

From Editor's Desk

Dear fellow CEEAMA Members, Greetings!

I think we all are passing through unprecedented trying times.. Just when the lockdowns got lifted and life was limping back to normal both personally and professionally, we had to face the stand-off with China along LAC. This forced our Government to take strong and assertive actions at Military, Diplomatic and Trade levels. We at CEEAMA don't want to worry about Tik tok and other applications getting banned, but our industry and commerce is getting affected adversely. Since a lot of Indian Industries have close tie ups with Chinese raw material suppliers, business partners and service providers, the strained relationship between the two Governments only adds to the uncertainty in the business environment. Think Global Act Local is a concept which sounds very noble, however we should have a complete action plan ready before any meaningful change can be brought about.

On the domestic front, COVID-19 is a serious threat since we started the un-lockdown process and the spread seems to be unstoppable even though the recovery rates are quite good. All in all the business sentiment seems to be very apprehensive, to say the least.

On our part, CEEAMA has organised about 30 Webinars in the past 8 weeks and a lot of Members have taken benefit of the same. We will continue to organise the Webinars about which Members will be informed from time to time. We once again appeal to all our Members to participate in these Webinars in large numbers and take advantage of the available Knowledge, Information and Expertise.

Best wishes for the Second half of 2020. Stay safe, take precautions and stay healthy...

Warm Regards,

Abhay Pimpalkhare

Editor committee



CEEAMA

FAILURE MODES AND IMPORTANCE OF ELECTRICAL MAINTENANCE Mr. Chindambar Joshi - Maitriser Technologies Private Limited (LFM-128) NEW CEA GUIDELINES ON TYPE TEST VALIDITY Ministry Of Power Central Electricity Authority

FAILURE MODES AND IMPORTANCE OF ELECTRICAL MAINTENANCE

It is known that electrical systems can have high inherent reliability to minimize end-product field service costs, safety hazards and, of course, liability. Failures of electrical systems are most frequently due to external factors such as poor design, improper use, faulty manufacturing, substandard service, mishandling and other causes. System malfunctions are rarely caused by random component failures and a properly executed failure analysis will almost always identify an entity liable for resultant damages. It may be noted that Reliability is a fairly complex topic with many different methods and definitions.

Reliability specialists often describe the lifetime of a population of products using a graphical representation called the bathtub curve. The bathtub curve consists of three periods: an infant mortality period with a decreasing failure rate followed by a normal life period (also known as "useful life") with a low, relatively constant failure rate and concluding with a wear-out period that exhibits an increasing failure rate. This article provides an overview of how infant mortality, normal life



failures and wear-out modes combine to create the overall product failure distributions. It describes methods to reduce failures at each stage of product life and shows how burn-in, when appropriate, can significantly reduce operational failure rate by screening out infant mortality failures. The bathtub curve is thus a conceptual model that generally defines all of the probable failure rate regions that a system, machine, component or individual failure mode might exhibit as a function of time, cycles. These regions include infant mortality, constant failure rate and wear-out.

Reliability experts assert that most machines or systems exhibit a constant rate of failure as a function of time for most of their lives and is generally seen accurate. The constant failure rate period often follows an infant mortality period (machine's or the system's early life) during which the failure rate is elevated. Reliability Centred Maintenance (RCM) experts rightly utilize this inform-ation to modify and optimize maintenance plans. Again, for electro-mechanical equipment, the failure rate often increase linearly as a function of time.



The constant failure rate period is the region in which most of the systems spend most of their lives once they survive infant mortality. The failures in this region are often called the "random" failure period, which probably explains why it's the least-understood region and hence the most difficult to deal with. While the failure rate may be mathematically random because systems fail to exhibit a definitive time relationship, it's not to say that the failures are without cause. Accepting that the failures are mathematically random can divert the individual or organization.

The typical and appropriate response to a constant failure rate is to develop an appropriate inspection and monitoring program and employ condition-based-maintenance (CBM). Predictive CBM is still reactive; it is a much more acceptable form than waiting until the equipment function is affected, but it's reactive just the same. If we accept that the failure rate is random and fail to gain an understanding about why the failures are occurring, we miss opportunities to proactively alter the failure rate through changes in system design, operational context and environmental condition control. In reality, the constant failure rate period appears constant because:

- i. Some of the failure modes are indeed random as a function of time, and
- ii. There are so many unrelated failure modes contributing to the overall rate that the result appears to be random

For truly random failure modes, CBM is the best option. However, if the time to failure could be assessed individually on a mode-by-mode basis, it would likely be found that many of the individual failure modes do indeed exhibit a time relationship – increasing or decreasing as a function of time. If a definitive relationship between failure rate and time for a specific failure mode can be established, one can take proactive measures to change the relationship. When all of the modes are lumped together to produce a constant failure rate, which creates a random appearance, all one can do is wait for the next failure and hope the monitoring program catches it and then reacts to it. By all means, for failure modes with no clear time dependency, CBM is the preferred course.

In summary, we should be very careful about selecting overhaul preventive maintenance tasks because our equipment may not have an age-reliability pattern that justifies such tasks. In addition, due to human errors, overhauls are likely to cause more problems than they prevent if aging regions are not present. When data is absent to guide us on this very fundamental and important issue, we should initiate an Age Exploration program and/or the collection of data for statistical analyses that will permit us to make the right decisions. However, this takes a lot of time and effort, thus higher cost. We should also defer, where possible, to the non-intrusive condition-directed tasks until we have more definitive results from the age exploration process.

Conclusion:

For old and complex electrical systems comprising old and new equipment installed without holistic planning and lack of maintenance, condition-based-maintenance is the best option. Any other option results in higher maintenance cost and may provide mis-leading trends.

References:

- 1. Bathtub Curve and Product Failure Behaviour Part 1 Dennis Wilkins Weibull
- 2. Electrical Equipment Failure Cause and Liability TASA Group ID 419
- 3. Fallacy of bath tub curve Anthony Smith and Glenn Hinchcliffe Feb 2006

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CEEAMA E-NEWS I JULY-2020

CEEAMA Activity

CEEAMA WEBINARSin the month of 2020			
SR	DATE	COMPANY NAME	Participants
1	10-Jun	Savita Polymers Limited	157
2	12-Jun	Orient Electric Ltd	111
3	15-Jun	HPL Electric & Power Ltd	117
4	15-Jun	Telawne Power Equipments Private Limited	114
5	17-Jun	P2 Power Solutions Pvt Ltd	138
6	19-Jun	KEI Industries	182
7	22-Jun	Siemens Limited	166
8	24-Jun	Legrand India	115
9	26-Jun	C&S Electric Ltd	113

• In Response to our appeal for conducting webinars from our associate members for mutual benefit, the associate members responded quickly. CEEAMA is very much thankful to them. LFMs and other CEEAMA associates responded in large numbers and we could conduct 9 webinars as above during the month of June 2020 and the program is continuing in full swing and the dates are booked even till mid Aug 2020.

• This is giving good opportunity to our associate members to get in touch with consultants and end users in on going difficult times and present their products and technologies.

• Our event managers FairAct Exhibitions & Events LLP took gallant efforts as usual to take the information to all of you and to organize the webinars professionally up to high level standards set by them. Many thanks to Fairact as well.

• Associate members are using this opportunity as "Mass Cold calls" and the activity is helping them in continuing the bond with consultants during the period when there are lot of restrictions on field movement of their sales staff. These webinars are also highlighting technology behind the product, various associated standards and also actual available products.

CEEAMA GC and ENEWS editing committee is grateful to all members and nonmembers who are helping us to uplift this webinar scheme and we have decided to continue with this at least till March 2021 and even further. So be on lookout for information on upcoming webinars.

