





# The operator in focus

- using an intelligent & smart ergonomic workplace

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## The Big Problem

Industries have for many years been focusing on the automation process rather than the human that makes the critical decisions when something out of the ordinary occurs. It has been found, after countless accidents and incidents, some including fatalities, that it is the actions (or sometimes the lack of action) of the system users who more often than not are the actual pre-cursors to the events actually occurring. In the US alone it is estimated that over $20Bn (or 3% – 8% of industrial output) is lost due to unplanned downtime. As such the "Human Factor" element is an extremely important aspect, that if addressed, has the potential to recover up to 25% of lost production in the US alone. *(Source: Bill Hollifield, Dana Oliverr, Ian Nimmo, and Eddie Habibi, HMI production handbook)*

It is with these accidents and losses in mind that industry and international standards are now starting to demand considerations around Human Factors be part of the initial design phase as well as demanding owner/operators continually demonstrate their moves to comply with the various guidelines to retain operational certification.

The Human Factor components of ISO, EEMUA and NORSOK are now being discussed well in advance of protocols and hardware.

## The Next Generation of users

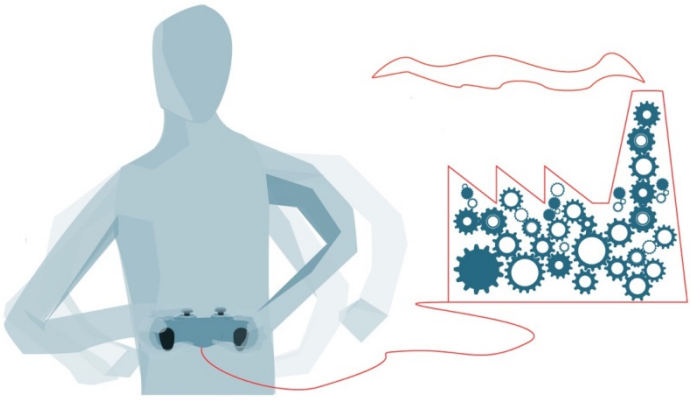
The UK alone requires over 31,000 new graduate engineers every year for the next 5 years to meet the current demand. Currently only 12,000 Engineers graduate annually and between 40% and 50% will move into non-engineering roles. Another issue is the impending retirement of baby boomers, this is expected to be nearly 100,000 engineers between now and 2016. This is an example of the issues in the UK although this demonstrates the potential crisis for engineering groups around the world. Part of this group of impending retirees is the current Control Room Operators.

Little has been done in the past decade to attract the next generation into the industry although it seems like the sleeping giant, which is the whole Engineering industry, is just beginning to wake and attempt to address the situation.

It is expected that the soon to arrive generation of operators will be higher educated than their predecessors although have less experience of the process and its safe and efficient operation. Training will need to pick up at pace although technology has the ability to mitigate some of the risks posed by this less experienced generation.

The picture is not all bad though. This generation, more than any before it, will have an ability to deal with the many layers of simultaneous information, and have a better understanding of interacting with technology, than the current groups of Operators and Maintainers.

Due to the technology made available to this new group during their development they are affectionately known as '***Generation G***' or '***Generation Gamers***'……we are faced with generation 'X' retiring to be replaced by generation 'G'.



It is obvious that this generation will not be satisfied with the standards set by previous generation (several keyboards and a lot of different telecom equipment on the desk). This new generation of operators (iPad generation) are more used with touch interaction technology and they are accustomed to higher environmental standards, and happen to be great problem solvers (skill gained from gaming).

This is also the generation that carries around their entire world in their mobile phone, that expects immediate access to information and think nothing of interacting with global groups to solve problems during their gaming adventures. They are also the generation that are so well connected that they are informed of all their friends whereabouts 24 hours a day.

As with all generational changes, the newer generation often sees the last as rather 'backward'. This particular generation though has absolutely no fear of interacting with HMI's and technology to solve complex multi-layered problems and in the process of doing that they are used to communicating globally to achieve that. They build strong networks and discard the weaker ones to achieve their goals; they have a gaming situational awareness which us 'parents' can never understand; they are able to deal with many layers of conflicting information and survive and then at the end of that they can still do their homework.

The key question should be: *"How to attract this group into our own Industry?"*

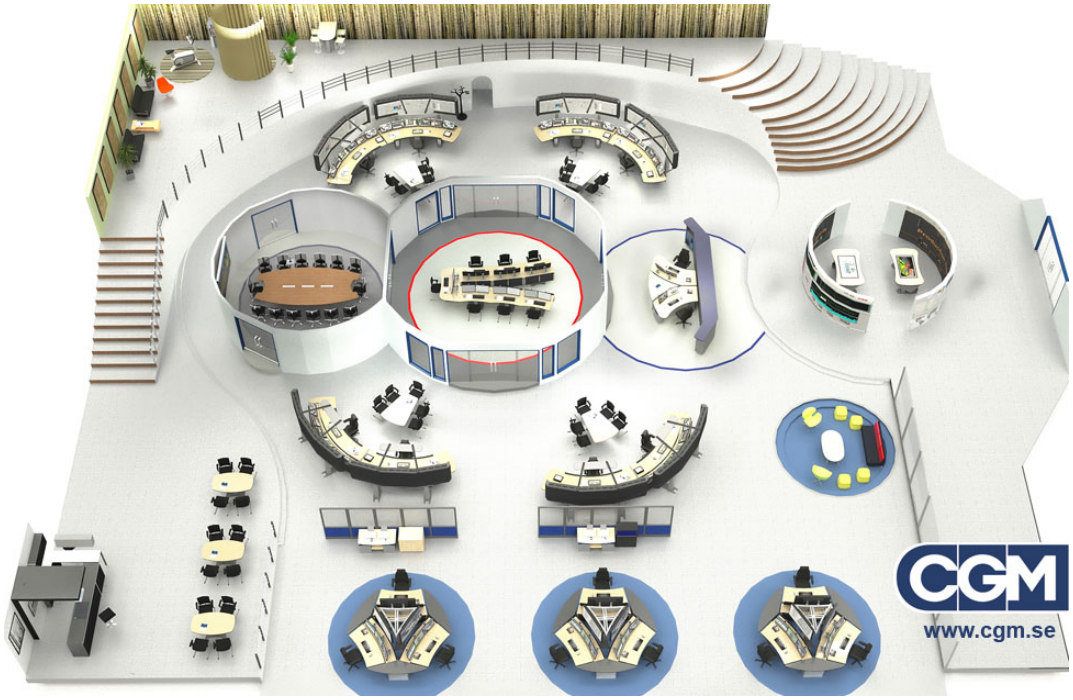
## Attracting the next Generation

One issue that most industries have, whether they want to admit it or not, will be one of attracting young engineers and technicians into an industry which is often seen as uninteresting and unrewarding. No matter how we try to convince them a major 'marketing' exercise is required at all levels.

After talking about this issue with many operators and end users it has become evident on many occasions that this issue has the ability to override conversations about the advantages of one particular technology over another.

No one would ever believe that using the technology of our parents would attract this new generation of potential operators and as such we need to take our thinking a little into the future to attract, and then look after, this next generation of users.
ABB/CGM are doing this in several ways, firstly we are extremely innovative when it comes to the development of technology which falls both inside and outside usual automation network, we are also industry leaders when it comes to designing facilities which comply with

(and exceed) the current guidelines, ensuring clients are offered a Control Room Solution which can easily impress even the most hard to please young engineer.

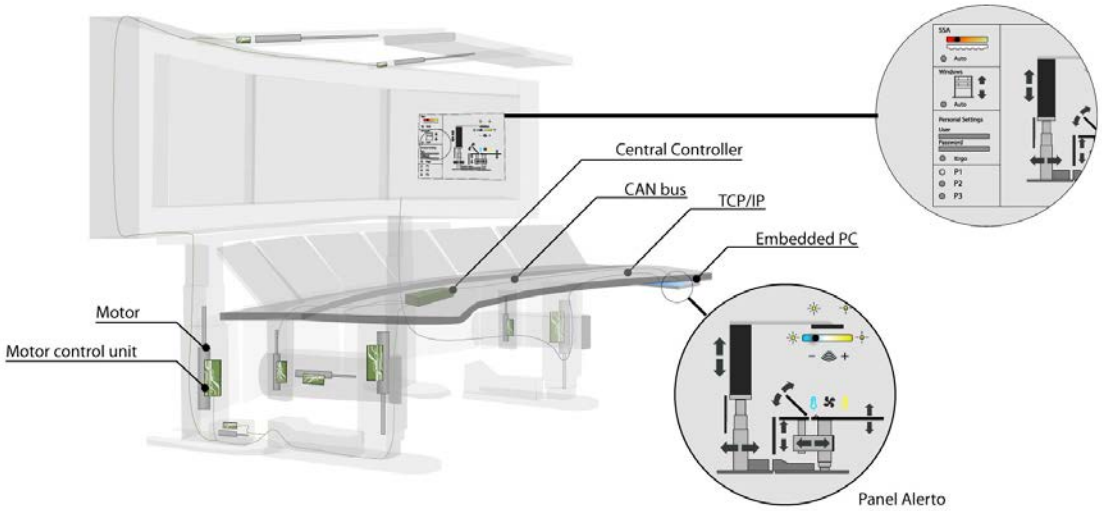



Giving careful consideration to the facility will only go a certain way to attract the next generation whilst improving the standards of the current. Taking the Human Factors aspect into consideration then it is more likely that they stick around.

## Retention – Human Factors Thinking

After attracting the next generation it is obviously extremely important to keep them and to do that it is important to address the environment and the wellbeing of those utilizing these spaces.
Health and Safety groups around the world are starting to wake up to the importance of an individual's wellbeing in the workplace. A component of this focus is the drive to improve 'Safety and Operator Effectiveness'. This has proven to be achievable with a greater consideration to Human Factors in the workplace.

In the modern world; manual work is less and less common and for most of us we spend a lot of the day sitting down; this is now being recognized as having a real negative impact on an individual's wellbeing. There is plenty of research on the dangers of being seated for periods which may be seen as too long (see article in British Journal of medicine http://bjsm.bmj.com/content/43/2/81.full). This can also lead to tired unmotivated employees and has been found to significantly contribute to sick leave and early retirement which can have a very serious impact on the bottom line of any business.




The users' environmental concerns have long been the focus of ABB and CGM. Together we have developed an industry message using the Extended Operator Workstations (EOW-x) and System 800xA.

Some of the in-built features which help maximize productivity and reduce operator stress are:

- The EOW automatically changes all ergonomic functions to preset settings at login
- Ergonomic features are automatic therefore will always be active
- Changes slowly and unnoticeably over time to reduce fatigue
- Height of desk, monitor board and large screens can change to user preferences
- Distance to the monitors and the large screens can be optimally set
- Angle of the monitors can be changed to a user's preference
- Both the down light and up light brightness and color temperature can be changed
- Can set sound conditions for both PA speakers and direct sound speaker system
- Sound suppression systems are built into the EOW unit
- Personalized temperature settings are available for normal and upset conditions
- Single Keyboard function to operate all the HMI workplace
- High Definition screens to lessen the load on the eye whilst viewing

CGM are further developing the EOW for the 'next generation of users' and they are calling this new development '***Smart Ergonomics***'. Ergonomics and Human Factors can best be described as '*The applied science of equipment design, as for the workplace, intended to maximize productivity by reducing operator fatigue and discomfort.'*

The new Smart Ergonomics of the EOW-x means: screen settings can slowly and un-noticeably change during the course of time to prevent eye strain and fatigue. Sitting down, as mentioned above, is a major contributor to fatigue and longer term health issues therefore a lot of work is being done around helping the operator move during his/her period at the system whilst still providing the ideal viewing angles. An operator does not need to stand for long periods to really improve their overall wellbeing.

The new EOW-x, with its Smart Ergonomics, has the ability to promote more alert and motivated operators leading to safer operation and less downtime. By making these features

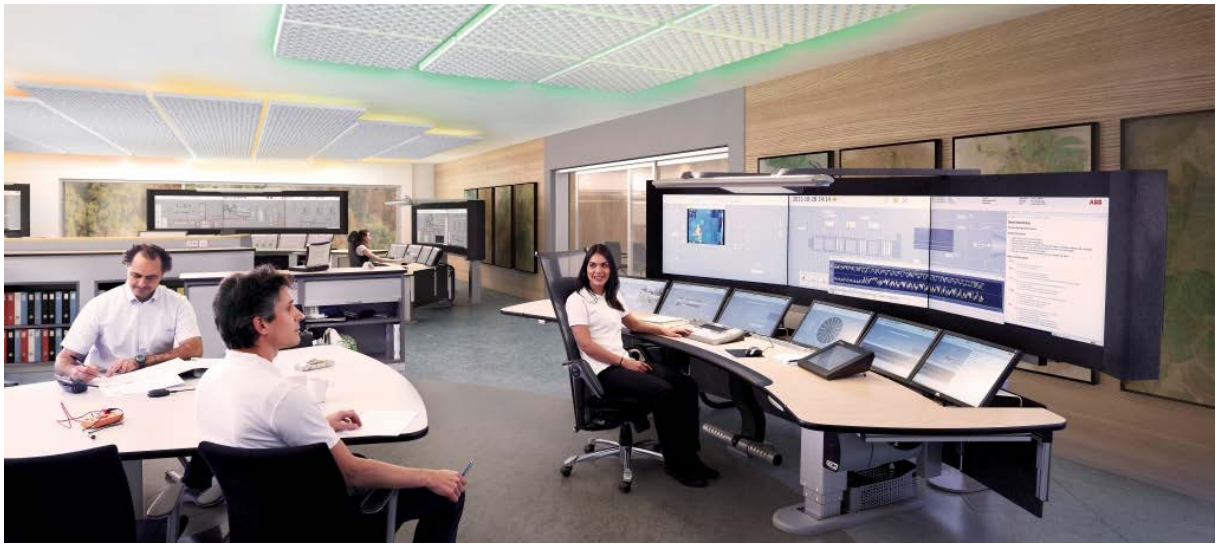
automatic at login in the EOW-x we estimate that the ergonomic functions will be used 75% more by the operators compared to the traditional manual settings. Human nature dictates that when humans become familiar with their environment they tend not to worry about the optimized configuration and tolerate the current. The impact of this has been seen over many of the past incidents and may go some way to explain the rather short operational lifespan of Control Room Operators. Manual adjustments are of course still possible.

## Improved safety due to Smart ergonomics

According to studies, gamers were up to 25 % faster at making a correct decision when faced with screen based problem solving tasks. It is important to facilitate for the operator to act on these decisions in an effective manner and promote fast and correct decision making.

By reducing the clicks needed to act on an alarm, having one single keyboard that controls all computers, monitors, communication tools needed and an interactive large screen overview to easily get a general idea of the situation at hand; the efficiency improves. All monitors and large screens are interactive and the operator can seamlessly move from one monitor to the other with the cursor or using the keyboard. The EOW-x is connected to three different client computers and each computer is connected to three screens of the EOW-x3 so that the operator may work against different parts of the process or choose to zoom into and focus on one part or one alarm.

This is a big difference between the reality in many control rooms today, where often each computer is connected to one monitor with its own keyboard and mouse. Some monitors are only used for CCTV monitoring meaning that the operator only can use this monitor after something has gone wrong. If the operator has to move around and work on many different computers, monitors, keyboards and sometimes systems; this will add unnecessary time on alarm handling and will create ineffective work. One single avoided shutdown justifies a better working environment with the EOW-x.



*Protect your greatest assets by focusing on the heart of the organization*

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