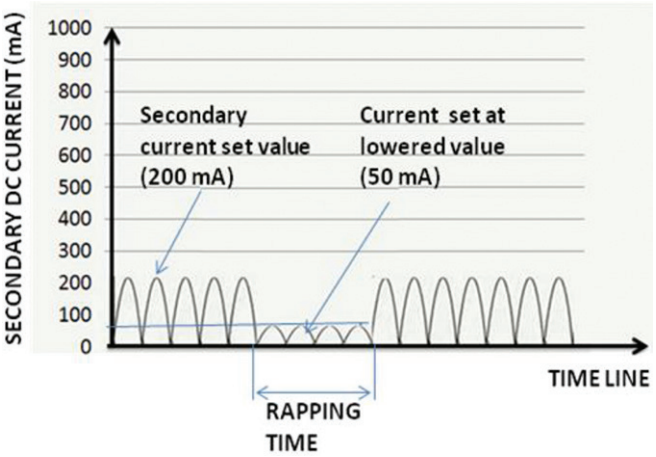


Fig.3: Limit switches in SME machine

3.0 Proximity switch introduction in SME machines in lignite handling system

In SME machines hydraulic hoist and lower and higher operation limit switches were fixed in critical and dusty location and access was very difficult. Hence frequent problems were reported and very difficult to attend problems. The Fig.3 shows the critical location and the arrangement of mechanical switches in SME machine.

The Fig.4 shows the new arrangement of electronic proximity limit switches of reclaimer and stacker. Cost saving approximately Rs.1,25,000/per year.

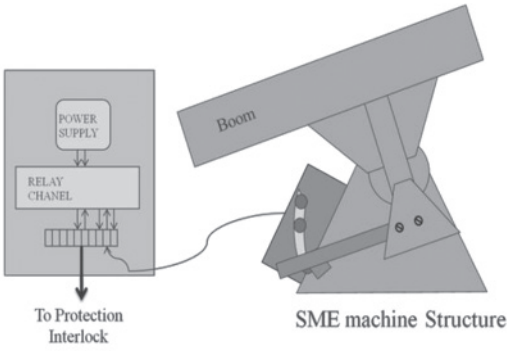
4.0 Modification of LHS cable holder in automatic medium velocity water spray system

AMVWSS system comprises automatic fire detection, quenching and alarm. IRD and LHS cable are the sensing organs

- The LHS cable is laid very closer to conveyors got damaged. Its holding hooks also fail and displacement away from conveyors. The Fig.5 shows damage of LHS cable and holder.

New type of cable holder was made with L angle pieces as shown in the Fig.6. The cable strength was also increased by adding stray wire.

This modification saves Rs.2,80,000 per year.



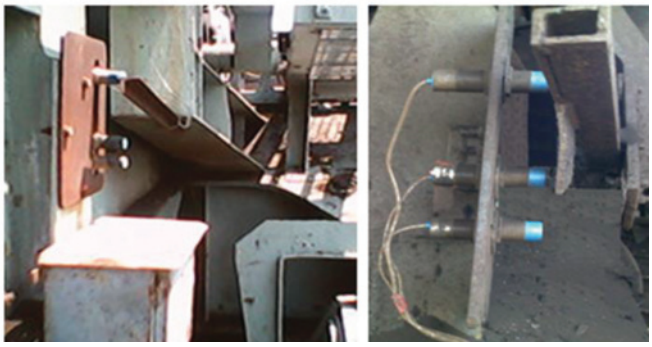


Fig.4: Hoist new limits and supports

Fig.5: Damage of LHS cable and holder

5.0 Conclusions

The Power Regulated rapping will be adopted for all thermal units with the consideration of stack emission level.

1. All the collection sections can be put in power regulated rapping mode except the last collection electrodes.
2. The effective of dislodging process will be higher than that before. Hence rapping frequency can be lowered and energy can be saved.

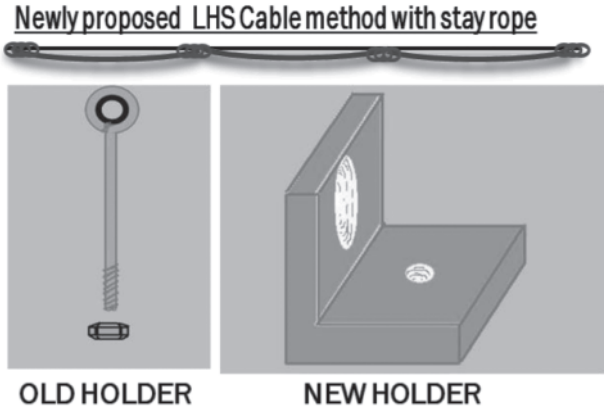


Fig.6: Holder and cable laying method

3. Energy saving during rapping period will be approximately 17 to 20% of previous consumption.

6.0 Acknowledgments

AHS maintenance electrical HOD, Division head, colleague and AHS maintenance mechanical executives supported for the preparation of the case study.

Footnotes

Abbreviations used in this paper:

ESP- electro static precipitator

SPM - suspended particulate matter

mA - Milli Amps.

AHS - Ash handling system

HOD - Head of department

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