# ANDON: The way to optimize your company

How to optimize the production lines in your company through timely attention to failures?

It is a light signal that notifies any problem that arises within the quality control or production flows. ANDON allows timely attention to failures for continuous improvement of production processes.

**ECON**
Industrial Automation

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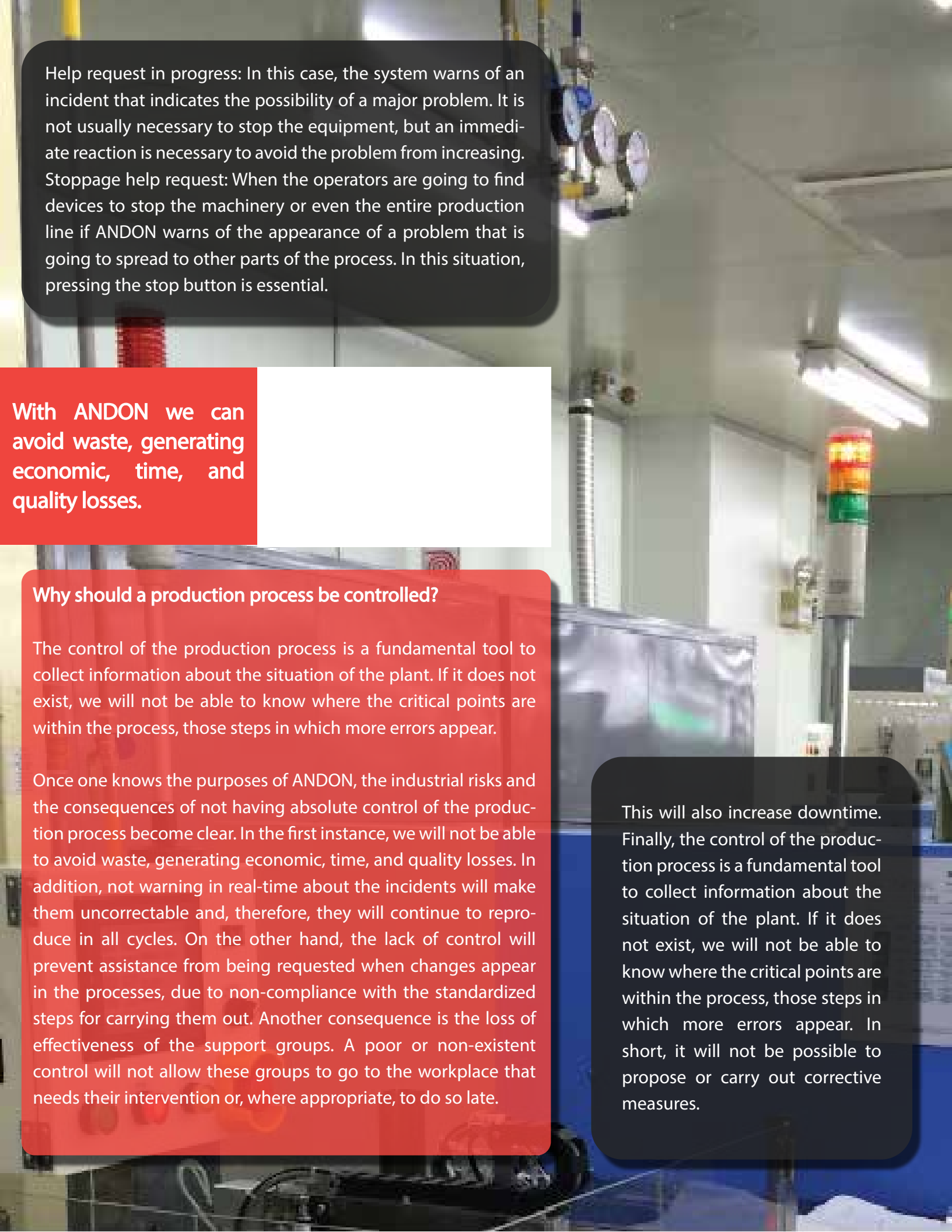
ANDON arose in Japan in the seventies, as a visual aid that highlighted the place where it was necessary to intervene during the development of a production process. Basically, to indicate the operating condition of a machine through a turret. It is a light signal that notifies any problem that arises within the quality control or production flows. For example, it can be a flashing light that signals when the production line has stopped due to some problem.

## Understanding ANDON as an essential factor within the LEAN MANUFACTURING philosophy

With its appearance, ANDON becomes a very important tool within the LEAN Manufacturing philosophy. In this context, it is commonly used to apply the Jidoka principle in lean manufacturing. Its objective is to warn of any inconvenience that may appear from the moment it manifests itself. Once the system gives the alarm signal, those responsible can correct the error immediately and introduce the necessary measures to prevent it from happening again. Generally, it is a light alarm signaling problems within the quality and control flows and the exact place within the production chain where intervention is needed. The system is activated using a button, with which the production stops automatically. This allows the team to collect information, analyze the causes and the origin of the incident. Once this diagnosis is made, it is time to solve it.

ANDON warns of the appearance of a problem that will spread to other parts of the process.

There may be several ways to proceed when the ANDON signal is activated, depending on the factory or industry's problem and context. They are as follows: Immediate resolution: When ANDON provides sufficient information so that the operator can resolve the incident by himself, without the need to notify anyone else.

Help request in progress: In this case, the system warns of an incident that indicates the possibility of a major problem. It is not usually necessary to stop the equipment, but an immediate reaction is necessary to avoid the problem from increasing. Stoppage help request: When the operators are going to find devices to stop the machinery or even the entire production line if ANDON warns of the appearance of a problem that is going to spread to other parts of the process. In this situation, pressing the stop button is essential.

**With ANDON we can avoid waste, generating economic, time, and quality losses.**

## Why should a production process be controlled?

The control of the production process is a fundamental tool to collect information about the situation of the plant. If it does not exist, we will not be able to know where the critical points are within the process, those steps in which more errors appear.

Once one knows the purposes of ANDON, the industrial risks and the consequences of not having absolute control of the production process become clear. In the first instance, we will not be able to avoid waste, generating economic, time, and quality losses. In addition, not warning in real-time about the incidents will make them uncorrectable and, therefore, they will continue to reproduce in all cycles. On the other hand, the lack of control will prevent assistance from being requested when changes appear in the processes, due to non-compliance with the standardized steps for carrying them out. Another consequence is the loss of effectiveness of the support groups. A poor or non-existent control will not allow these groups to go to the workplace that needs their intervention or, where appropriate, to do so late.

This will also increase downtime. Finally, the control of the production process is a fundamental tool to collect information about the situation of the plant. If it does not exist, we will not be able to know where the critical points are within the process, those steps in which more errors appear. In short, it will not be possible to propose or carry out corrective measures.

# When is a visual control system appropriate?

In its communicative tool aspect, visual control should focus on all the information that generates added value in a process. If this is achieved, its implementation can be considered successful, in addition to serving as a perfect complement to methodologies.

The implementation of the ANDON system can be carried out, among many others, in the areas of:

- Process of manufacturing
- Equipment
- Security
- Organizational management
- Storage
- Quality Assurance
- Maintenance
- Offices

To implement the visual control system it is mandatory to follow a systematic process. To do this, there are a series of questions that it is important to consider beforehand:

- Does the process that we want to control add value?
- How are nonconformities or anomalous situations identified?
- Actions to be carried out and decisions to be made based on the information from the indicator.
- What indicators do we want to monitor?
- Who will be responsible for recording the information and how will they do it?
- According to the calculations of the indicator
- Where do we have to monitor?
- How can we review the indicators?
- ANDON has had a vertiginous evolution, due to the current Enterprise Resource Planning System (ERP)
- The evolution of ANDON to be a benchmark in Industry 4.0

# The ANDON evolution to be referent of Industry 4.0

ANDON is reinforced by the inclusion of new technologies in the industry, going from being more than a visual control to a new and dynamic form of communication within the novel industrial models. Under the umbrella of new technologies and foundations of this changing era in automation, ANDON has had a vertiginous evolution, due to the current Enterprise Resource Planning (ERP) System and the vertical and horizontal integration of systems. Today, ANDON can manage production statuses visually and auditorily at the line, digitally provide these statuses and their changes, that is, the interested user can see the status of the lines in real-time from your mobile, from your PC, or a screen.

This is equivalent to saying that the system is intelligent, interactive, and scalable.

## 13 Advantages of current ANDON systems

•Measure, report and analyze machine performance and keep track of downtimes when they are serviced and resolved. It can also be configured by who attended the event and reset rules based on the event.

•Optimize monitoring activities by decreasing monitoring time and increasing problem resolution time.

•The actions and events are stored in databases, in real-time, and can be processed for the generation of dashboards or interaction with other systems such as power BI

•Establish ways to identify alerts that help supervisors understand problems and their solutions.

•Generate Pareto charts of delivery times by departments and by production line. Remind employees of their routine tasks at the preset time

•It can be adapted to an industrial development platform that allows unlimited licensing.

•KPI Generation

•Early detection of smart notifications.

•Analysis Tools.

•Unlimited connections to devices.

•Unlimited connections to PLC and database.

•Easy programming of escalation rules.

•Analysis for decision-making with hard data.

## ANDON and the importance of measuring KPIs

Key performance indicators, or KPIs, dictate the activities and priorities of manufacturing companies, setting a target for the period along with a benchmark or baseline – the starting point from which to seek improvement and set aggressive but realistic goals. It is said that what is not measured is not controlled. Therefore, the measurement and monitoring of a series of indicators - linked to the strategic objectives of the business units, largely determines the business direction.

## Productivity

• Installed Capacity It is the calculation of the production capacity of the plant or facilities, working in 3 shifts 7 days a week.  This indicator comes from the bottleneck capacity of the productive system, as established by the theory of restrictions.

• Utilization Measures what percentage of the installed capacity of a line, unit, or plant is being used at a given time.

• Performance (Throughput) Measures how much product is produced in a machine, line, unit, or plant in a given period.

• Man-hours/unit This is a calculation of how many man-hours were invested to produce each unit of product in a specific project or during a period. In the latter case, it will be necessary to stratify the data by product or model.

• OEE (Overall Equipment Effectiveness) It is a multi-dimensional indicator, relevant in aspects of efficiency, productivity, and maintenance. In its calculation, Availability x Performance x Quality is multiplied, to measure the effectiveness of a team, machine, or production line.

## Maintenance

• Percentage of ShutdownsIt is the percentage of time that the production system remains stopped due to a failure or breakdown of some equipment or machine. It is calculated by dividing the total downtime and dividing it by the total available production time in a period. It is the opposite of availability.

• MTBF (Mean Time Between Failures) It is the average time between failures (stops) of a machine or equipment.

## Stock

• Inventory Turns Rate It is a measure of the efficient use of inventory levels. It is calculated by taking COGS (Cost of Good Sold) and dividing them by the inventory valuation in a given period. The more inventory turns, the faster the cash-to-cash cycle. It is the average value of inventory in storage during the period.

## Financial

• Unit Tax Margin It is calculated by dividing the profit margin generated by a business unit or manufacturing plant and dividing it by the production volume. It is important to segment the data by product type or model.

## Quality

• FTPY (First Time Pass Yield) Indicates the percentage of product that meets all specifications and passes quality inspection the first time it goes through the process, without rework or scrap.
• Cost of Guarantees per Unit Sold
• DPMO (Defects Per Million Opportunities) The number of failure modes is first evaluated in the form of all possible defects (opportunities) that may occur in the product. Then we proceed to calculate the index with the following formula, for a quantity of product.

**All configurations of schedules, calendars, and notification escalation rules can be done by the user.**

## What is the modern ANDON sequence for sending a notification?

The tool is configured within the framework of a production process to send notifications via Telegram, a line is selected and the priority and area to which the call is to be made are indicated.

A request is sent that would be arriving at each person who is registered in the roster and is in their work schedule.

All configurations of schedules, calendars, and notification escalation rules can be done by the user. On the shifting screen, all the team's work schedules are registered, to define which days and times and in which formats each of the shifts will be repeated, so that it can be assigned to each staff. The personnel window is where users and different work teams can be registered. As well as defining your contact information, which would be how the messages would arrive, be it email, text message, or notifications via Telegram. The user can make use of the identification routes to make the escalation rules.

The classic ANDON systems are visual notification systems at the foot of the line, while ECON Tech's ANDO Pro, in addition to making smart notifications, collects important data for analysis. An analysis window opens where you can see statistics of the events that have taken place, which in turn give great added value to be able to take improvement actions in the various processes. Some KPIs of interest such as total alarms, durations, how many are acknowledged, the average time of each one, frequency, and duration, are also collected.

Regarding the advantages of the different versions of ANDON Plus from ECON Tech, it is noteworthy that it is supported on an industrial development platform that allows unlimited licensing by Inductive Automation Ignition (clients, screens, tags, connections, and equipment), cross-platform compatibility (Inductive Automation Ignition works with any major operating system, including IOS and Android); it also allows instant installations and updates (in just 3 minutes a server can be installed), scalable Server-Client architecture (easy implementation in one or more sites), Universal Platform (SCADA applications, MES, IIoT, alarms, etc.) and Critical Mission (Fault tolerance for systems by adding redundant servers), among other benefits.