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Expertise Collaboration & Data Integration in Industries

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Abstract – Tracing clues of revolutionary moments in the recent past that have given economic development a breakthrough leap worldwide, one cannot forget to mention the phrase Fourth Industrial Revolution[1] (4IR or Industry 4.0) which was introduced by a team of scientists developing a high-tech strategy for the German government and was later introduced to a wider audience through including it in the theme "Mastering the Fourth Industrial Revolution" of World Economic Forum Meeting for the year 2016 held in Switzerland.

While institutionalizing new ventures of innovation is widely being considered as the way ahead for India to achieve its aspirations of becoming a $5 trillion economy, exploring ways towards extracting maximum yield out of its existing industrial resources is another important pillar which is needed to be given equal attention upon.

Undoubtedly, the next leap of industrial transformation lies in combining the power and value of data. Interestingly, data is already there, industry owners have struggled to see through or make sense, to access or harness its value.

As the theme here is Engineers for Viable Technology and $5 Trillion Economy, which is a Techno-Philosophical subject, let's explore the correlation between the technical human resource and their scientific deliverables.

Keywords– Expertise Collaboration; Data Integration;
Shared Supervision

INTRODUCTION

The existing practice of supervising operation and maintenance of all machines including rotating machines in major industrial institutions have infamous stream wise departmental segregation that too in a multilayer manner which is there because of few of its well justified administrative reasons that are mainly aimed at setting accountability and authority in order to get precise and efficient functioning. There is no problem with this approach as far as the administrative control is concerned but, there is this fact cannot be denied that midst long run of discharging this methodology somewhere an invisible boundary line gets drawn unintentionally in the delivery approach of the personnel involved at all layers. Not to blame anyone of these departmental verticals since this conduct is a natural outcome of the established framework that they are bound to adhere with. However, here comes the need of envisioning a solution that can address this immeasurable problem in a précised way and chalk out a platform where deliverables of all involved stakeholders can be defined and integrated in a measurable manner. Once all such streams & verticals come together and join hands not only for solving problems but also for developing new techniques capable of mitigating the root causes, it is then only our aspirations can come true.

CASE STUDY

While this is a popular phenomenon happening across all segments of industries, here for better understanding of the subject and it's detailed analysis purpose we will consider the case of rotating machines (pumps & blowers) in industries.

Few of the outlined demerits of not having a digital mechanism of integrating the outlooks of all stakeholders at a common platform, are as follows:-

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1) No digital tracking system for supervising the running pattern of rotating machines.
2) Total continuous running hours of these vital rotating machines are not known in lack of digital record system. Even if it is available in some of the upgraded PLCs[2] (Programmable Logic Controller) realizing them into useful data is still a complex process.
3) No robust reference for supervising timely changeover of pumps & blowers in lack of a guiding feedback system.
4) No tracking system for supervising the frequency of breakdown of a particular pump or blower leading in ambiguity of corrective action.
5) No tracking system for ensuring whether timely preventive maintenance of a particular rotating machine has been performed or not.
6) Sometimes few of the above inputs are available in the manual log-books but owing to their scattered possession and that too across a wider timeline, combining them manually in the form of a useful data is totally impractical.

SOLUTION

Digitization of the above referred activities and statistics by feeding them in the DCS[3] (Distributed Control System) and their integration in the form of Timer and Trend can dramatically improve the practice of supervising the service pattern of rotating machines with respect to their maintenance events which ultimately will result in optimization of their usability for a comparatively extended life span, which is usually not harnessed otherwise. Salient features of implementing integrated timelines of rotating machines in industries are as follows:

1) The Timer on DCS will instantly guide the operating personnel to changeover the pumps & blowers upon attaining the preset standardized running hours for respective rotating machines.
2) The Trend which is produced by data logging of multiple activities taken place across the timelines of respective rotating machines can be used for producing self generated preventive maintenance calls in the form of alarms, which will also eliminate the delayed preventive maintenance due to human errors or overlooking.
3) Additional provision of tagging events of all repair & maintenance jobs performed on the respective rotating machine’s trend in the forms of color coded pegs will be of great use in assessing the machine’s performance as well will be helpful in planning suitable future course of action. Kindly refer Fig.1 for typical view of activity timeline of a rotating machine.
4) Further, drop down selection provision will instantly provide list of all previously performed maintenance activities of specific category for a particular rotating machine, during any desired period.
5) These above provisions altogether will largely enable engineers in reaching data driven decision making s.

BENEFITS

Few of tangible & intangible benefits of implementing the integrated timeline scheme are enlisted as follows:

1) Huge financial savings can be made on account of avoiding the maintenance cost by preventing the rotating machines from premature breakdown through ensuring timely “changeover” and “preventive maintenance”, which otherwise happen due to continuous overrun.
2) Financial savings in terms of protecting opportunity loses which otherwise happen if breakdown of rotating machines occur resulting in production interruption and material wastage which were under process chain at that particular time.
3) Lifecycle enhancement of rotating machines.
4) By tracking preventive maintenance of equipments on their own timeline with the facility of producing self-generated preventive maintenance calls, will raise the practice of comprehensive monitoring & TPM[4] (Total Productive Maintenance) to next level.
5) Facility of tracking records for all repair & maintenance jobs performed on a

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particular rotating machine in a trend form will be largely helpful in better assessment by engineers across department verticals. This collaboration of expertise and knowledge sharing will also help engineer's develop their problem solving skills.

CONCLUSION

It is widely known that major technology suppliers across the globe these days are pushing for inclusion of artificial intelligence, advance robotics & IIOT[5] (Industrial Internet of Things) in their technology packages as much as possible, in order to uphold their competitiveness in luring industries by providing all in one solutions. In fact, many of the contemporary economists have already termed this ongoing business strategy in their references as a data driven economy.

From the above explained case study we saw how sharing data & their useful integration can help & guide us in deciding the right course of action. It is therefore true need of the hour for the Indian engineers to realize this transforming trend of swift transition of technology and should come forward in joining hands across streams & functional verticals to collaborate and share their expertise making value addition in their existing resources and yield more returns.

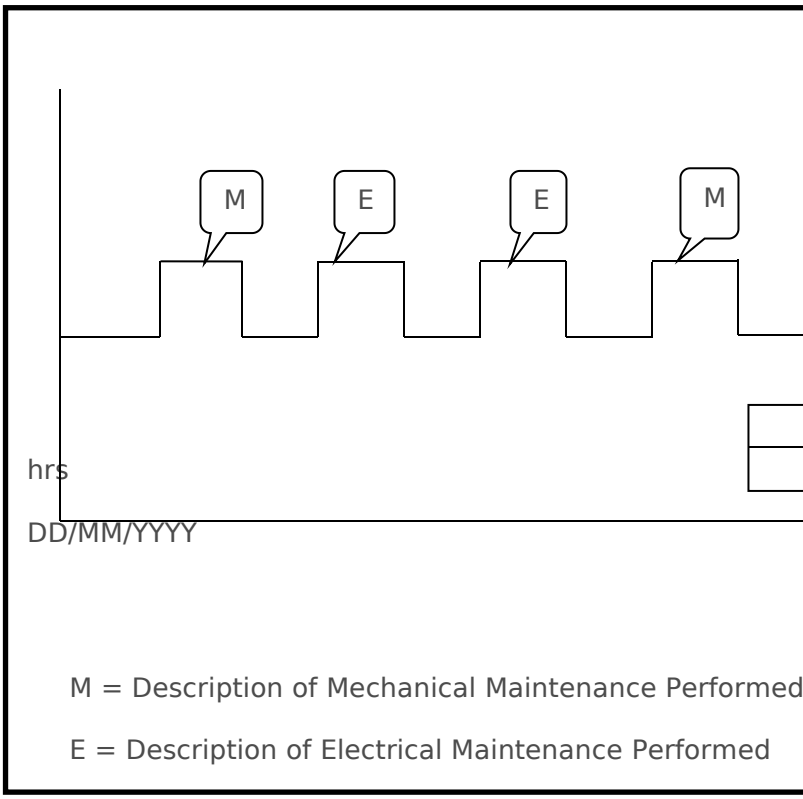

Fig.1 Typical view of an a

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