



# CEEAMA E-NEWS

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## *From Editor's Desk*

Dear fellow CEEAMA Members, Greetings!!!

In these unprecedented times, one is really at a loss of words to aptly express the feelings. Since our April 2020 news, practically nothing has changed except Calendar dates which also have become irrelevant.

All this while we have been used to terms such as 1.0, 2.0... etc. for versions of technology or software updates. We never imagined that we will ever have countrywide lockdown, leave alone having its versions like 4.0 which we are about to enter, come next week.

It is without a doubt that the world economy has been crippled and India is no exception. However, it is really heart wrenching to see the plight of our poor migrant labourers. The question that obviously crosses our minds is, where is the dignity of labour?

In this gloom the real ray of hope comes from our Covid-19 warriors who have been relentlessly working day and night to fight this pandemic & even sacrificing their own lives. A big salute to these martyrs....

While we all await the engine of economy to crank up again & eagerly waiting for economic package to be announced by the Government, the new normal of our behaviour, social distancing & hygiene practices are going to be critical in holding the fort till the vaccine is developed.

All crisis create opportunities and we are already looking at "Atmanirbhar Bharat" which will require a lot of resilience, commitment, dedication and hard work from all of us. Can we also try and feed meals to few people as a part of our social commitment?

I am sure all of you must have spent quality time with family members and got the batteries recharged.

On the professional front some of you may have been able to work from home which will become a new normal in near future. Others may have attended a lot of webinars and sharpened their skills. CEEAMA have also organised few webinars for their LFM, patrons and other members. GC members have conducted monthly meeting via teleconference to discuss on CEEAMATECH 2021 and improvements in CEEAMA program. On behalf of GC members, request all LFM, Patrons and Associates to participate in all CEEAMA activities, and send your valuable suggestions.

Good luck and best wishes for the post lockdown world...

*Article :*

### ***Process Control on Android System 'goMobile'***

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### ***" Case Study of Steam ingress in a 60MW Turbo generator "***

***Mr.A V Prasanna ( LFM 87 )***

# Process Control on Android System 'goMobile'

Background — Demand & Supply equation has always directed the path for any industrial revolution. Until Industry 3.0, this demand was well supplemented by the development of Electromechanical & Automation sector. But due to continual growth the demand for improving profit margin has also increased. This objective can be achieved by better productivity by way of effective manpower utilization, time study calculations, process like JIT, etc. This is impenitent to carve out additional profits in ongoing processes. Introduction of Digitization and concepts of IT has to be introduced and implemented in a safe and effective manner to change the face of ongoing processes.

This requirement has triggered new era of Industry 4.0 where solutions are found using advanced techniques of communication connectivity, data gathering, analysis of data and use of digital techniques to bring process control on fingertips. This project is aimed to provide suitable information and controls of system to process operators and management level personnel. A tool that will enable its users to make decisions faster and on time using a Tablet / android system without compromising safety, security and integrity of the system.

Keywords — WiFi, HMI, Remote Processing, Internet of skills etc.

## I. INTRODUCTION

The Internet of Skills allows humans to interact in real time over great distances – both with each other and machines so as to enjoy similar sensory experiences to those who experience it locally. In any industry type, the control cubicle is equipped with desktops/servers and huge monitors to check ongoing processes. There is nothing fundamentally wrong with this approach however this approach confines operators and managers in the control cubicle. This possibly reduces their capability to multi-task and summarize data of many processes at one place to make faster decisions.

Today Mobiles and tablets have advanced in their processing capabilities and still continue.

Hence we have used these gadgets in the project to acquire data, store, and display and give more/ new functions to operators. Mobile and Using Wi-Fi Main controllers can be accessed through customized gateways / connectors and data is gathered in tables to database. Functions described throughout the paper are based

on this model of data and connectivity. The project is designed in customizable modules for easy singular and/ or cluster implementation.

Modules introduced hereinafter are under the brand name of "goMobile":

**HMI on Android** devices to give complete Human Machine Interface (HMI) overview with all functions as available in control cubicle to operators wirelessly.

**Virtual control desk** where operator can 'see and operate' the equipment through an android device without confining himself to any particular area.

**Camera Online** where operator can actually view the line from anywhere

**Parameters online** to see live parameters of any equipment online and archive trends function to visualize signals and compare its behavior for faster/ on the spot decision making.

**Trend Online** gives graphical analysis empowering engineers towards faster decision making

**Report manager** to give online and assorted management for any reports / incidents information and also draw attention of intended personnel towards it.

"goMobile" modules will access electrical parameters of all connected power equipment such as MCCs, Motors and Drives, Brakes, Actuators, Solenoid valves, etc. The application can also view online parameters from these devices as well as live trends can be plotted to optimize energy consumption and check possible losses in those devices. For example parameters from Power Incomer, drive, blower, Intelligent MCCs can be viewed with process parameters to check performances of individual equipment as well as process as a whole. Energy savings and optimization goals could be achieved using this project.

## HMI- goMobile – (HMI on Android Devices)

If we consider operational category of group, for them what are the essential requirements? What would they like to know about the system or process at any given instant: it may vary from process speed, temperature or current, etc. This will give him a clear picture to understand overall situation of current process and parameters. Also this information will assist him to take decision and timely actions from remote locations as well.

Currently these values are provided by SCADA or HMI (Human Machine Interface). Visual systems have become one of the essential elements of today. So the concept of **HMI-goMobile** has been proposed.



Fig. 1. HMI Screen accessibility on Mobile Device

This gives accessibility to the operator to know what is happening in the system at any given point of time, online and most importantly when the person is not physically near the control station or near SCADA systems.

The advantages of such mobile availability are

- Faster / centralised decision making
- No dependency and proper planning

During the journey we have attempted to implement SCADA on the Web based system. So now live data and values are accessible on mobile device. An online interface with systems means one can virtually access it from anywhere through the Web browser on their smart phones / tablets or desktop computer.

## Control Desk-goMobile – (Virtual Control Desk)

For any process to operate locally, there are control desks at the actual site. These desks have various elements to operate the system manually under the supervision of operator either in process or maintenance purpose. These control desk elements are wired to one of the nearest remote intermediate module through signals that are connected to main PLC. With the introduction of wireless technology (WIFI) we can make such control desk elements mobile and flexible enough to configure. This concept in which we are creating a virtual representation of physical control desk is referred as Control Desk-goMobile.

Any end user with valid login credentials can access and operate any physical process remotely. This gives the operation mobility and flexibility of operator desks. However a situation can arise when the Wi-Fi connectivity allows the operator to control the device but the operator may not have clear view of the system. Or operator could be away from the actual machine/system and accidentally operate the same. To overcome this 'loss of sight of machine/system' the following integration has been introduced.

## Camera-goMobile – (Camera Online)

The introduction of camera may not be a new concept as we are already using it in live meetings etc. but this feature can be beneficial in terms of operation and safety by assisting operators in giving actual live visuals of the machine/ system/ site. This will enable the operator to ensure safety before he operates the control desk. Also as any given command has a specific impact on the equipment of process, the same is visible to the operator. In case of certain errors the same could be notified immediately and can be seen by the operator. A camera with good Microphone would give him better feel of standing (virtually) in front of the equipment.

Thus under this feature we are ensuring

- Safety of co-workers
- Safety of operator (Operating critical equipment)
- Material finish

## Parameters-goMobile – (Parameters Online)

In this feature we are trying to show the live parameters of the process fetched directly from the controller. User can remotely see the corresponding parameter that too instantaneously on his mobile device. This will enable him to understand effect of his command.

Thus combining Control Desk, Camera, Parameters as mentioned above we will have Virtual Control desk with which a user can operate a process effectively.

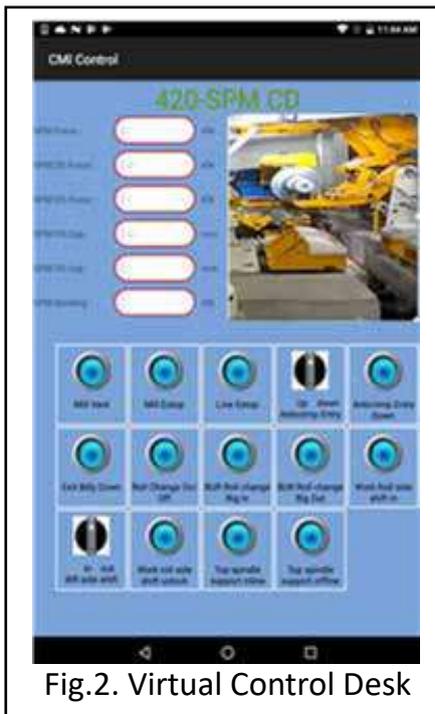


Fig.2. Virtual Control Desk

## Trends-goMobile – (Trends Online)

Any engineer is interested in knowing the equipment/ machine/ system performance based on time scale. By enabling this feature one can analyze multiple parameters together on mobile device.

Yes, we are showing 'Live' data trends on operator's mobile device. So that he can understand effect of particular command and based on that he can decide whether performance is good or need some improvement and can suitably schedule maintenance.

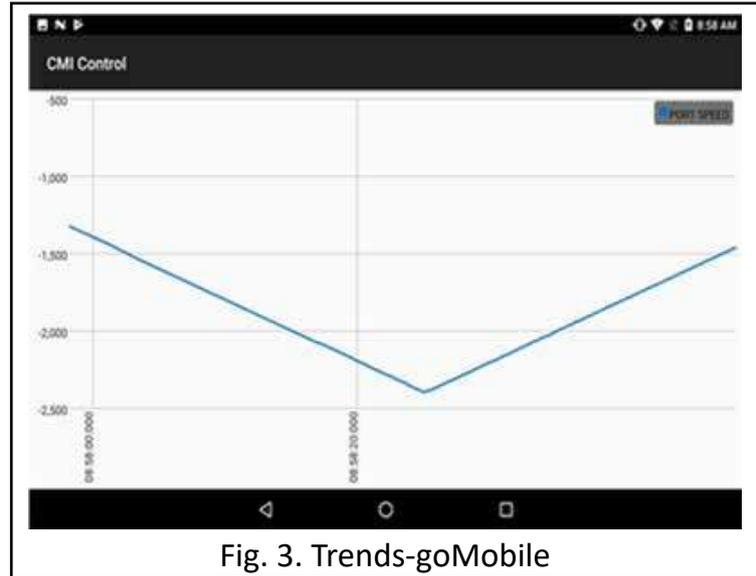


Fig. 3. Trends-goMobile

## DailyLog-goMobile – (Report Manager)

Reporting can become one of the major features when it comes to addressing an issue, fault finding, brain storming or report of any incident with detailed analysis. The prima fascia information of any incident can help management to take proper action and come to profitable consensus. A log book will help people on field as well on the maintenance job or there managers to report the events. Digitization helps in publishing these reports to intended persons instantly.

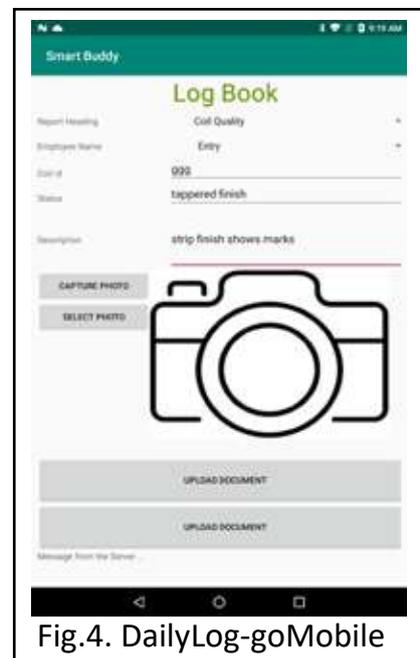


Fig.4. DailyLog-goMobile

The module can take pictures, add category of log, its severity and other important information and create a ticket or email to the plant. Go paperless concept is supported by implementing this aspect of IoT and digitization.

Inspection, Cleanliness, Shutdown, Equipment failure report or be it a Maintenance log, with suitable image or video, it will provide information of long lasting nature



Fig. 5. Implementation @ Site

## CONCLUSION

The concept presented in the paper is aimed at making any process digital, not only from operational point of view but also administrative and safety point of view. The components presented are actually developmental concept and further scope for its customization & improve. Safety is top priority in case of remote operation. Safety of human, equipment is well taken care of.

So summary is, Industry is looking to reduce cost which demands a person to do multitasking. Multi-tasking can be simply achieved if user able to see (Camera view), analyze (live values at fingertip) and operate (mobile control desk) remotely. Effectively save time and increase production. This is the pathway we propose towards 'Smart Factory'.

The benefits are we can actually control process remotely so we can think of centralized operation. We can save time and energy for collecting data or operation. We can go paperless.

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## CEEAMA Activities

Technical Product and Technology Webinar by Associates Members Company

Date	Company
15 <sup>th</sup> April 2020	Rittal India Ltd.
21 <sup>st</sup> April 2020	Northstar
23 <sup>rd</sup> April 2020	Phoenix Contact India P. Ltd.
29 <sup>th</sup> April 2020	Prama Hikvision India Pvt. Ltd.
1 <sup>st</sup> May 2020	ABB India Ltd.
4 <sup>th</sup> May 2020	Polycab India limited

# “ Case Study of Steam Ingress in a 60MW Turbo Generator “

## **Introduction:**

In any generator which has water cooling facility water ingress due to cooler leakage is a common phenomenon. What will one do during the leakage when rotor and stator megger is zero? Engineers adopt different method to solve this issue, let us study one such method.

## **Incident in brief:**

Abhijeet MADC Nagpur Private Limited, were setting up 60MWX4 units air cooled Turbo generator during 2010. At the time of commissioning unit # 2 during 2010, when the unit was ready and when steam was being injected in during warm up, engineers found that steam had leaked in the generator due to a cracked steam pipe in the vicinity of the generator. Unfortunately the erection team had not put the expansion bellows between the generator shell and air cooled condenser below the generator. This allowed steam to enter the generator shell. On meggering the stator and rotor the value was zero in place of Mega ohms.

## **Corrective measures:**

The steam pipe was replaced, and the expansion bellows were put back. But megger remained zero. Engineers from Dongfang Electric (India) private Limited ( suppliers of the generator ) tried all their best , to improve the megger, but were not successful. Owner’s consultant were Fichtner Consulting Engineers Private limited Mumbai, and my colleague from Tata power was the project manager. When this issue was brought to my notice, I offered my expertise to solve the problem.

## **Solution to Problem:**

The very next day I was in Nagpur. I was astonished to see the use of DC welding set hooked to slip ring and DC was passed on to the rotor. It was similar to “Birbal ki kichadi”. I discussed with the site management and engineers that there was only a single workable solution.

My solution was to remove the carbon brushes from slip ring. Run the turbine, as steam was ready. Allow the trapped air inside the generator to churn. Monitor the stator and rotor temperature, to be well within permissible limit. Take coolers in service one by one if the temperature rises. Physically check the generator shell to see if it is hot. Megger should improve with in a couple of hours.

On implementation of my solution the megger improved to the original measured value, and unit was taken in service.

## **Conclusion:**

Water ingress is a common phenomenon in any water cooled generators. Using the right technique can solve the problem. Perhaps we did not concentrate during our high school science class, where in our teacher had mentioned that when air is churned in a closed vessel it generates massive heat.

What I have adapted is the same old physics lesson.

Prepared by

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