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NIS User Handbook

Devices

The NIS in the Line

NIS is an acronym that stands for Next Improve System. NIS allows the control and monitoring of production efficiency, both in real time (Andon) and over a certain period (OEE).

How to Implement the NIS in the Field

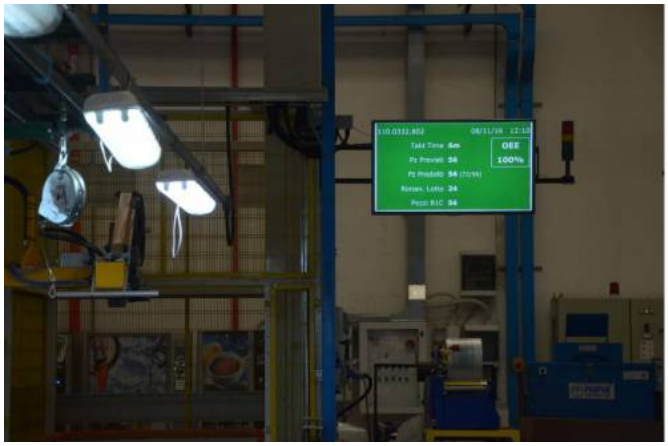
To implement a NIS system, you need the following devices:

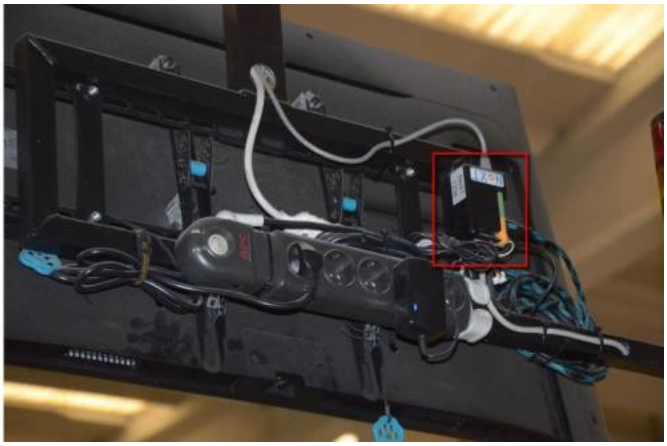
- An LED TV (we recommend a size from 40 inches up)
- A mini PC
- A Touch Panel
- A Barcode reader
- A PLC

For each production line, there will be a touch panel and an LED TV (The Andon board).

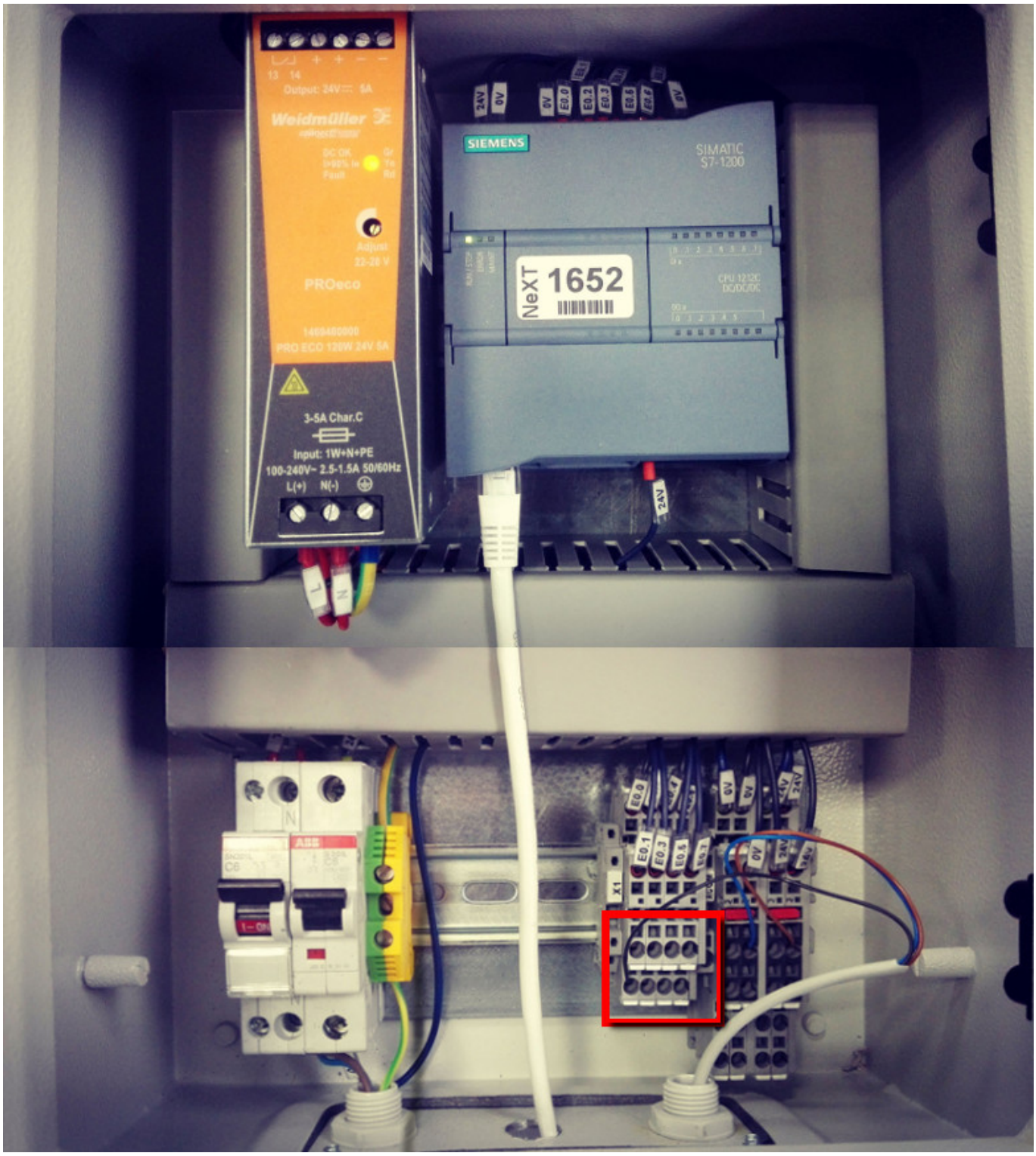
Connected to the touch panel is the barcode reader that will help the operator **change the production order** and, in case of absence of the PLC, **increase the number of pieces produced**.
The barcode reader is connected to the touch panel via a USB port, and the touch panel is connected to the system via an ethernet cable.

The Mini PC is connected to the LED TV via an HDMI port and is also connected to the system via an ethernet cable.





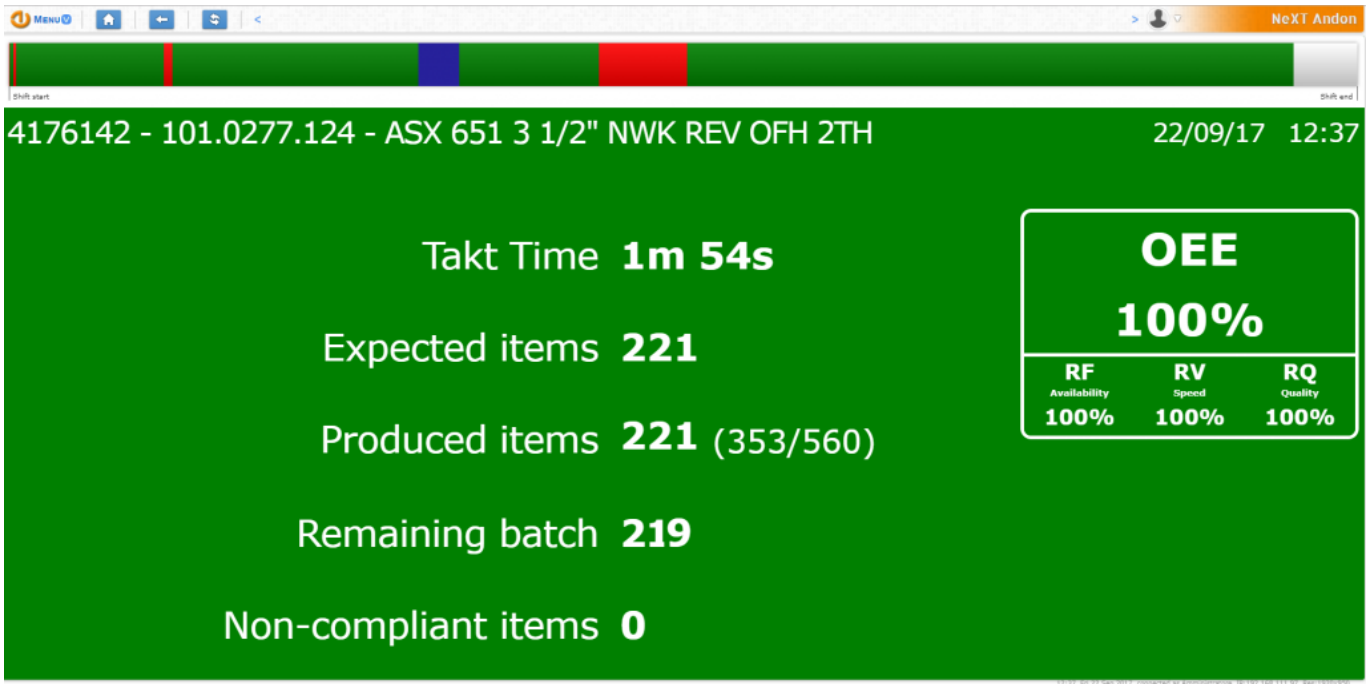
The main difference compared to a line without a PLC concerns the signaling mode of the advancement of a piece: the PLC automatically sends a signal when the operator performs the last operation.
Another signal from the PLC indicates if the machine is running or not.
Each PLC can be connected to 4 machines because it is provided with 8 slots.



Interfaces

The LED TV (Andon Board)

The Andon board shows different data relating to real-time production.

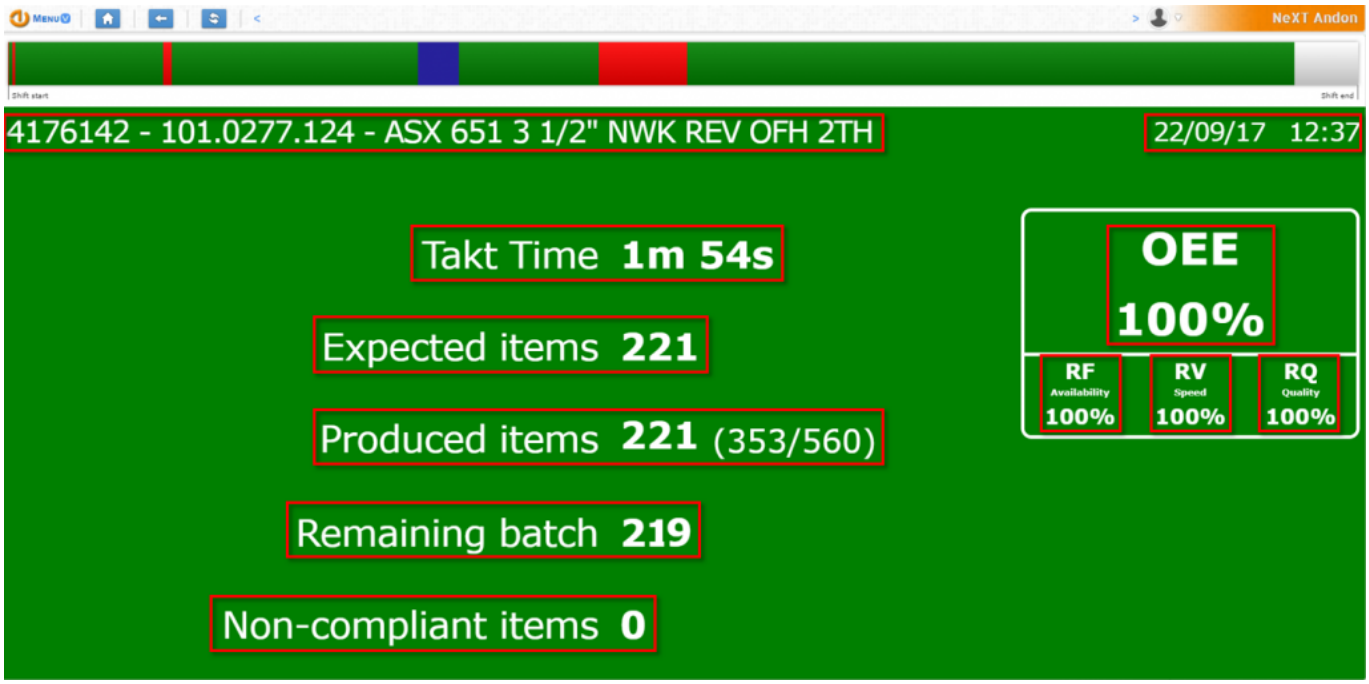


The Andon Board Interface

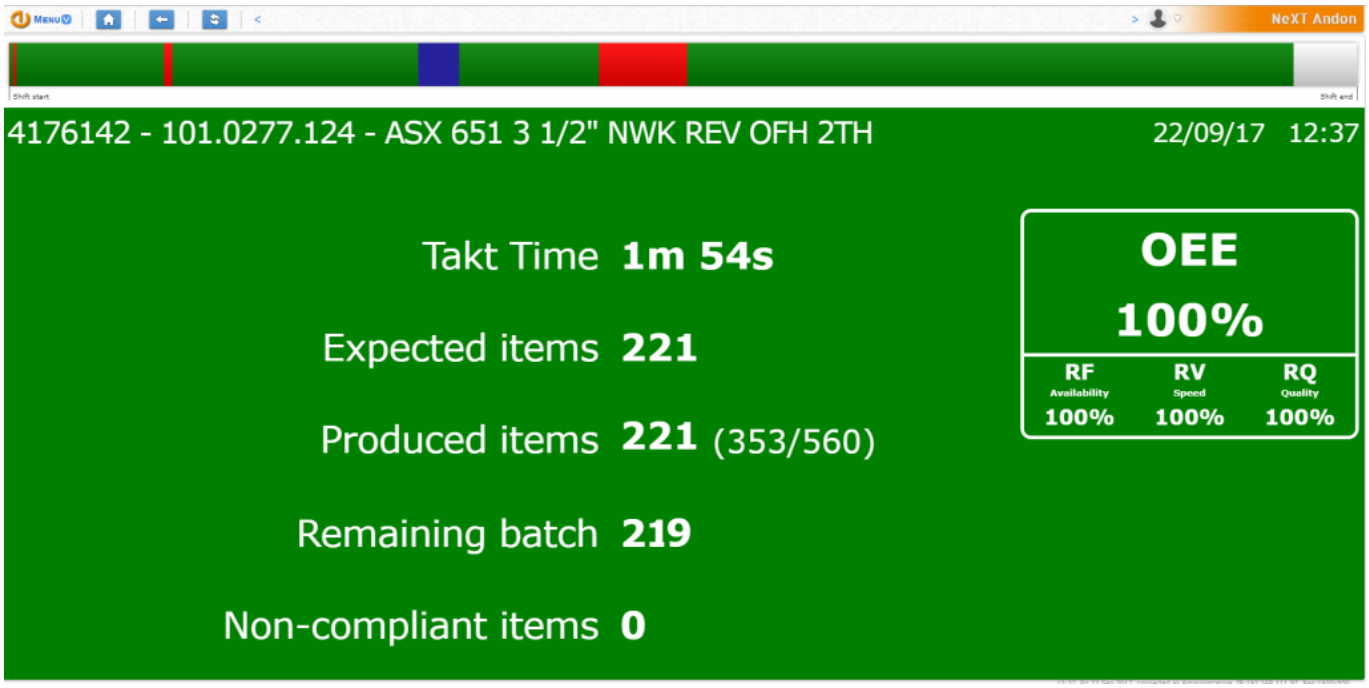
At the top of the page, a horizontal bar shows the sequence of stops of any type (programmed stop, stop for maintenance, etc.).
In green, the time the line is running; in red when it is stopped, and in blue when the stop is scheduled.

Let's see the meaning of each element:

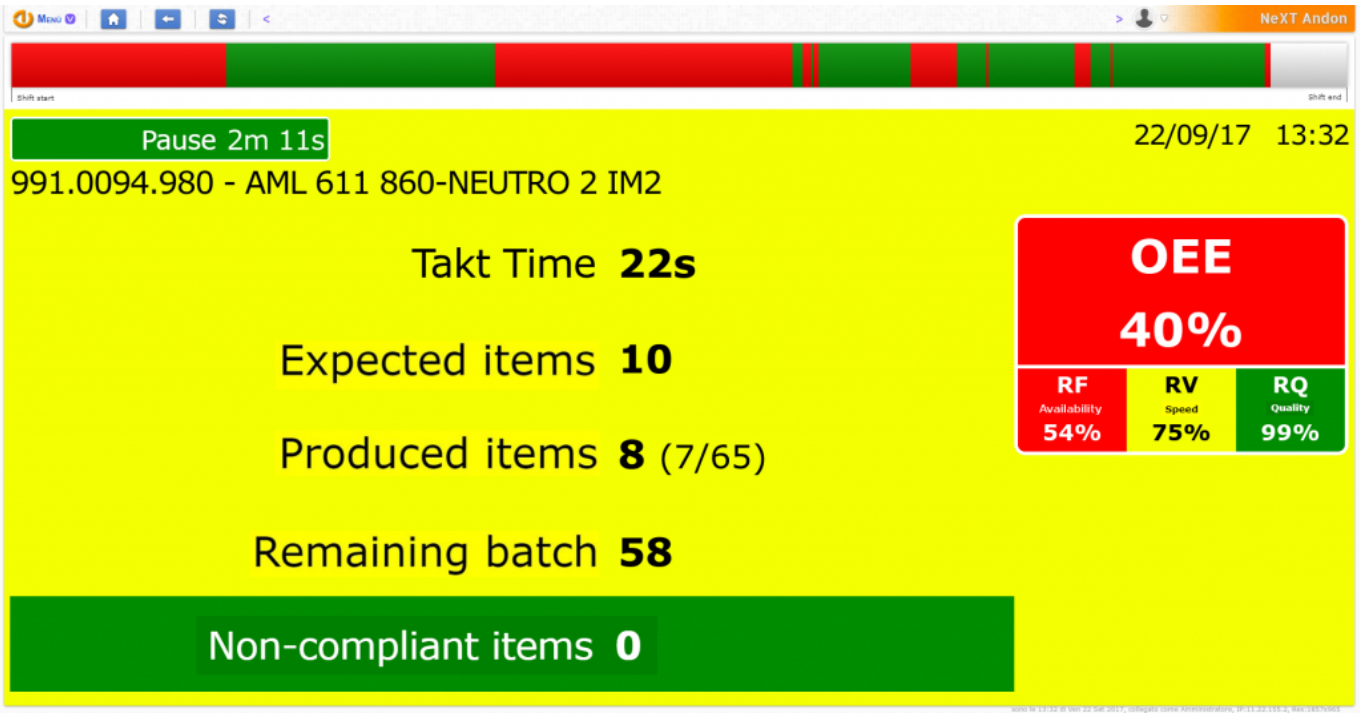
- At the top on the left, there is the «**Production Order code**» currently ongoing.
- At the top on the right, there is the **date and time**.
- **Takt-time**: is the time that each operator has to carry out its task.
- **Expected items**: it represents the theoretical production.
- **Produced items**: it represents the number of produced products, both goods and scraps.
- **Remaining batch**: the number of pieces that remain to complete the entire lot production.
- **Non-compliant items**: the number of parts not good (scrap items).
- **OEE**: on the right, there is the OEE value expressed as a percentage, referred to the current shift. Single percentages are also specified for availability, speed, and quality.



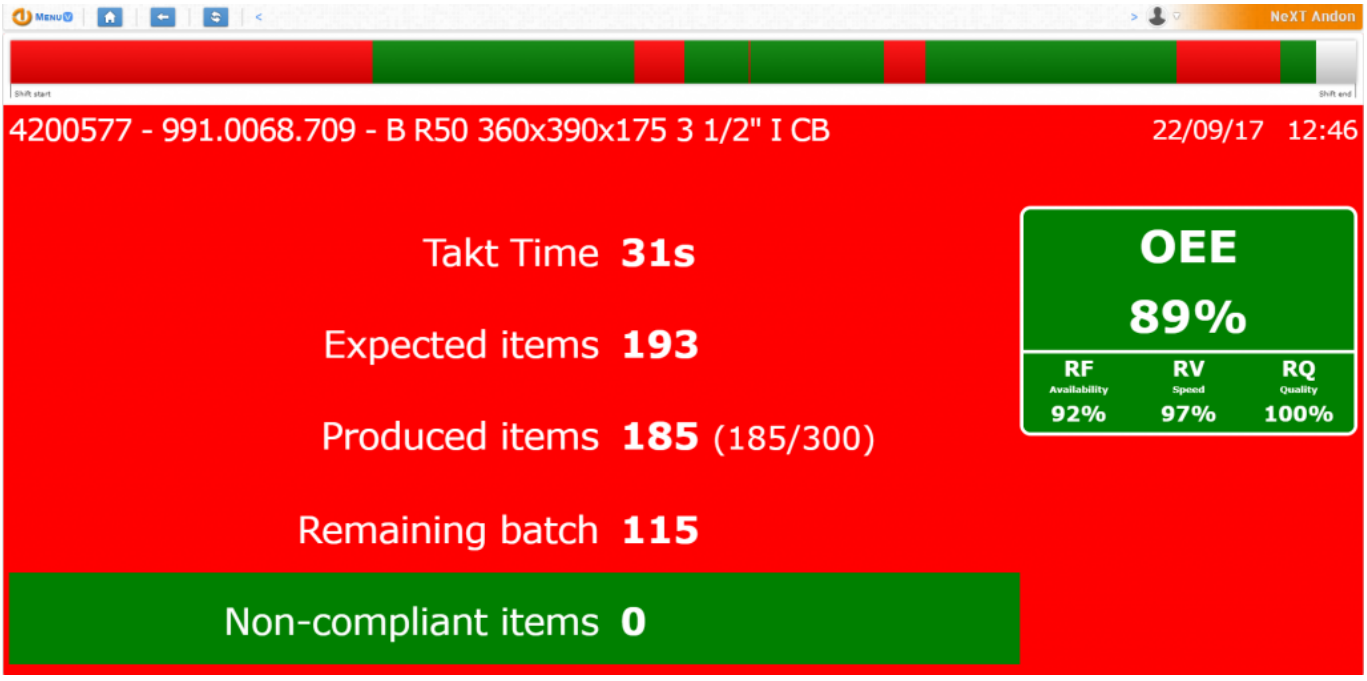
Even the colors of some elements have a specific meaning.
Green background: the background is green when the number of "Expected items" (for the current production) is equal to the number of "Produced items".



Yellow background: the background is yellow when the number of "Expected items" (for the current production) is greater by one or two items compared to the number of "Produced items".



Red background: the background is red when the number of "Expected items" (for the current production) is greater than the number of "Produced items" by three or more.



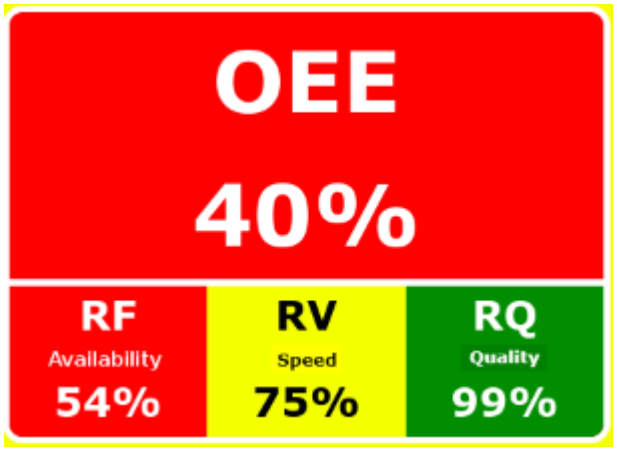
Also, the area "Non-compliant items" has its background color. Now we see the meaning of these colors.

- **Green background**: there were non-scrap items.
- **Yellow background**: there were one or two scrap items.
- **Red background**: there were three or more scrap items.

Non-compliant items

Also, the box that hosts the percentage of OEE will appear with different colors.

- **Green**: the percentage value is greater than 81%.
- **Yellow**: the percentage value is between 71% and 80%.
- **Red**: the percentage value is between 0 and 70%.



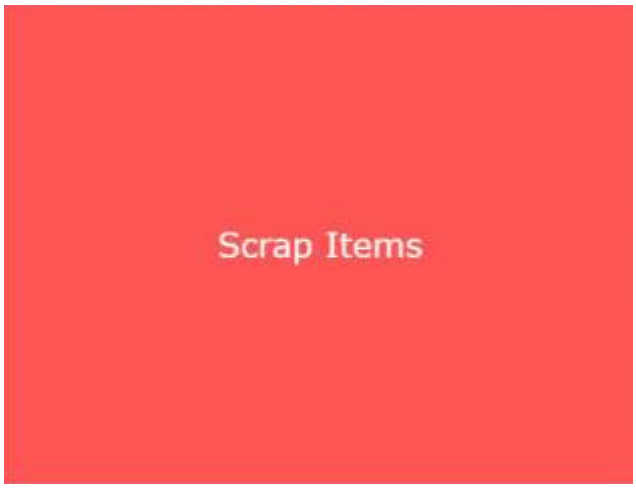
These percentage values can be customizable line by line, so they may differ from those shown in this guide. Likewise, the individual boxes of "Availability," "Speed," and "Quality" can take on different colors.

The Touch Panel

The Touch Panel Interface

This is the interface of the touch panel.
The red, blue, yellow, and green areas are buttons that allow the operator to access certain functions.

The "Scrap items" button provides access to a dialog box containing the datasheet of the loss of quality causes. The operator must specify the appropriate cause.
For more information, see the paragraph "Declaring scrap."



The "Tool changeover time" button starts the setup process.
For more information, see unit "Tooling."

The "Failure / Slowdowns" button provides access to a dialog box containing the datasheets of the causes of the stops.
The operator must specify the appropriate cause.
For more information, see unit "Declaring stop for failure or slowdown."

The "Organizational" button provides access to some particular stop causes that have to concern organizational factors.
The operator must specify the appropriate cause.
For more information, see unit "Declaring stop for organizational cause."

Below the four buttons, you can read the name of the line and the order of production that is processed at that time.

At the bottom on the left, there is the "OP button" that allows the operator to change the production order.
For more information, see unit "Production change."

At the bottom on the right, there is the "Flashing back" button that allows the operator to switch, to SAP, the quantity of produced units and non-compliant items.
For more information, see unit "Flashback function."

Near the "Flashing back" button, there is the button to **refresh** the page.

Advancement of the Pieces

Here we'll show how to advance the pieces (with or without a PLC).

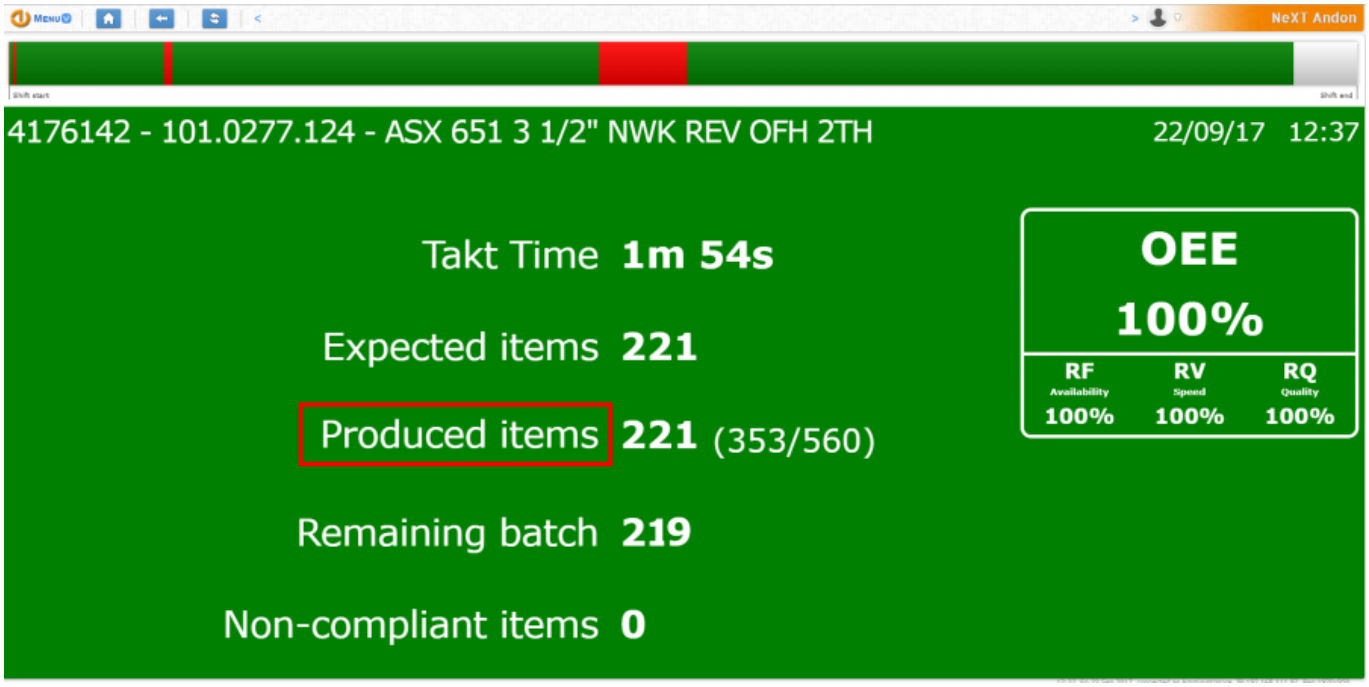
Without a PLC

When the operator finishes all the operations, before moving on to the next piece, he/she will indicate the progress of the piece using the barcode reader, scanning the unique item number.

With a PLC

The main difference compared to a line without a PLC concerns the signaling mode of the advancement of a piece: it is the PLC that automatically sends a signal when the operator performs the last operation.

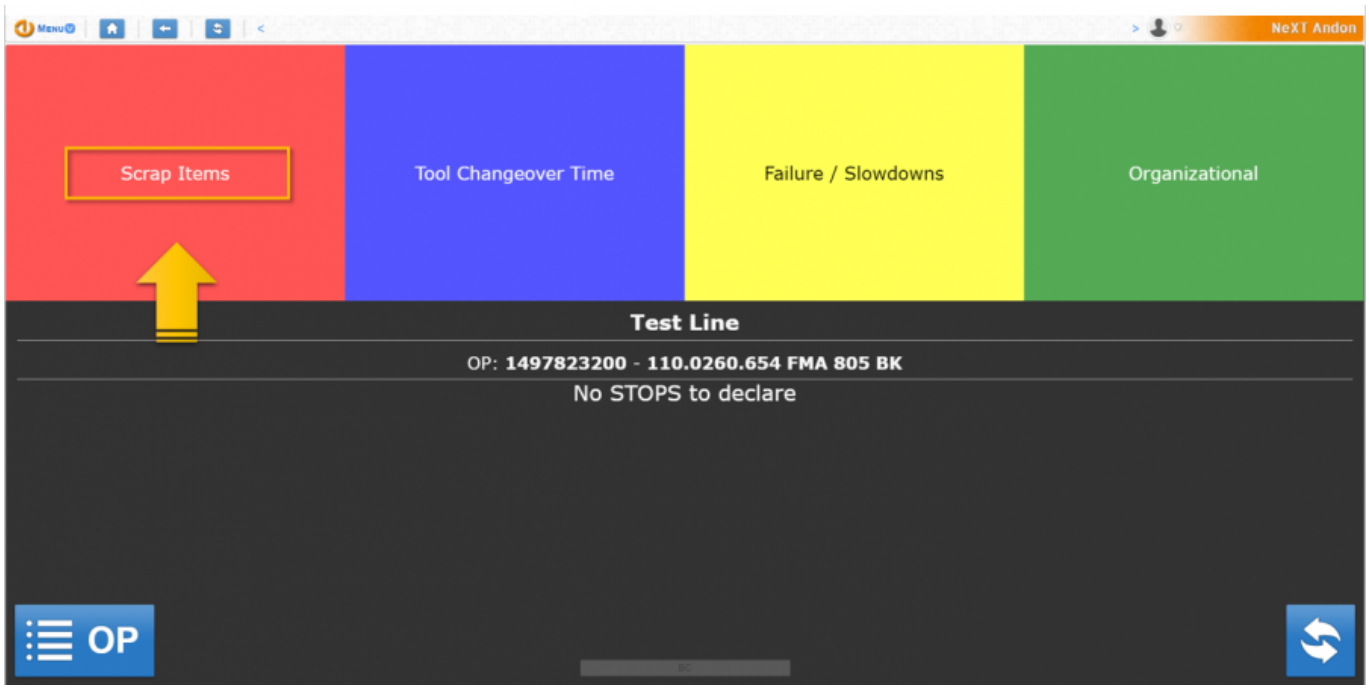
The number of pieces will be updated on the Andon board (LED TV), under the heading "Produced items."



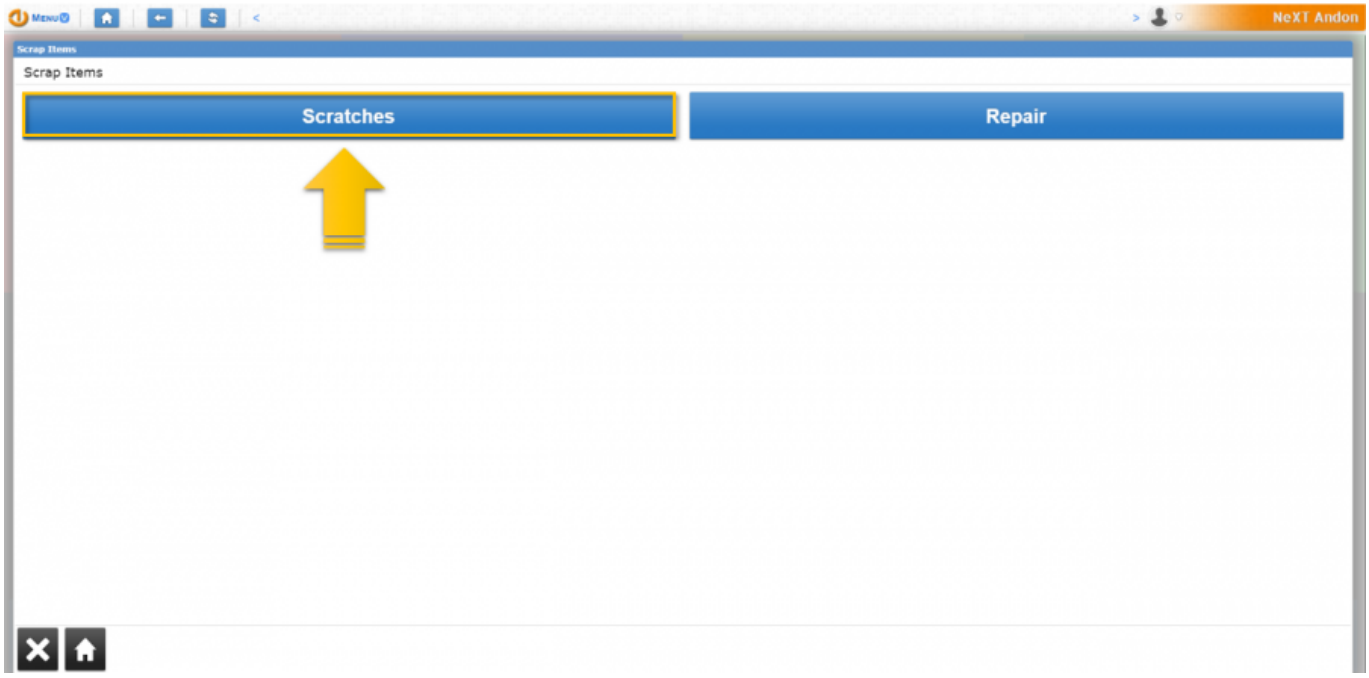
Declaring scrap

The following paragraph will show how the operator can declare the scrap items.

- Press the red area called «**Scrap items**»



- The operator has to choose from a list of causes



- Once the type of defect has been chosen, the operator can define the amount of pieces to be discarded

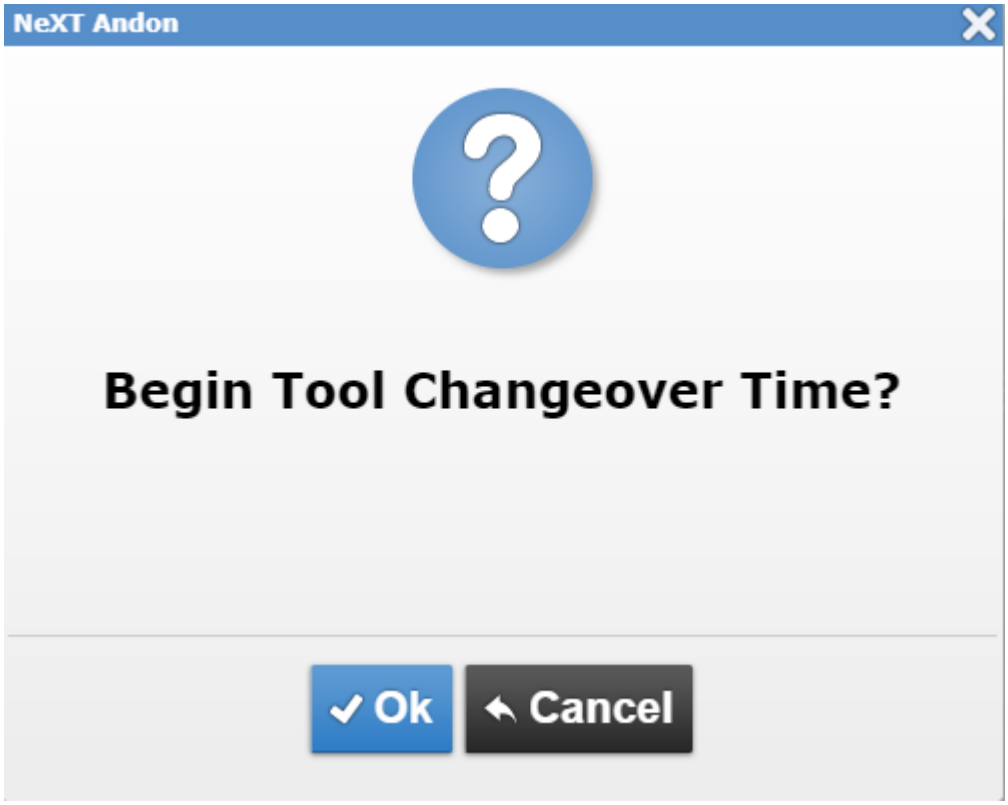
A message will inform the operator that the scrap declaration has been successful

Tooling

The following paragraph will show how the operator can start the tool changeover time.

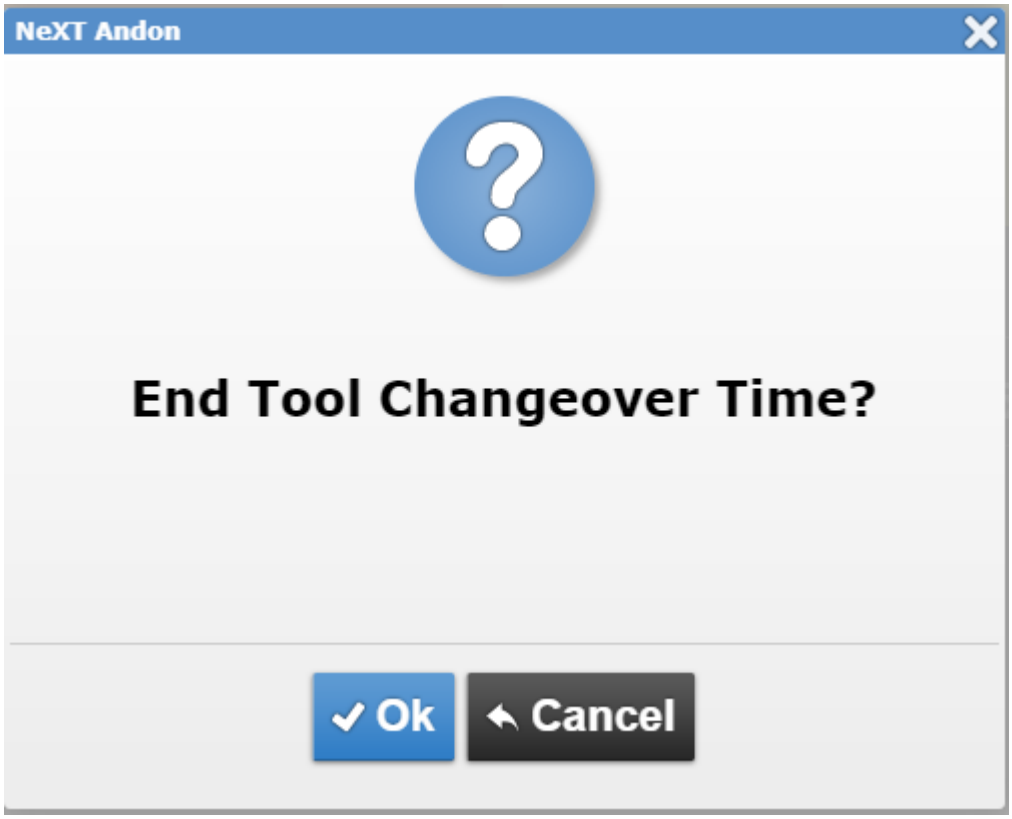
- Press the blue area called «**Tool changeover time**»

- The system will ask for confirmation of the choice to start the tooling



- Once the tooling has started, it will start blinking blue/orange for the entire duration.

- Press the blinking area to end the tooling. The system will ask for confirmation.

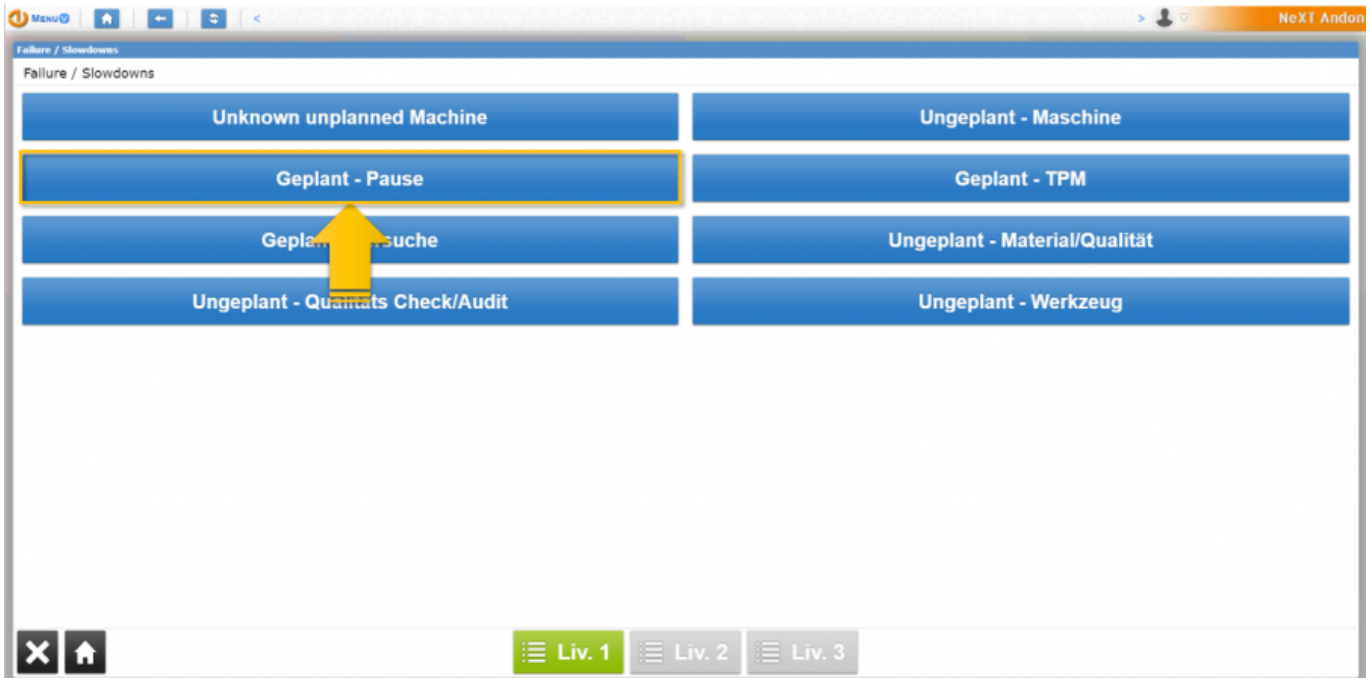


Declaring stop for failure or slowdwn

The following paragraph will show how the operator can stop the system for failure or slowdown

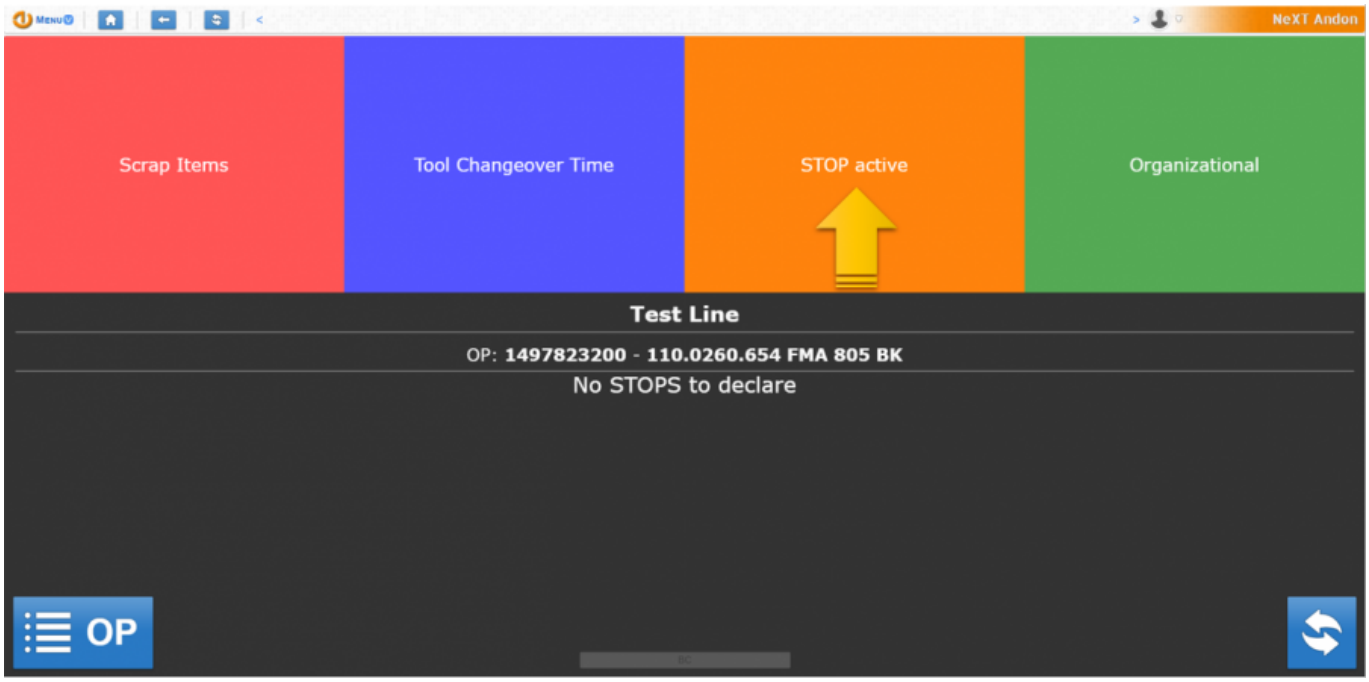
- Press the yellow area called «**Failure/slowdowns**»

- The operator will have to choose the correct stop cause

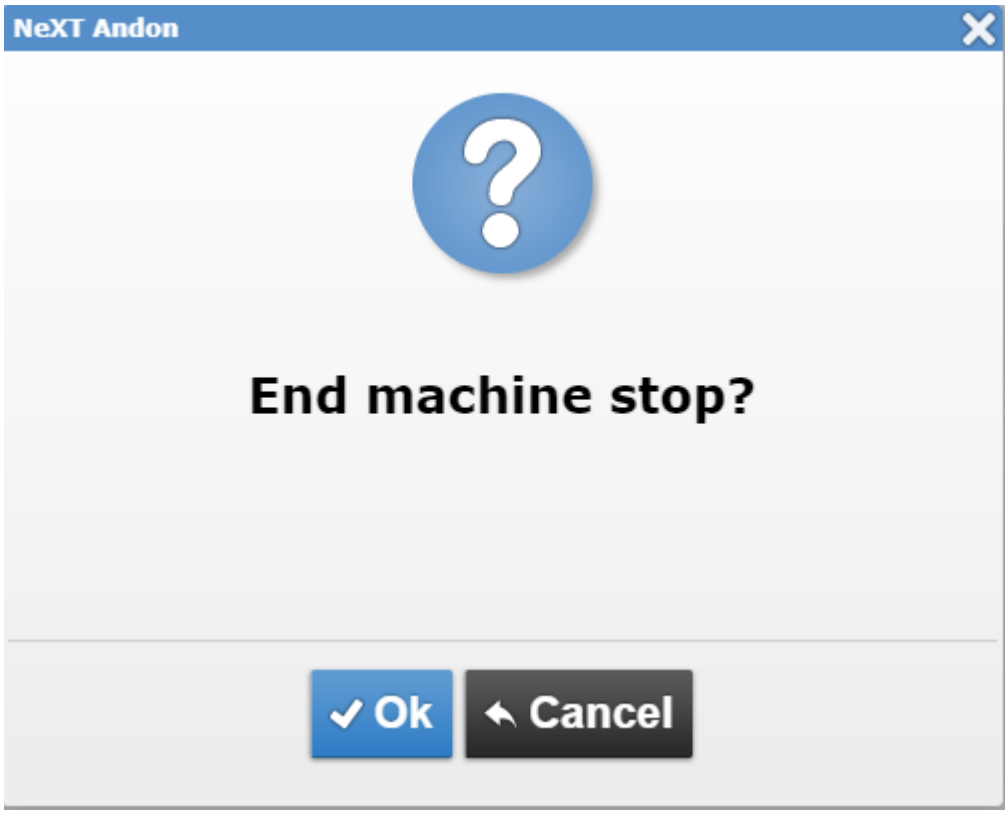


- The system will ask for confirmation of the choice

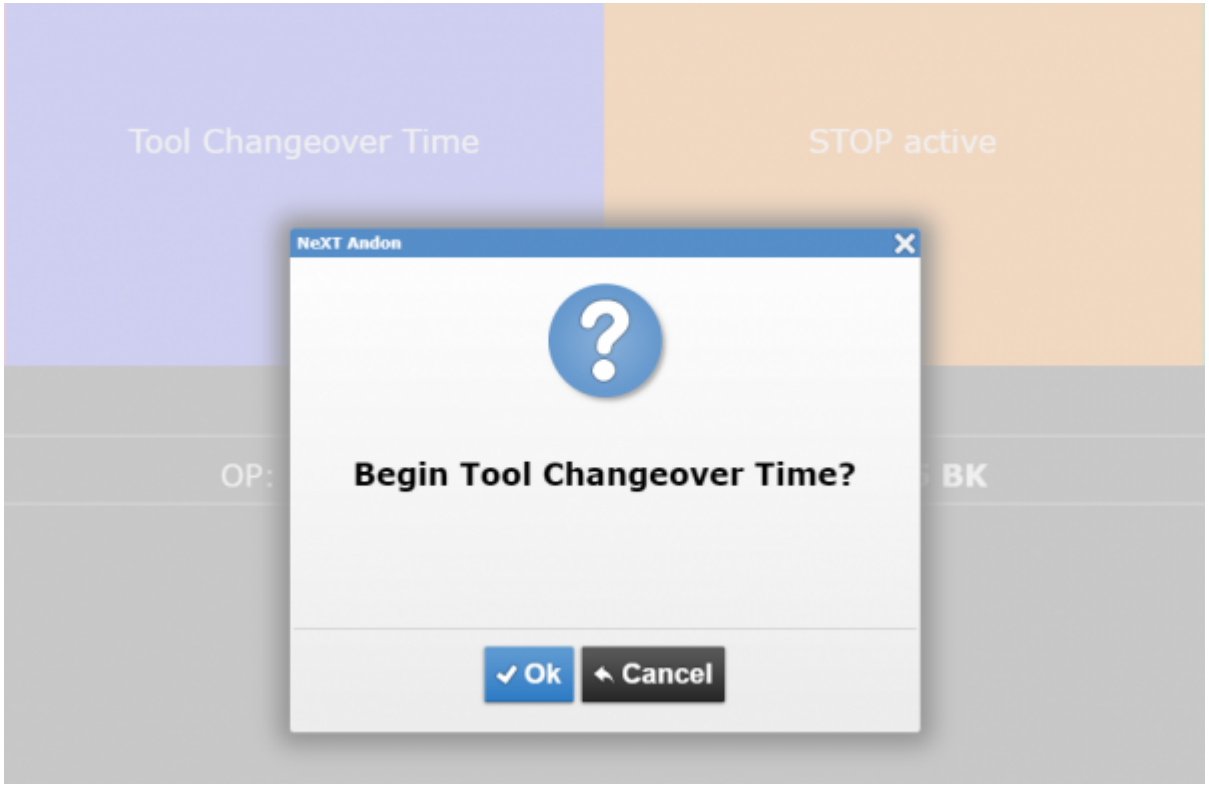
- Once the stop has started, it will start blinking yellow/orange for the entire duration



- Press the blinking area to end the stop machine. The system will ask for confirmation



- It’s also possible to switch from the stop machine, to tooling while stop is active

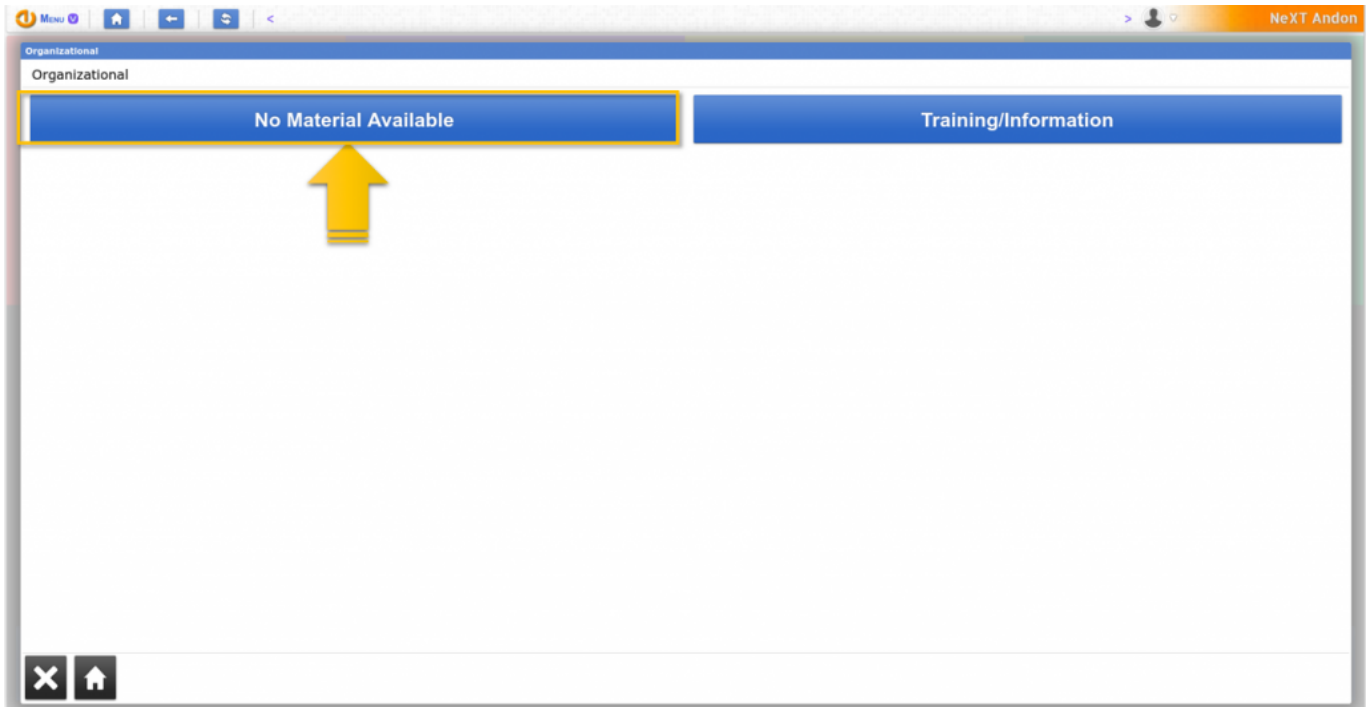


Declaring stop for organizational cause

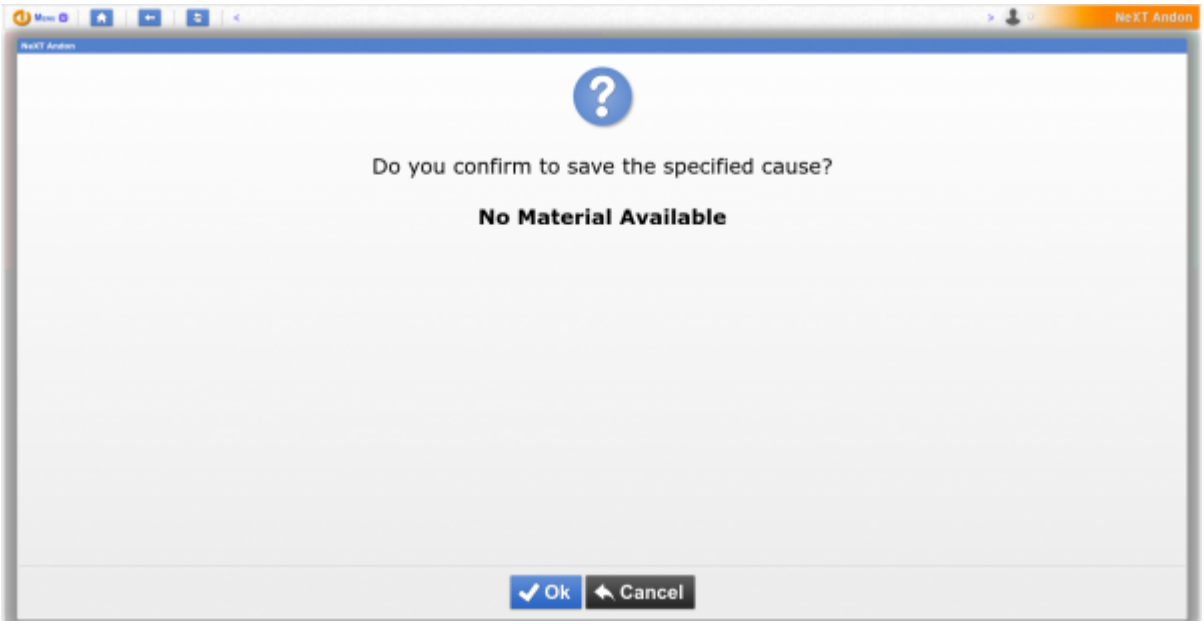
The following paragraph will show how the operator can stop the system for an organizational cause

- Press the green area called «**Organizational**»

- The operator will have to choose the correct organizational stop cause

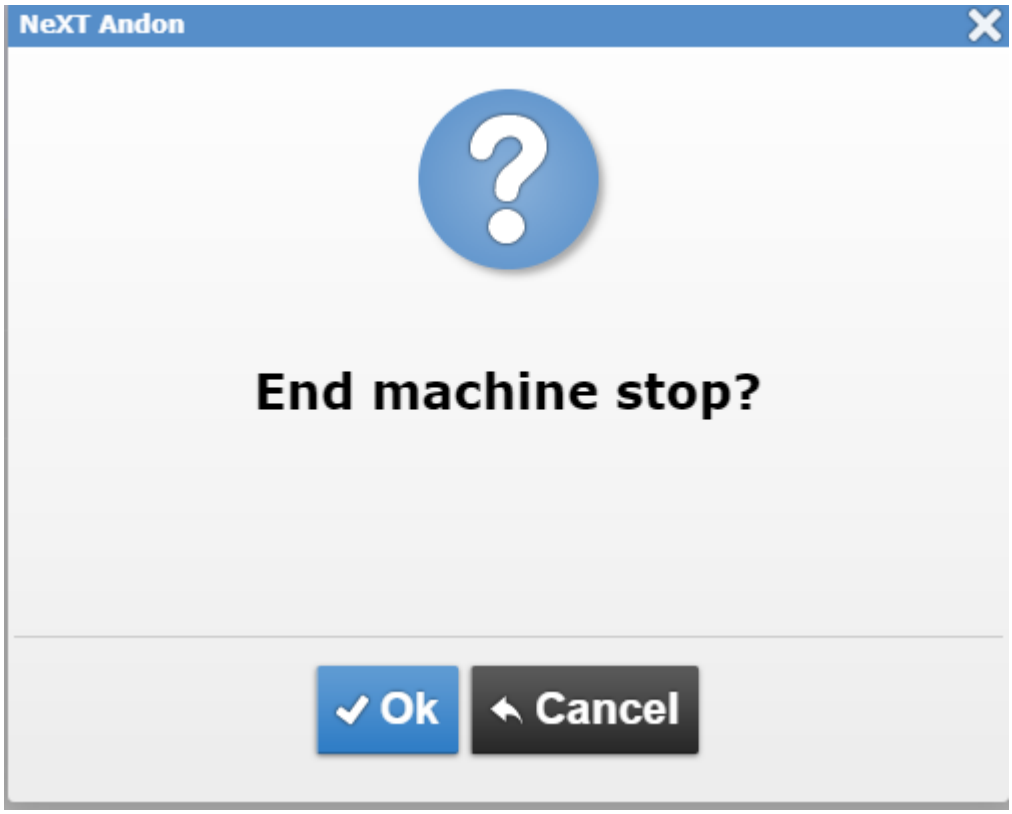


- The operator will have to confirm the choice

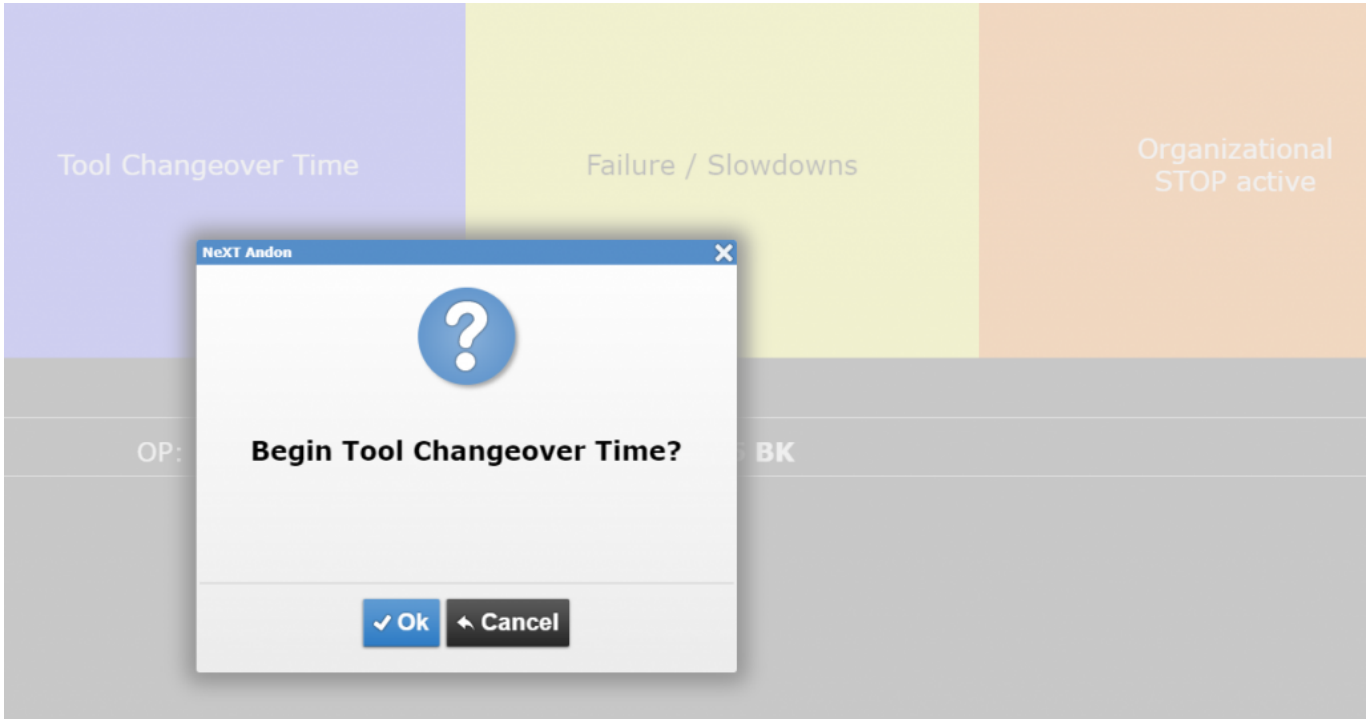


- Once the stop has started, it will start blinking yellow/orange for the entire duration

- Press the blinking area to end the stop machine. The system will ask for confirmation



- It’s also possible to switch from the stop machine to tooling while stop is active

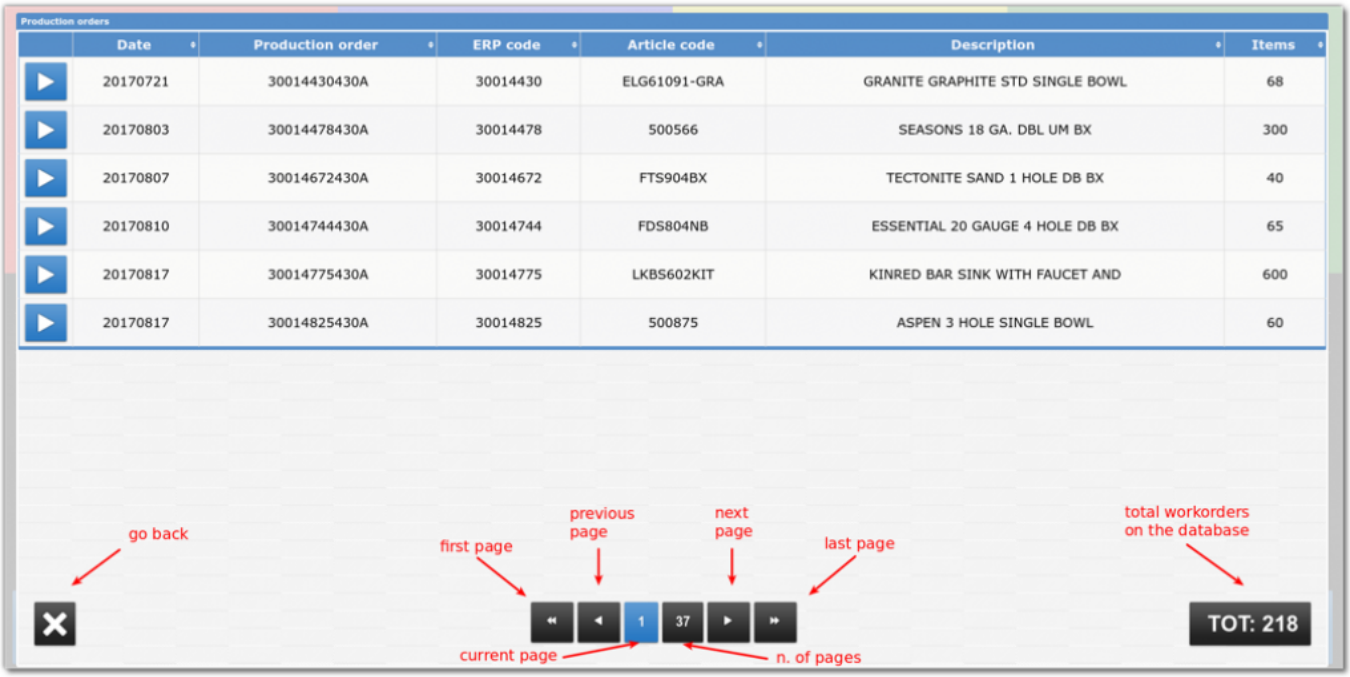


Production change

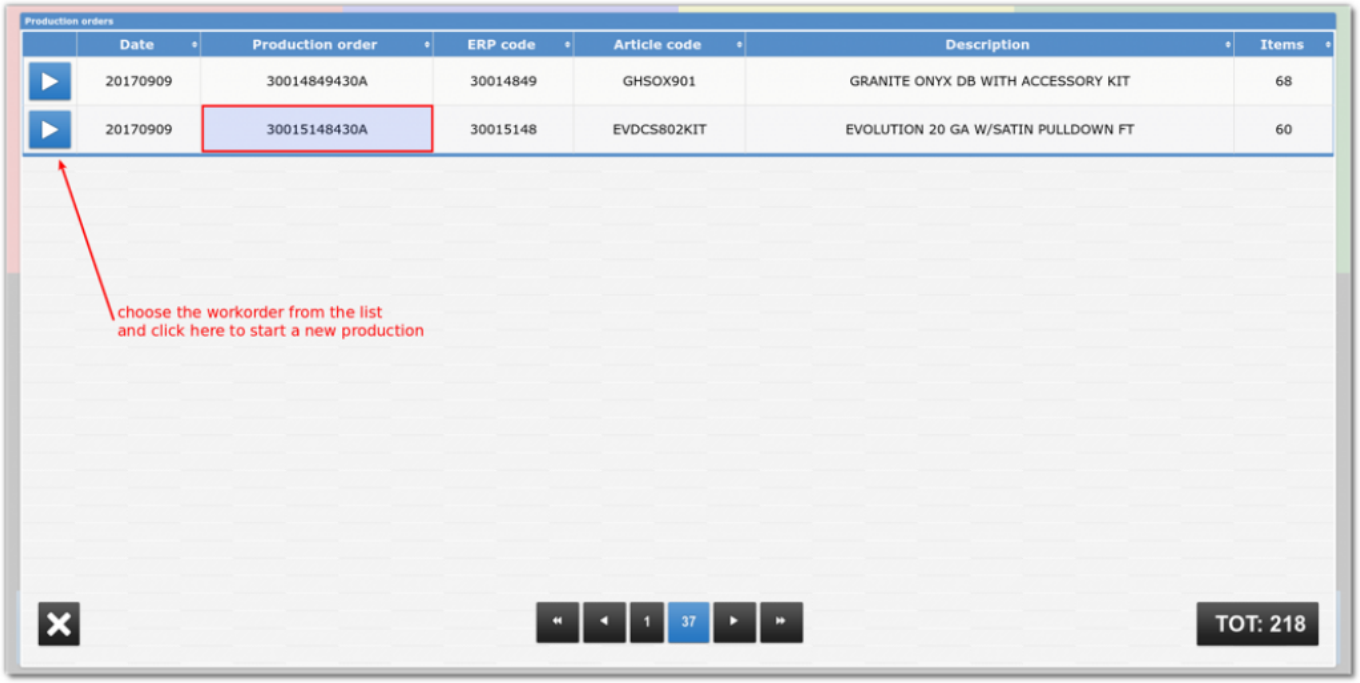
The following paragraph will show how to change a production

- Open the list of workorders and Press on the "**OP**" button to open the list. That list is sorted by release date in ascending order.

- Choose the workorder from the list. Use the buttons at the bottom to navigate.



- Press the "**Play**" button on the desired workorder to start a new production. A confirmation message will be shown.



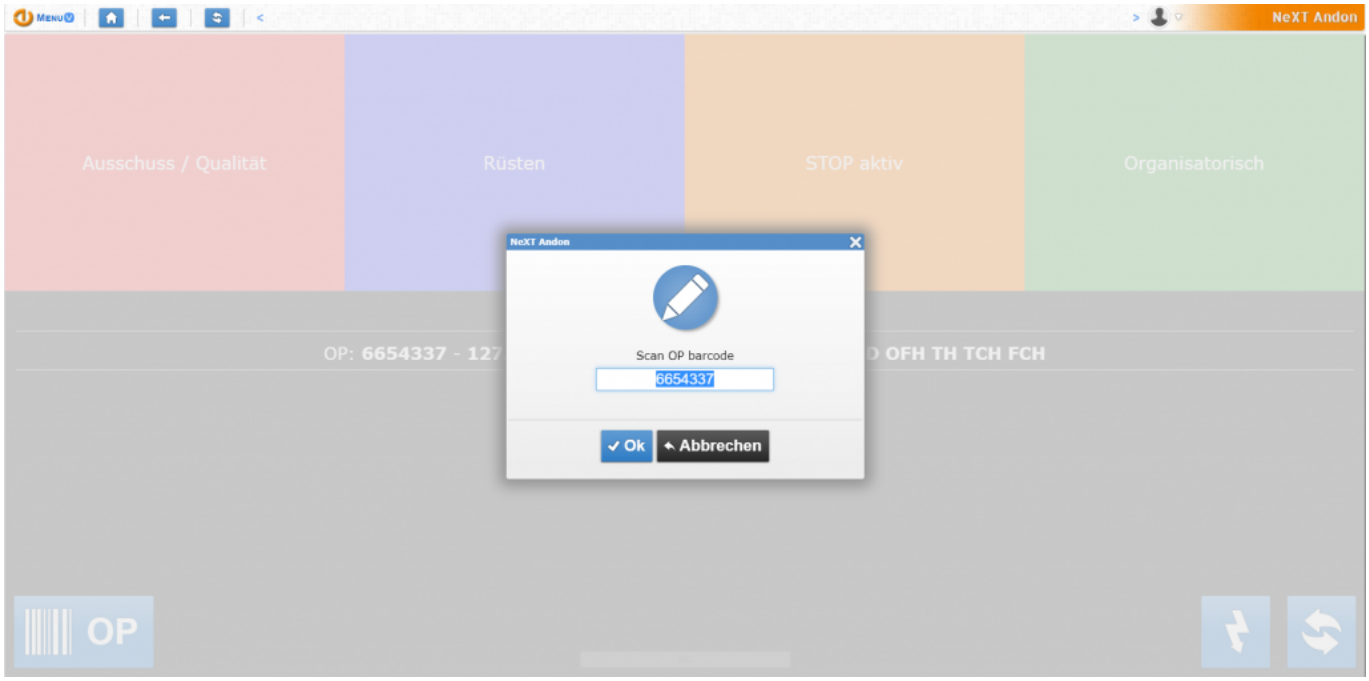
- Verify information on the touch panel. The new production will be configured and the information about the selected work order, will be shown on the touch panel.

The falshback function

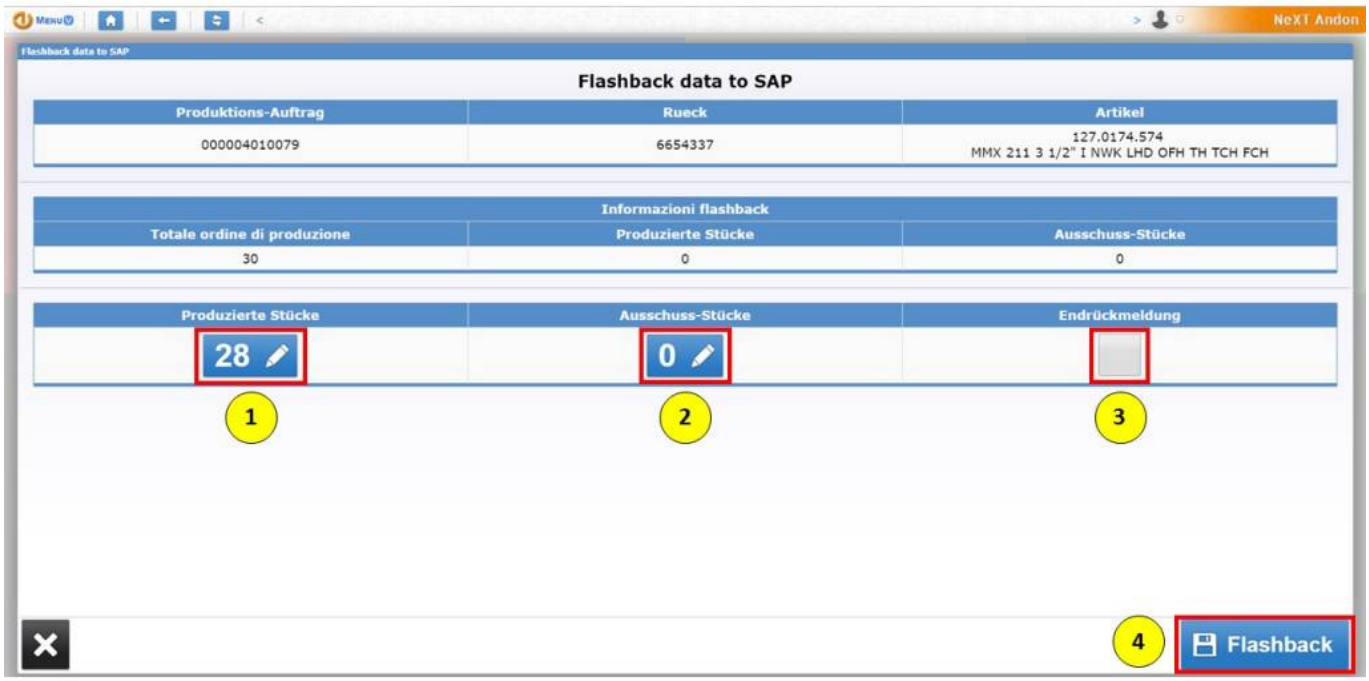
The **flashback function** allows the operator to switch to SAP, quantity of units produced and non-compliant items.

- Press the button at the bottom on the right, representing the icon of a lightning

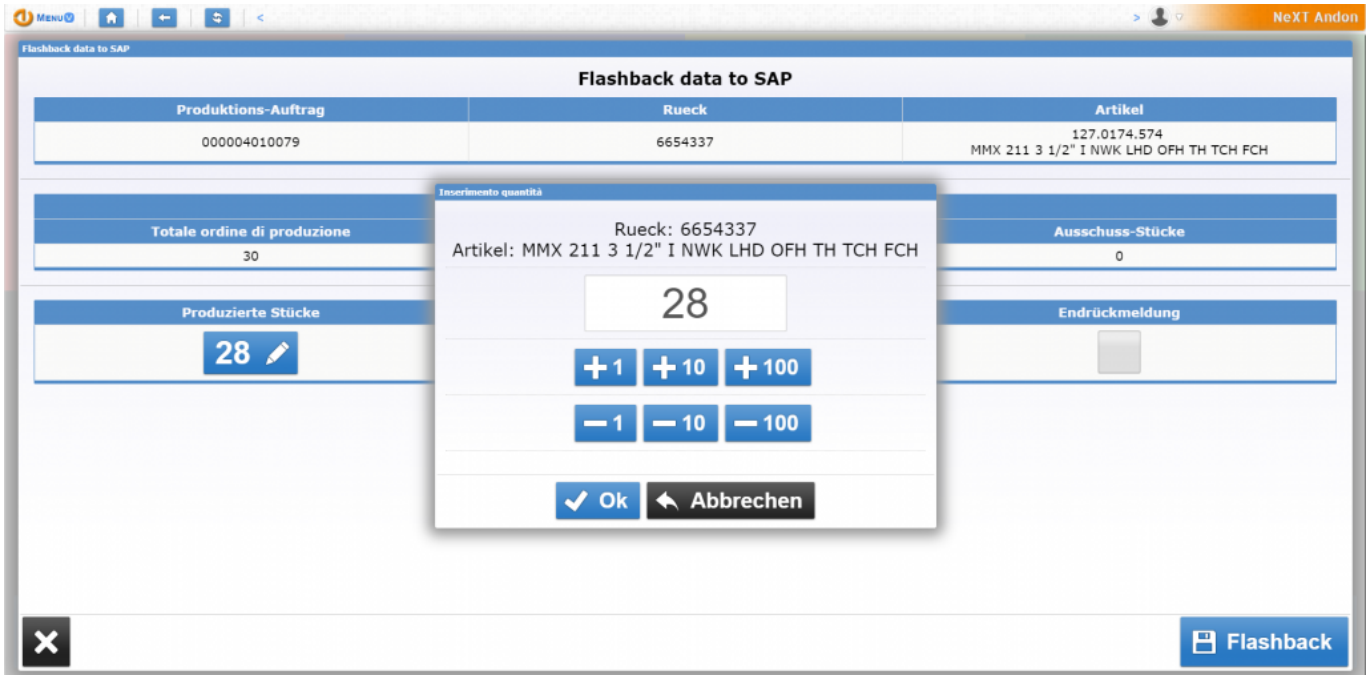
- Enter the RUEK code. By default, the system proposes the current production code.



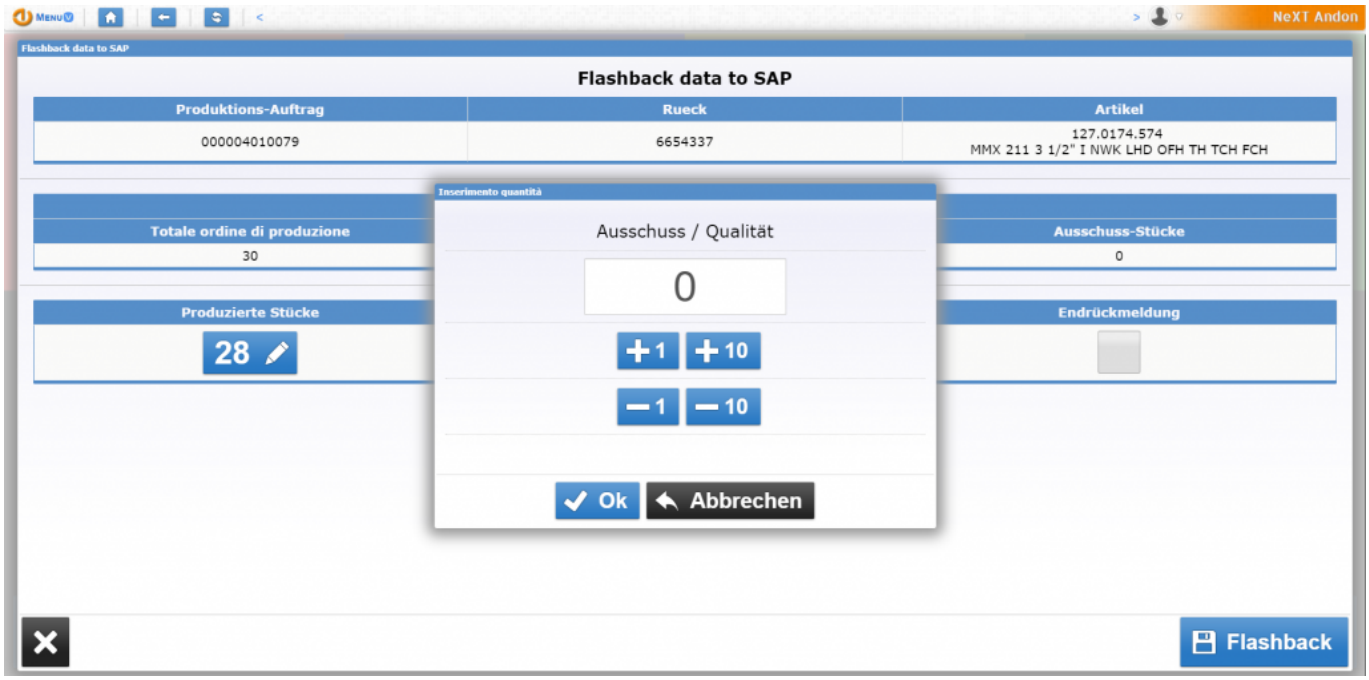
- From this screen the operator can communicate the quantity of units produced up to that time, and the quantity of non compliant items. The operator may also modify:
  - the quantity of units produced (1)
  - the amount of non compliant items (2)
  - he can declare the order completed (3)
  - finally, the operator must press the "Flashback" button at the bottom right (4)



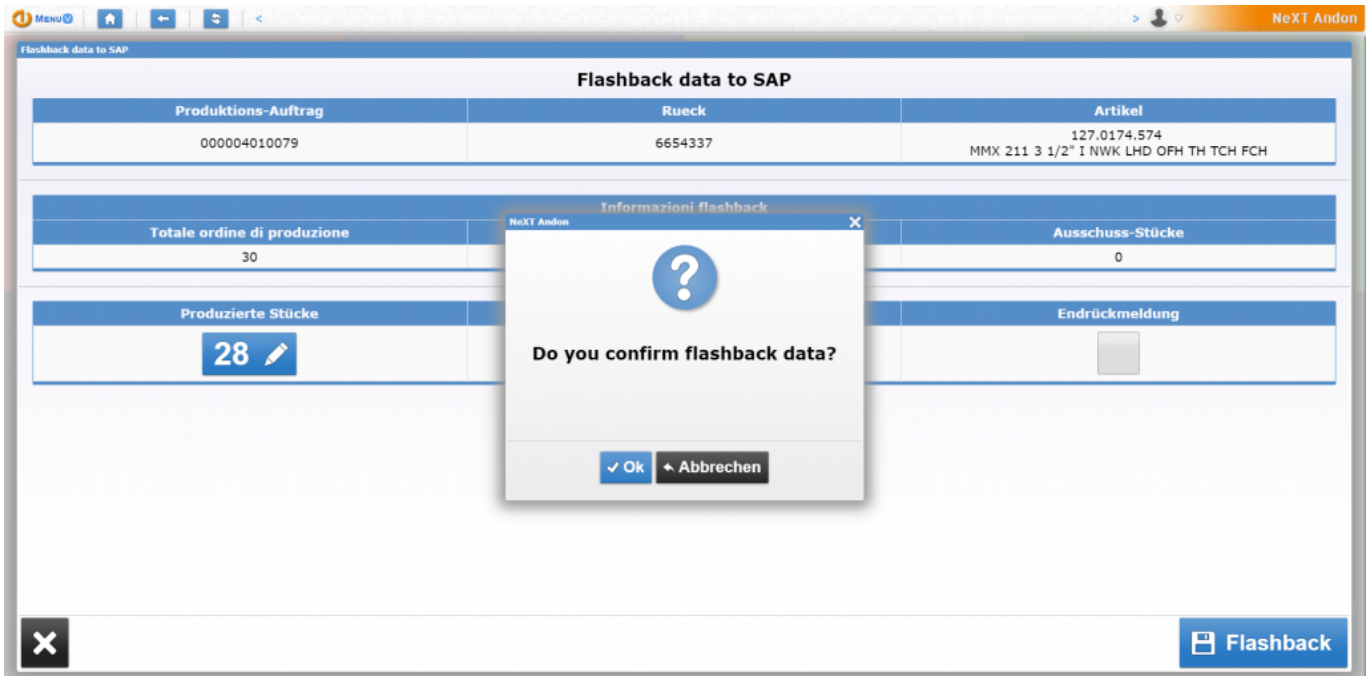
- This is the screen to change the amount of units produced.



- This is the screen to change the amount of non compliant items.

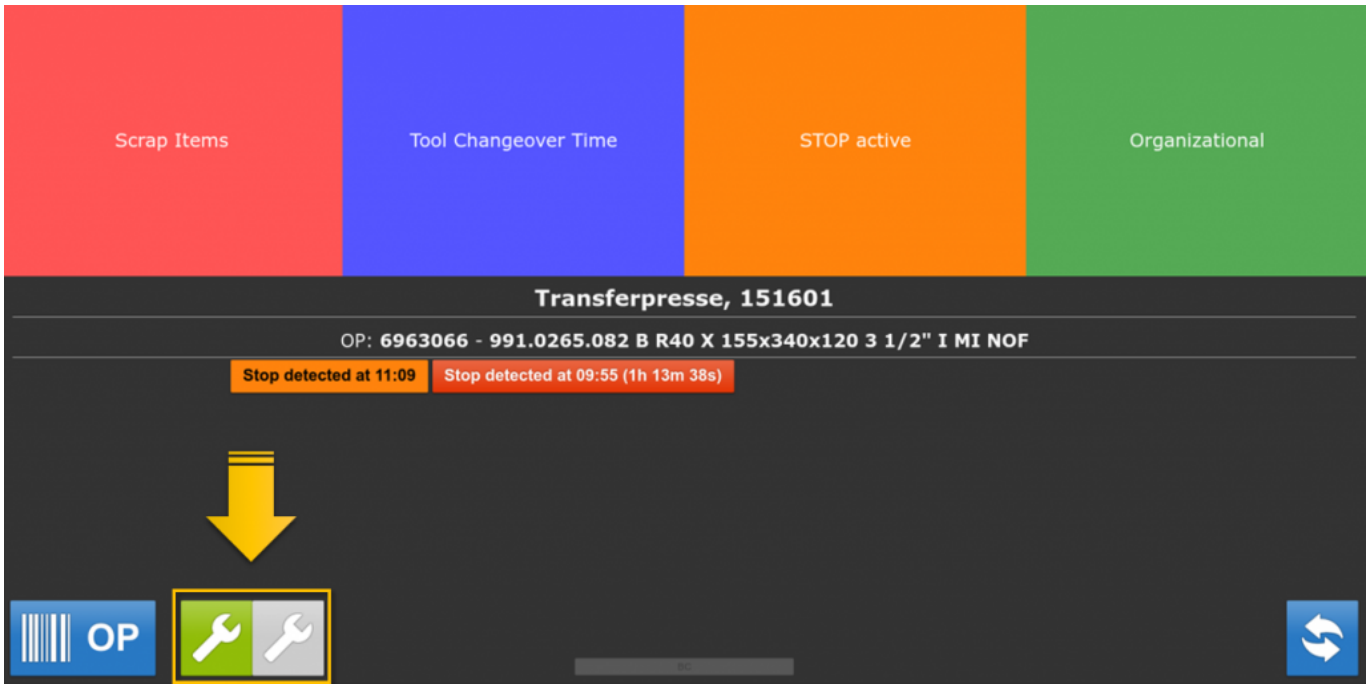


- When the operator presses the "Flashback" button, the system asks for confirmation of the operation



Tracking maintenance

It's possible to **track the maintenance** during a stop machine.
When the resource has a stop machine running, two additional buttons will be shown.



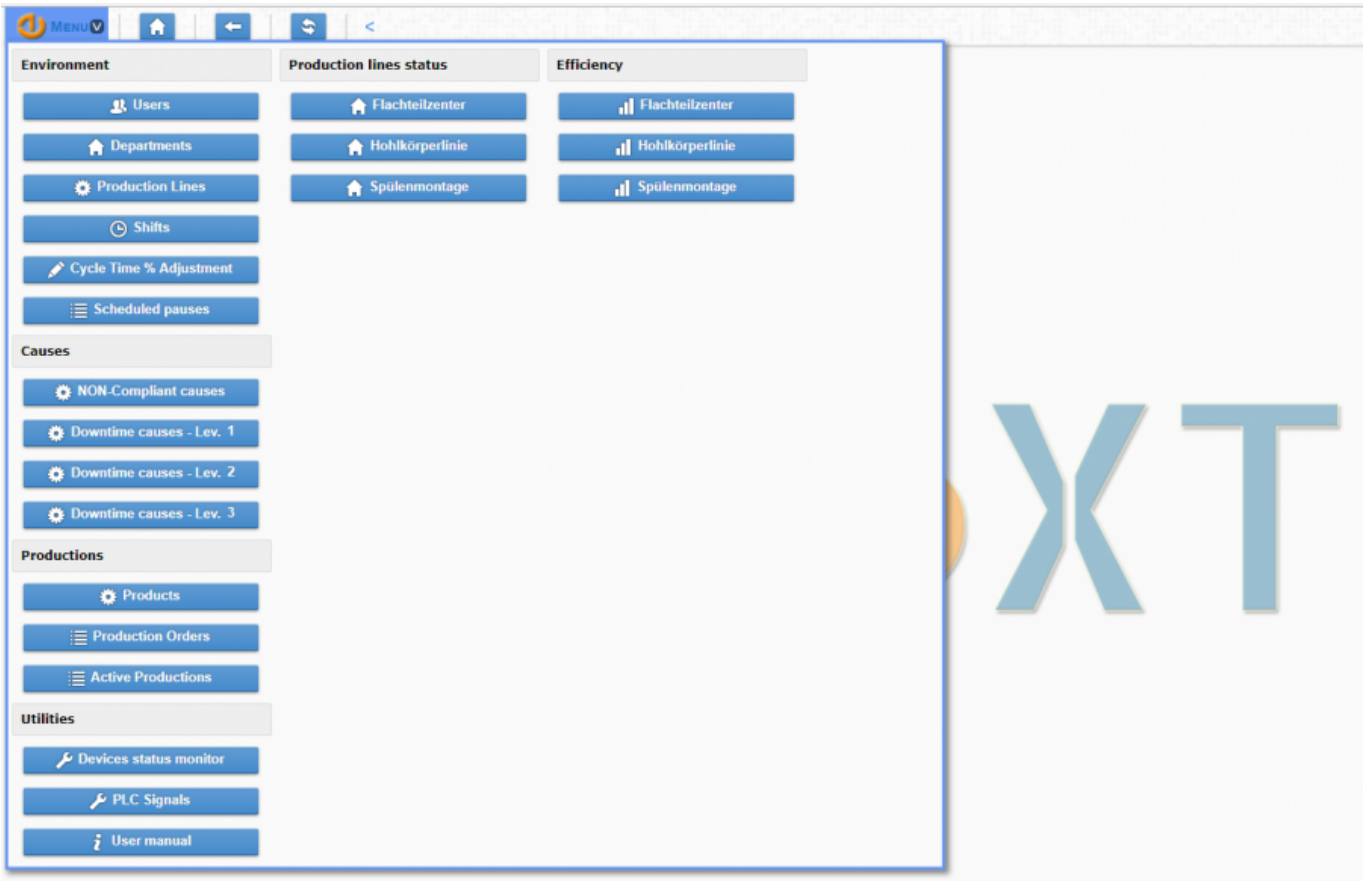
The operator will press the green one with the wrench icon and then will confirm the choise.
Success / error message will be shown based on the result of the operation.
Now, the green button become grayout (disabled) and the other button with the wrench icon become red: the operator has to press it to end the maintenance.
The running stop machine remains as is until the operator press the yellow blinking button “failure / slowdowns”.

In the office

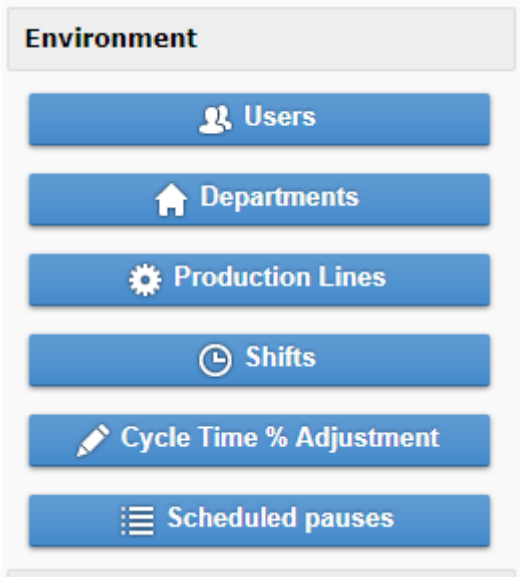
NIS web platform

The main menu

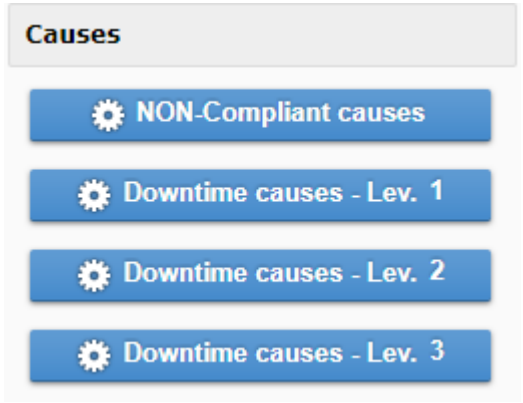
From the office the user will be able to **view**, **manage** and **customize** the entire NIS system.
All the operations the user can do are listed in the main menu. The menu provides different entries, depending on who is logged.
This is the menu that can see a user with the role of administrator.



The «**Environments**» section contains some general voices describing users, departments, lines, shifts, cycle time adjustments and scheduled pauses.
Through each single entry the user will be able to make settings and changes related to the context.
We will deepen this topic in the paragraphs «**Users**» and «**The environment**».



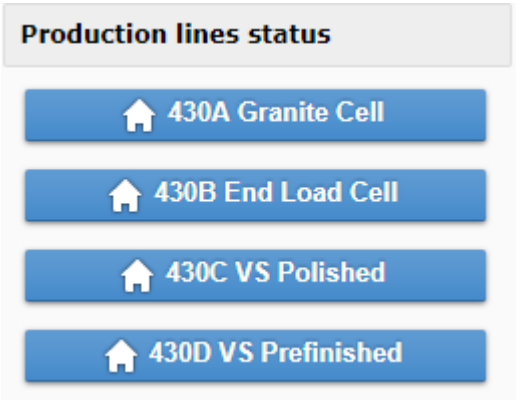
The «**Causes**» section represents the list of possible downtime or non-compliant causes.
We will deepen this topic in the paragraphs«**Non-compliant causes**» and «**Downtime causes**».



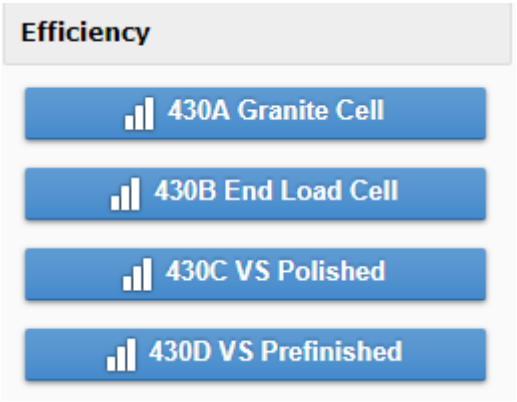
The «**Production**» section contains the list of products, the list of production orders, and the list of active productions at the moment.
We will deepen this topic in the paragraph «**Productions**».

In the «**Utilities**» section, there are three entries «**Devices status monitor**», «**PLC Signals**» and «**User manual**».
The first, gives access to the list of all devices involved and some control functions; the second shows the signals of a specific PLC; the third gives direct access to a web version manual.
We will deepen this topic in the paragraph «**Utilities**».

The «**Production line status**» section lists the monitored lines.
Through this list you will be able to view the data of each line, relating to the Andon: you will be able to view the screen of the Andon board (TV LED) and also the screen of the touch panel.
We will deepen this topic in the paragraph «**Production line status**».

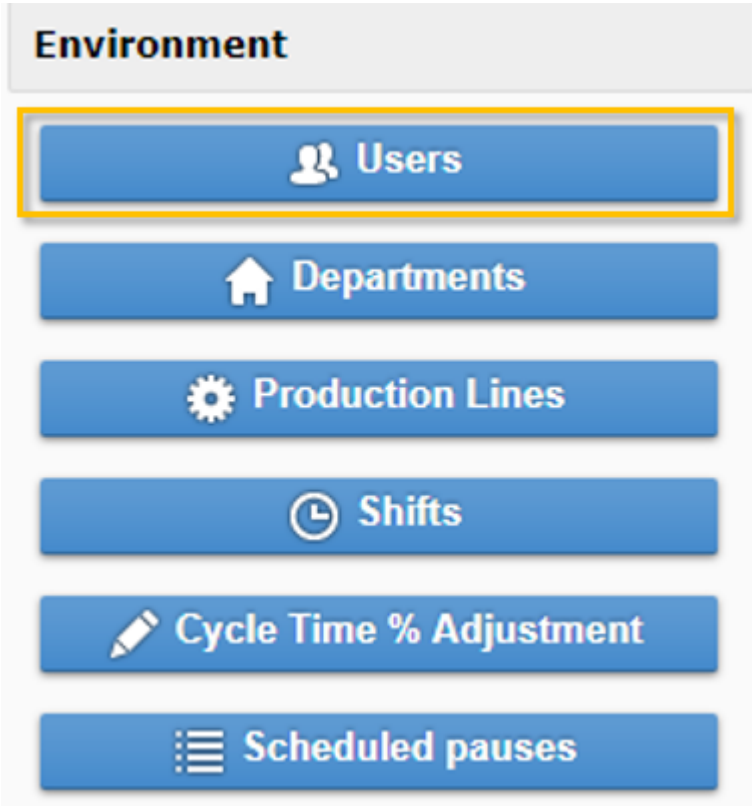


The «Efficiency» section lists the monitored lines.
Through this list you will be able to view the OEE of today's turn, but you will also be able to view the OEE of that line in a certain period of time.
We will deepen this topic in the paragraph «**Efficiency**».

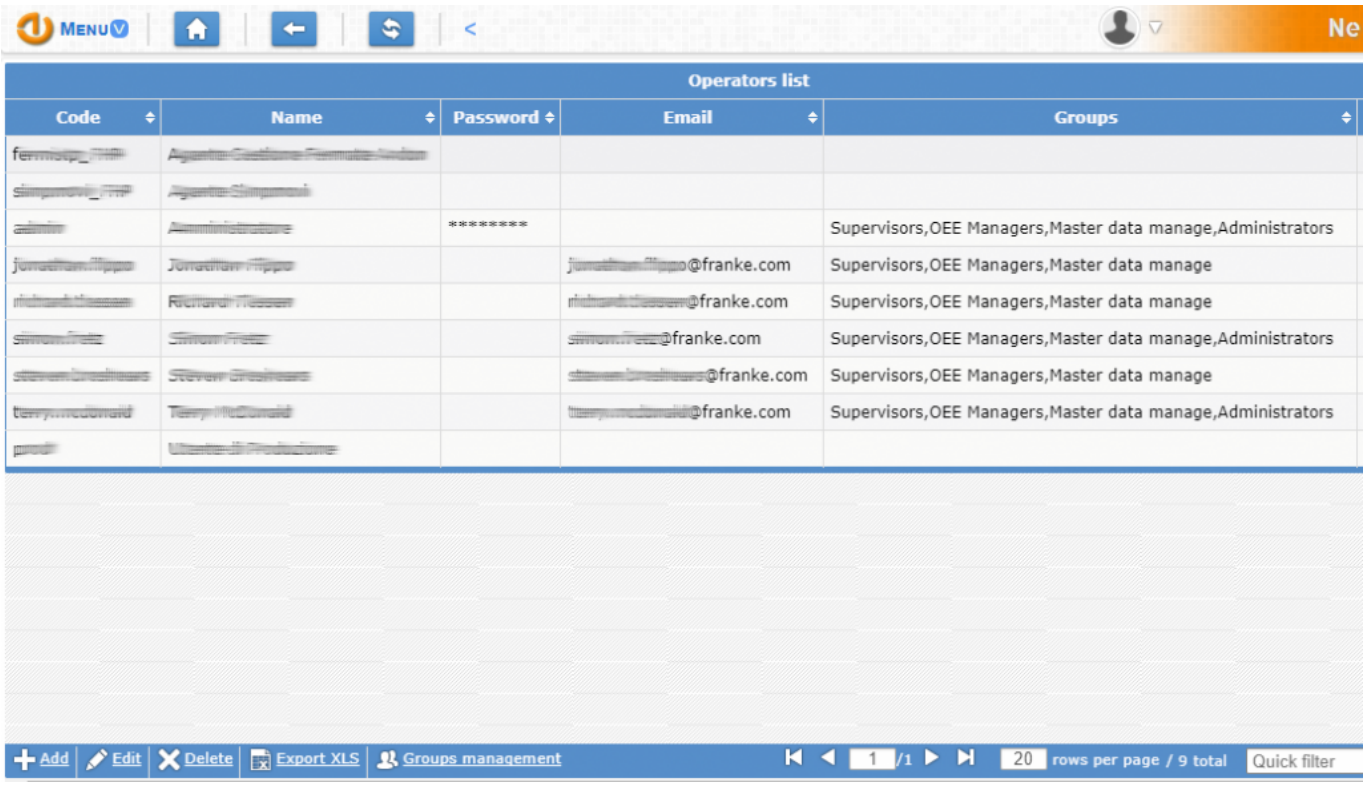


Users

The NIS web platform has several roles.
Using the "**Users**" button, you can add new users, associating it with one or more roles. Depending on the role, each user will have access to different views and functions.
Users and groups can be managed only if the logged in user has the «**Administrator**» level of rights.

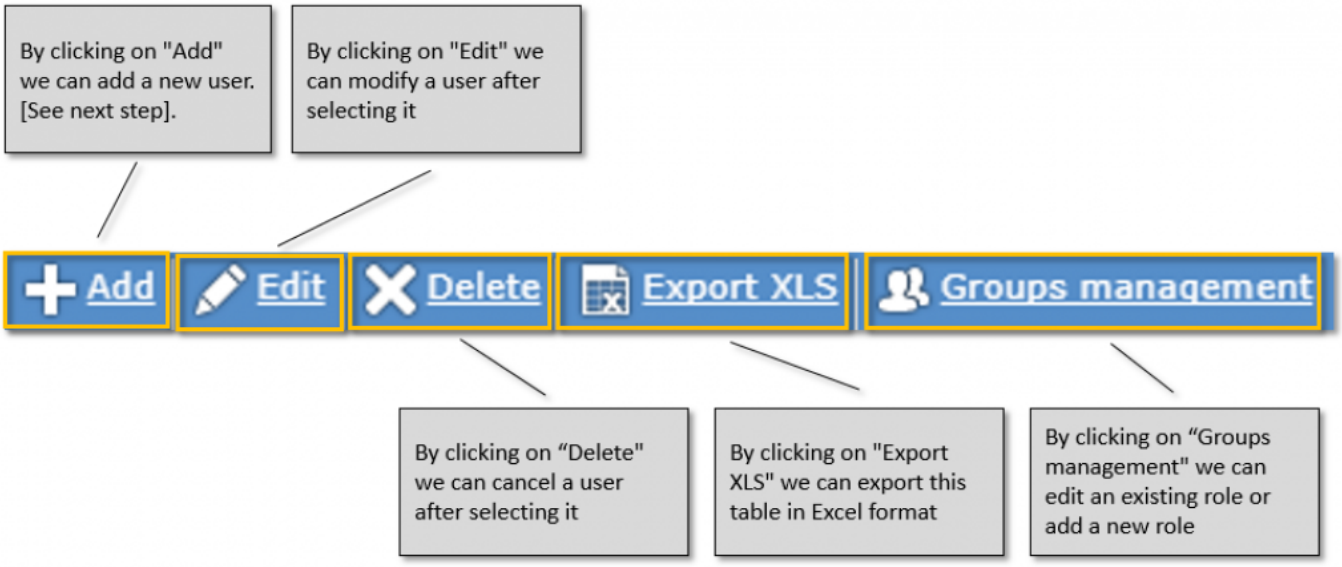


After clicking on the "**Users**" button, the user have access to the list of already registered users, displaying *Name*, *Surname*, *username*, *e-mail*, and the *roles* associated with each of them.

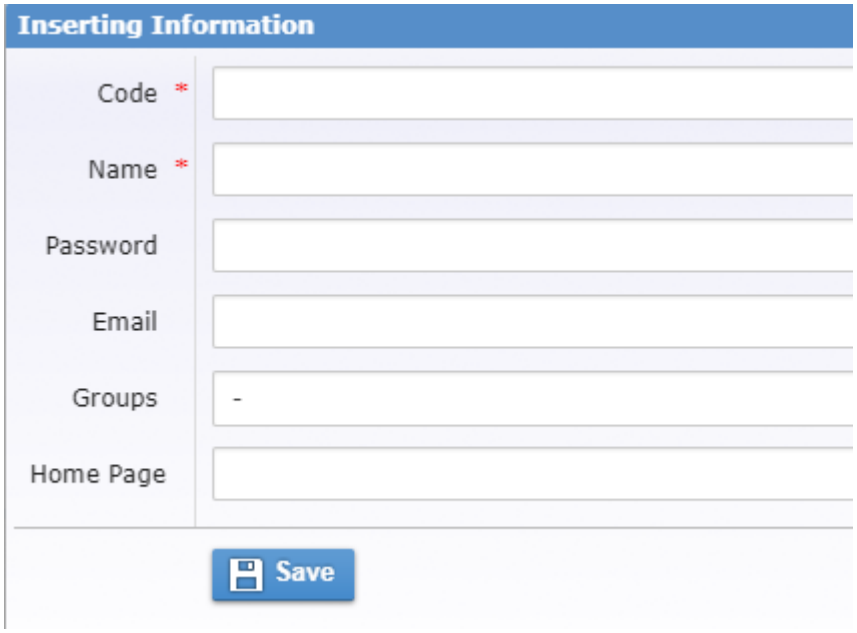


- «**Add**»: by clicking it, we can add a new user.

- «**Edit**»: by clicking it, we can modify a user after selecting it.
- «**Delete**»: by clicking it, we can cancel a user after selecting it.
- «**Export XLS**»: by clicking on it, we can export this table in Excel format.
- «**Groups management**»: by clicking on it, we can edit an existing role or add a new role.



To add a new user, you have to click on "**Add**". This is the form to fill in to add a new user: "**Code**" (username) and "**Name**" are necessary.



Groups

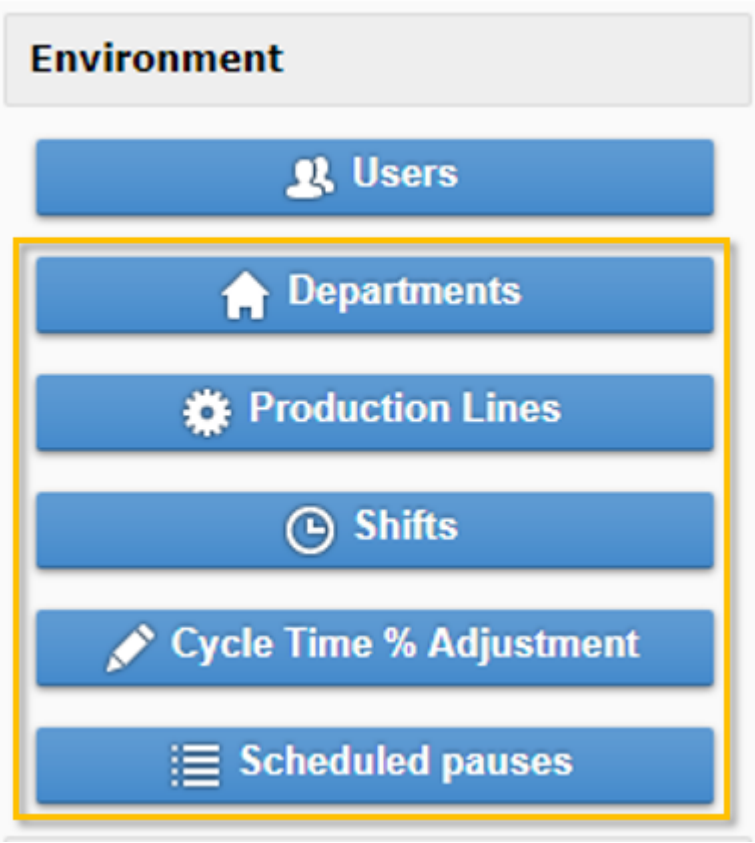
By clicking on "**Groups management**" you can access the list of existing roles. Currently they are: *Administrator*, *Master Data Manager*, *OEE Managers* and *Supervisors*.

Each role is enabled to perform specific functions:

- **Administrator**: all functions enabled.
- **OEE manager**: environment configurations, scrap and stop machine causes, OEE summary, reports.
- **Supervisor**: all functions except users and groups management

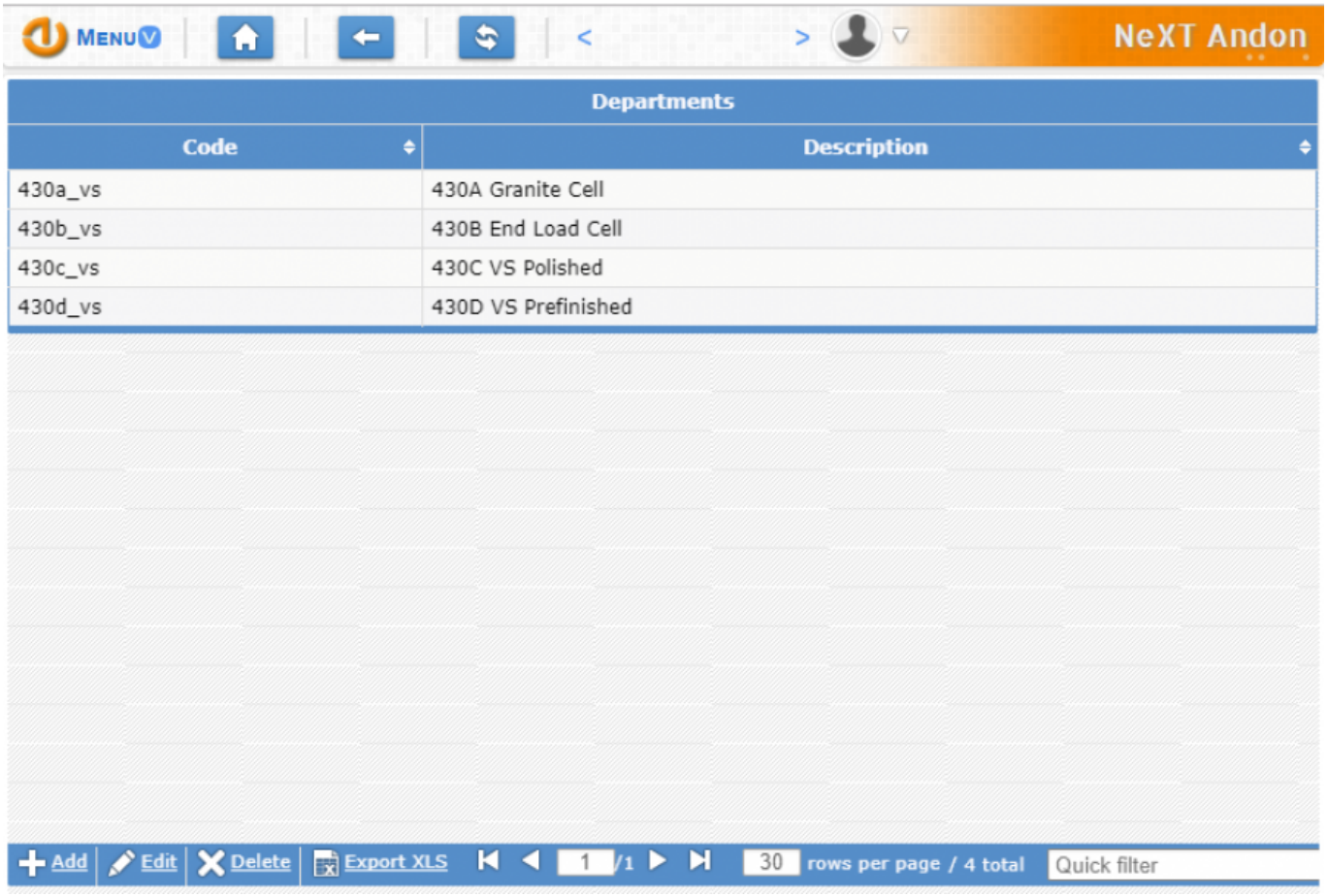
The environment

The remaining entries of the menu "**Environment**", are used to define the environment in which the NIS system is operational.
So this section include the departments and lines involved, the length of the shifts, the cycle time adjustment, and the the scheduled pauses.



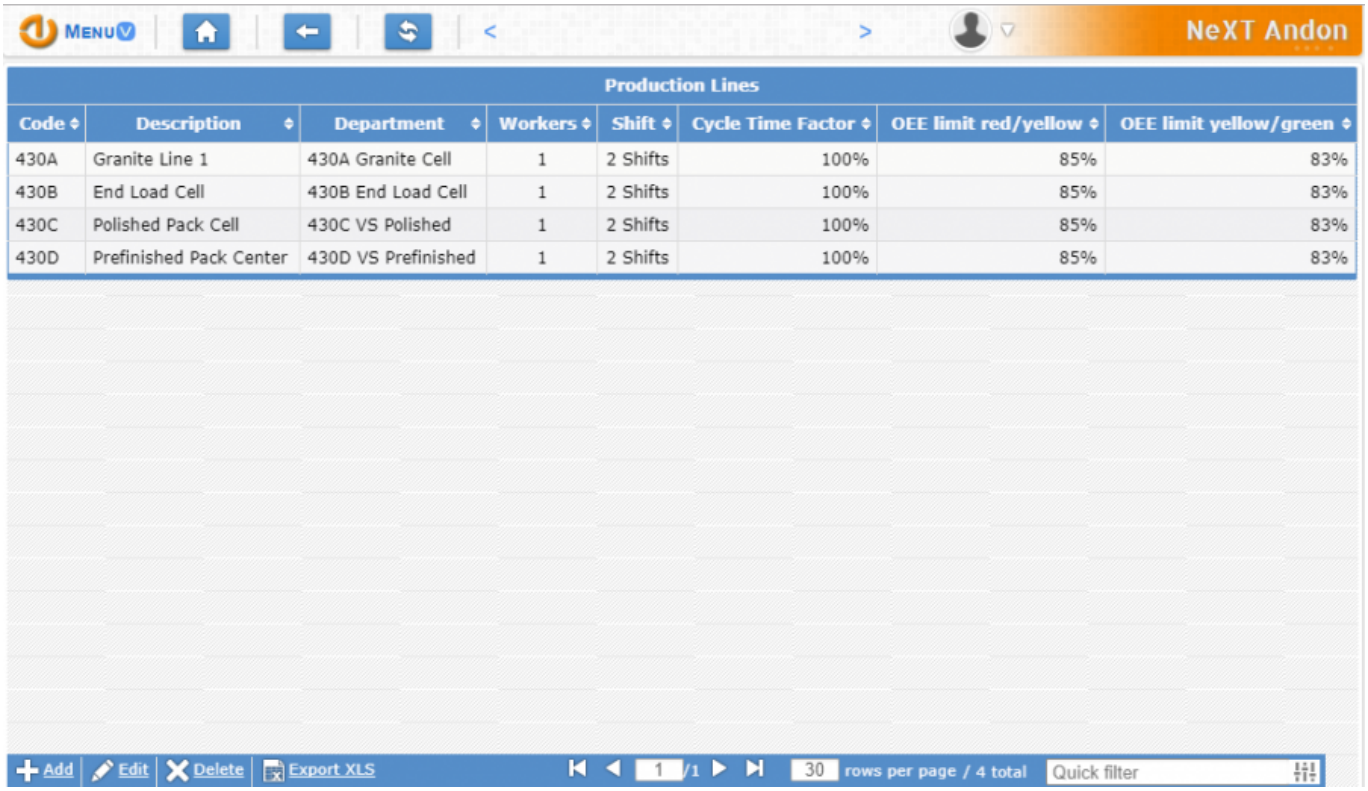
Departments

This section will show the list of departments where the NIS system is installed.
A department can contain one or more production lines.
The user who has the rights to edit this section can add new departments or edit/delete existing ones, or export this table in Excel format.



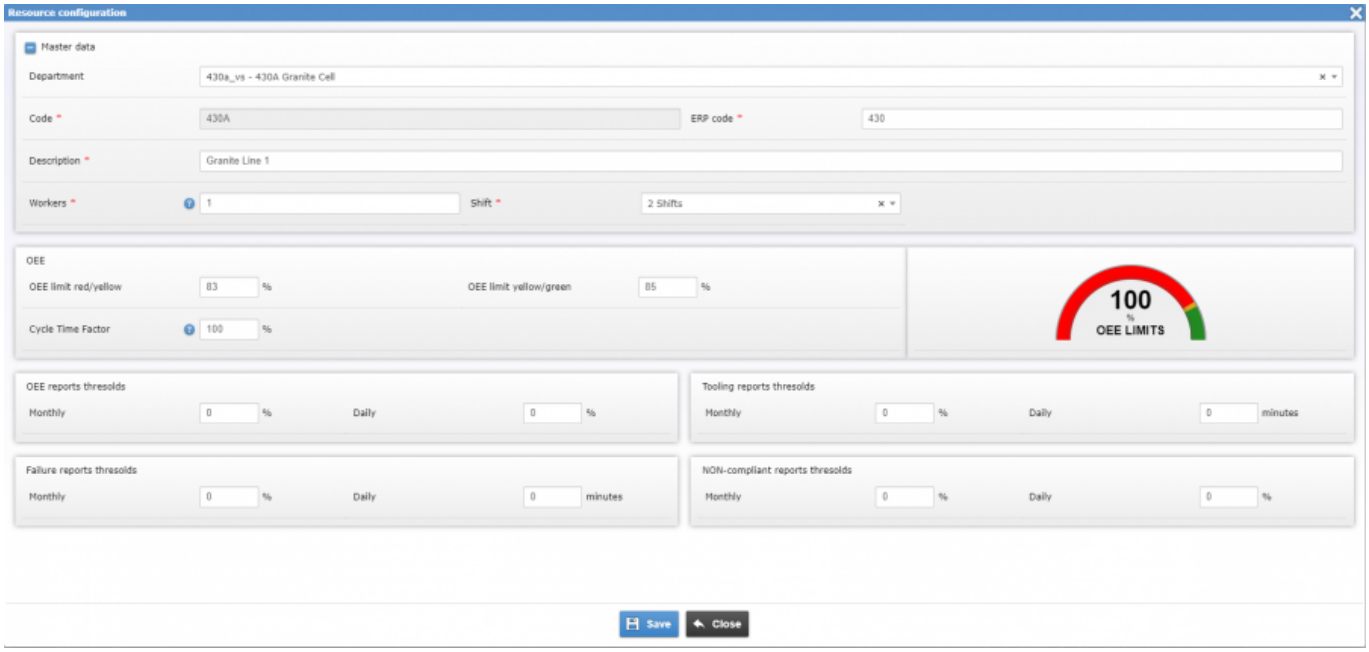
Production lines

This section will show the list of production lines where the NIS system is installed.
The user who has the rights to edit this section, can add new production lines or edit/delete existing ones, or export this table in Excel format.



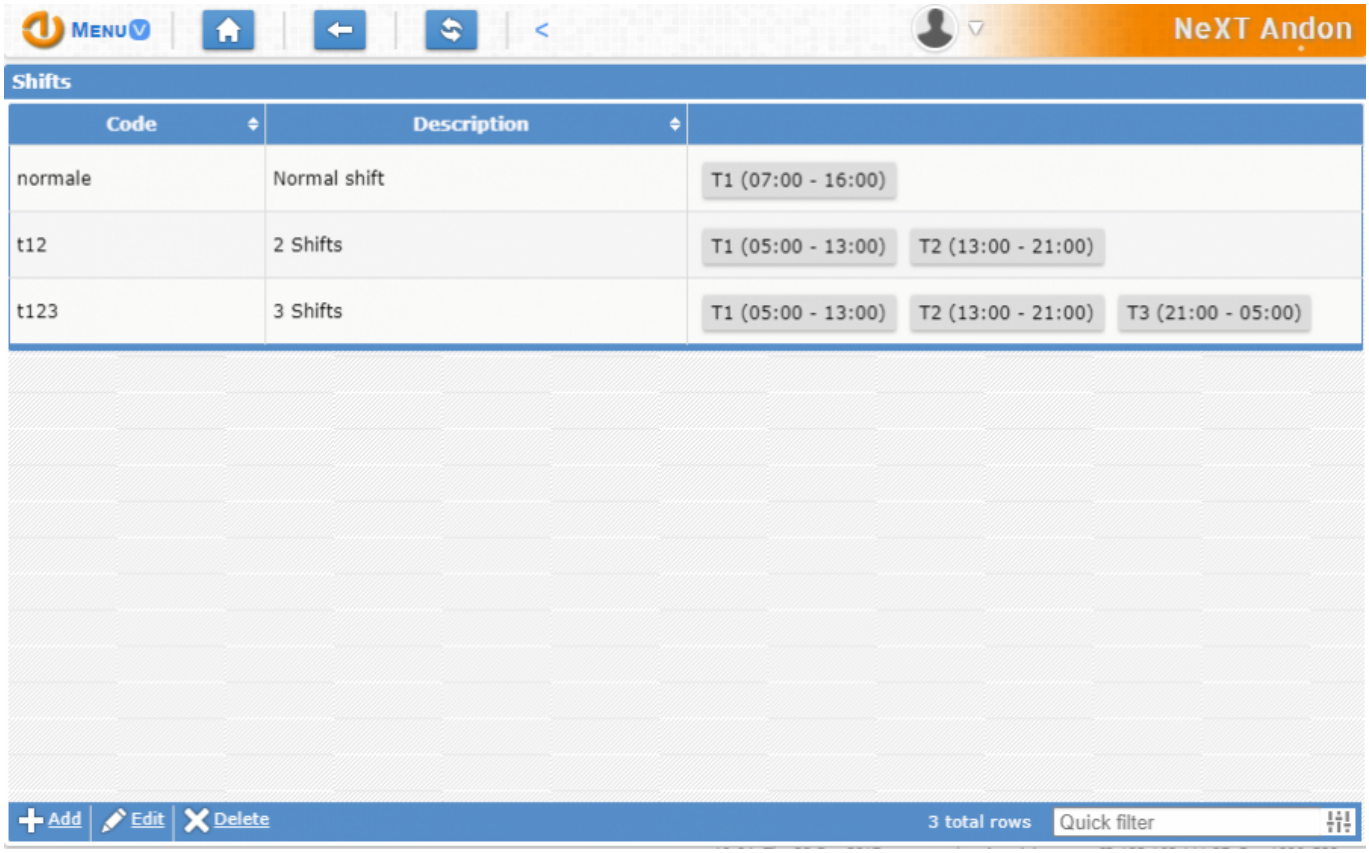
The user, when adds or edits an existing line, will have to set some values such as:

- the department to which the line belongs
- the number of workers (zero means gathered from ERP)
- the number of shifts
- setting **OEE percentages**, which will be represented by red, yellow and green
- setting the **Cycle Time Factor**
- setting the thresholds for OEE, failure, tooling and scraps reports (monthly and daily) (*see also paragraph «**Reports**»*)



Shifts

this section will show the list of planned shifts.
The user can add a new shift, or edit an existing shift. He will have to set the start and end of each turn.
The user can also delete an existing shift.



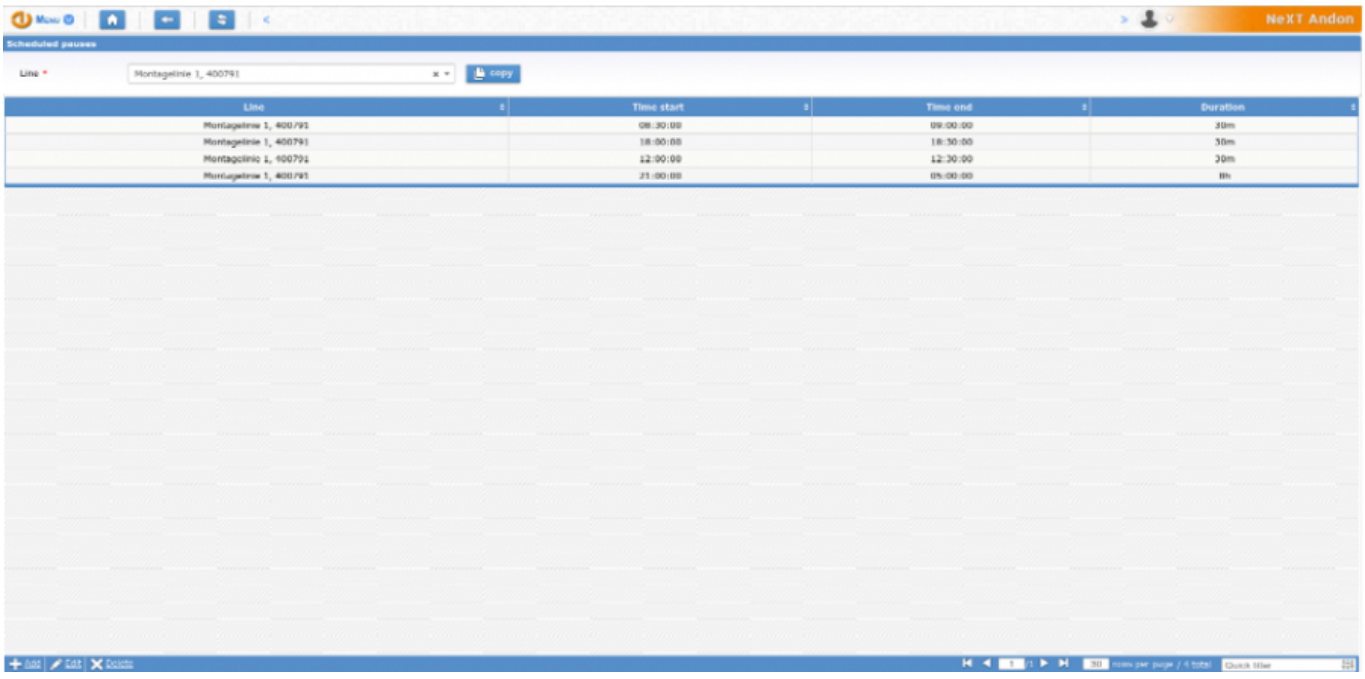
Cycle time % adjustment

The Cycle time is based on the cycle time gathered from ERP or manually entered by the operator in case of NO ERP data exchange.
It's coupled by articole code and the line involved. Examples of coefficient adjustments.

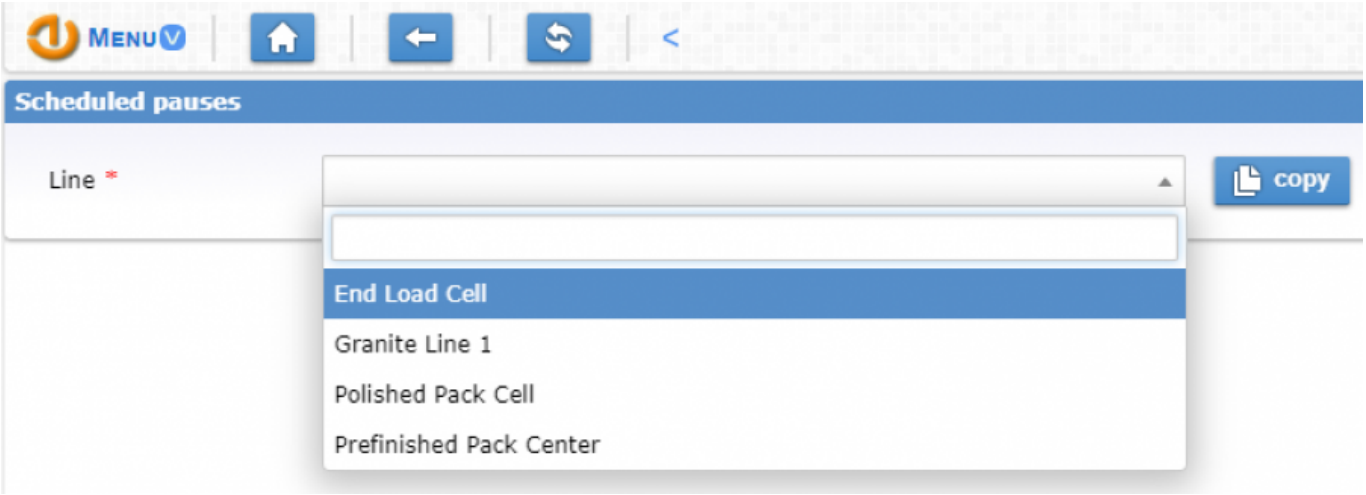
- 50% ⇒ cycle time halved
- 100% ⇒ no change applied
- 200% ⇒ cycle time doubled

Scheduled pauses

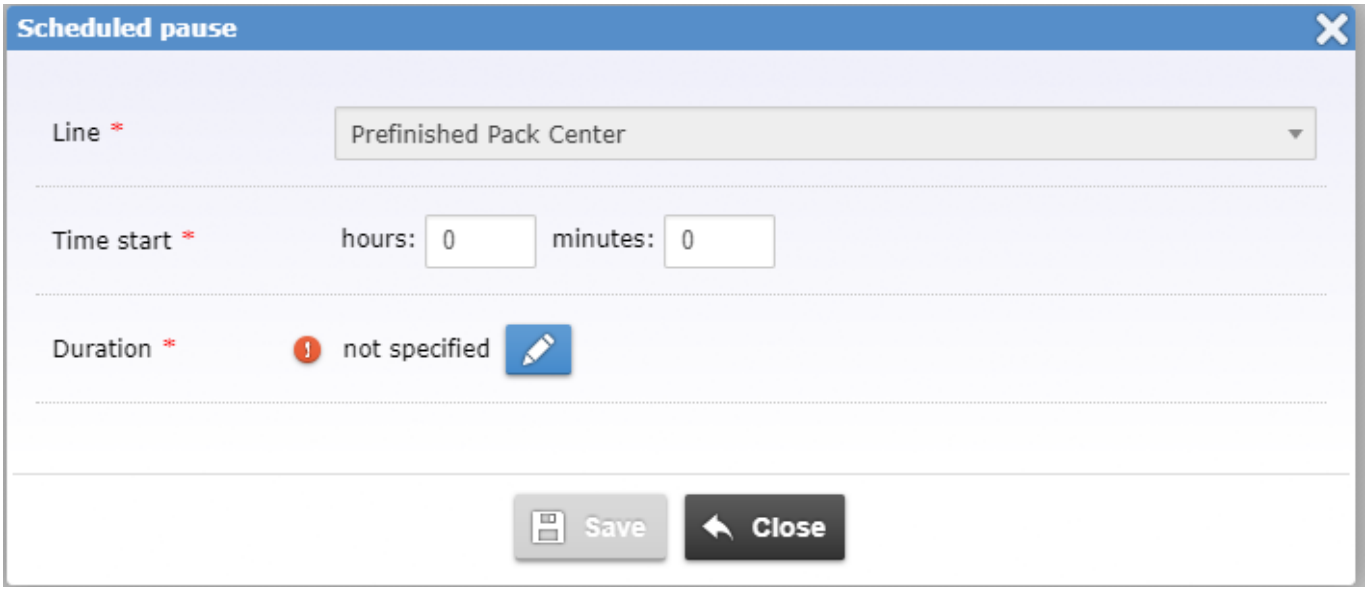
this section shows the list of scheduled pauses. The user can add a new scheduled pause.



Before adding a new scheduled pause, the user will need to select a production line.

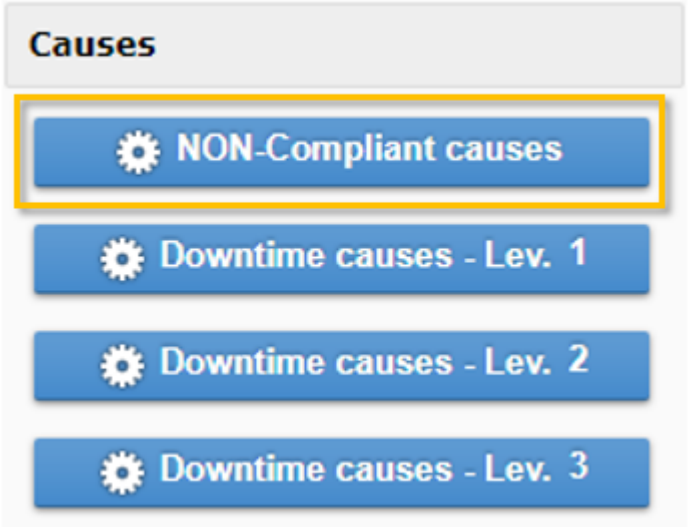


Finally, the user have to specify the start time of the pause and its duration.

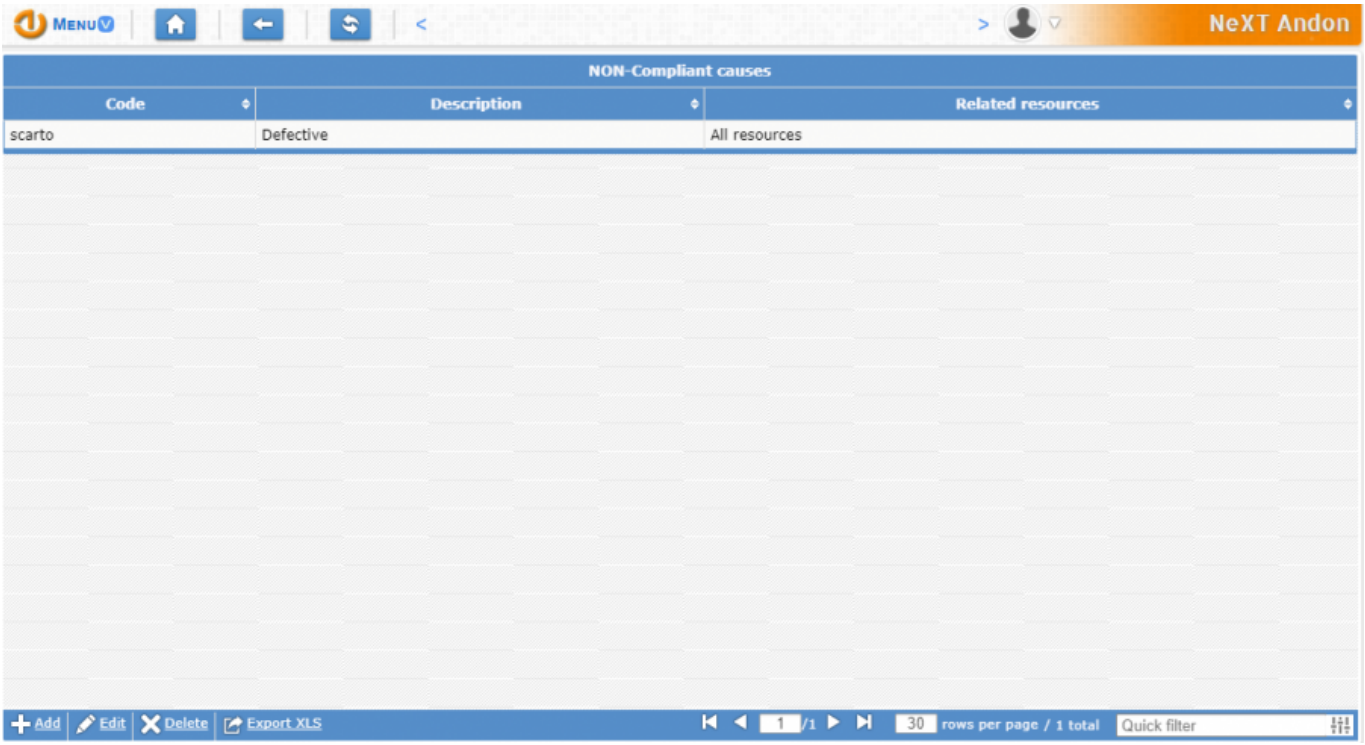


Non-compliant causes

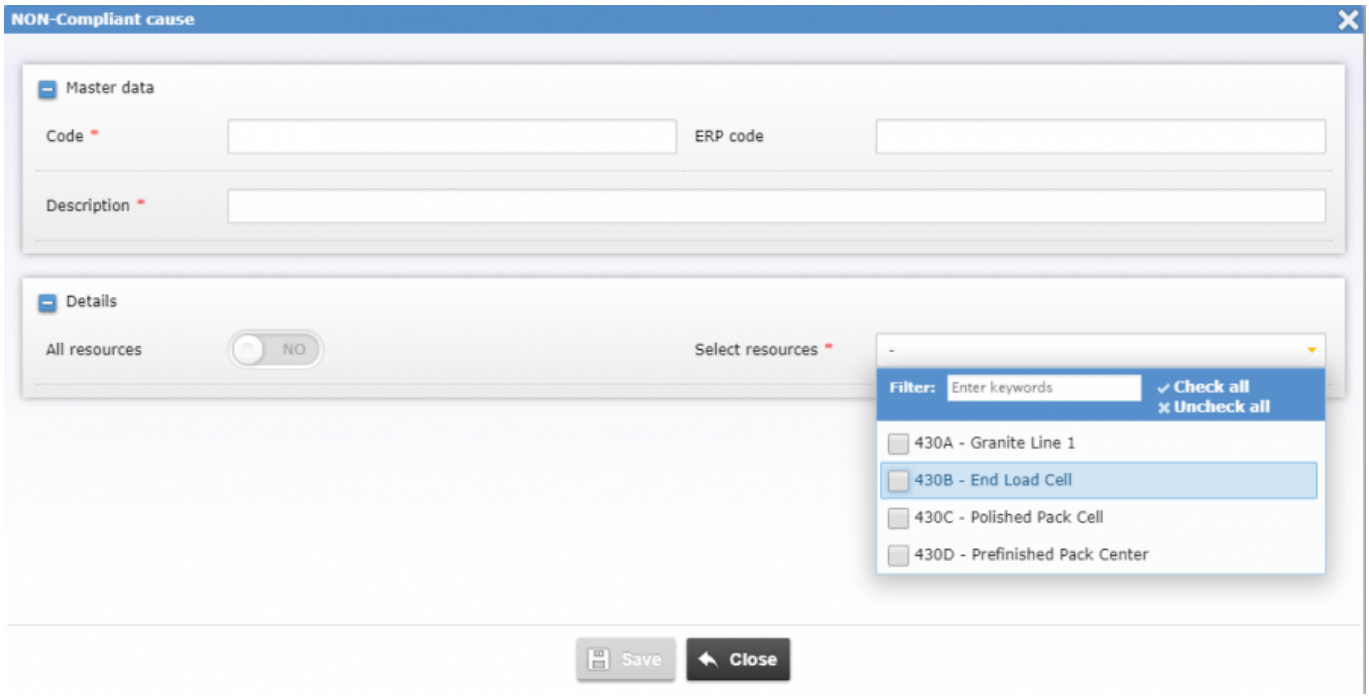
The "**Causes**" section allows the user to manage both the causes of quality problems and machine stops



The section **Non-compliant causes** shows the list of non-compliant causes provided.
The user can add a new cause, cancell or modify an existing one.



When adding a new non-compliant cause, the user have to give a description and to associate a resource (a production line).

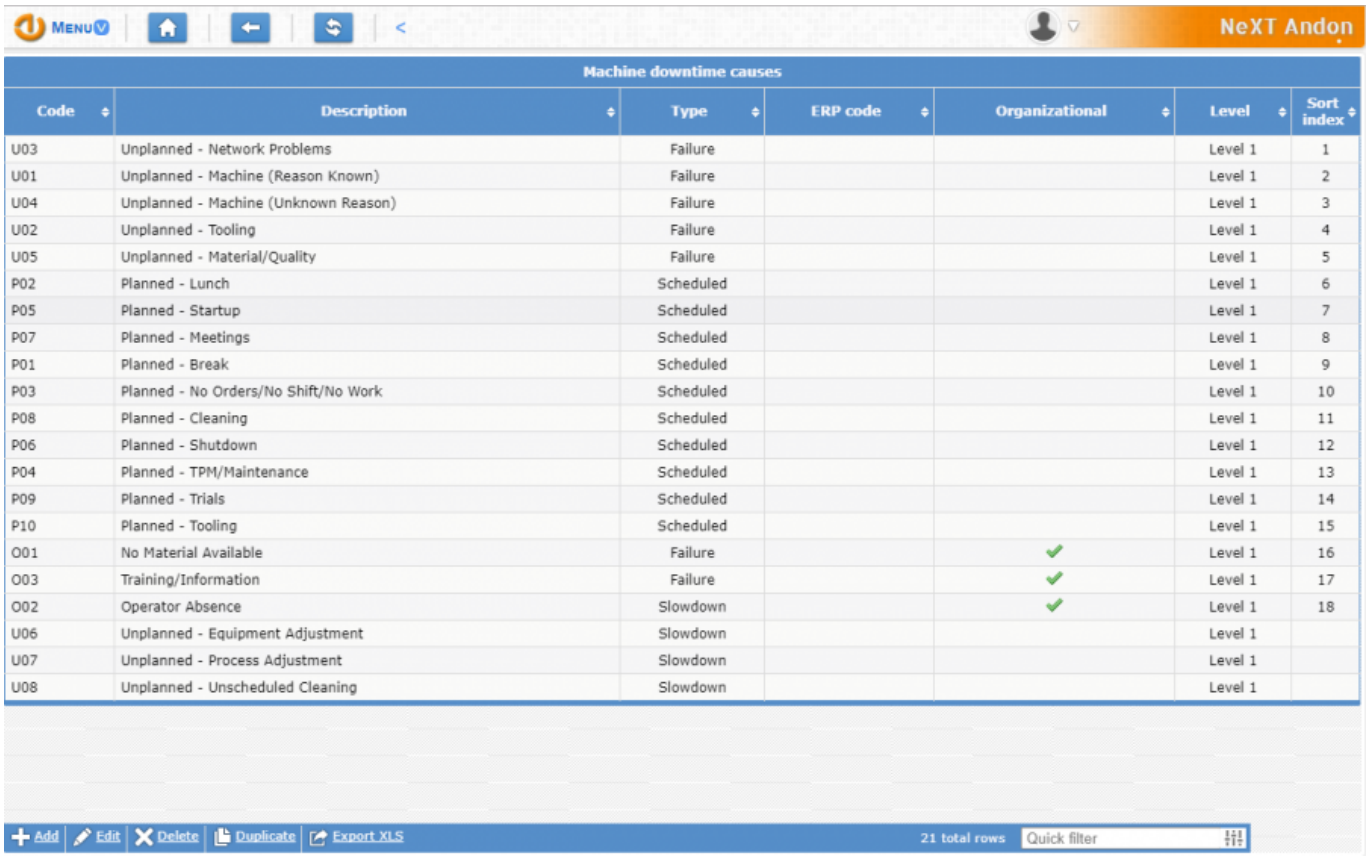


Downtime causes

The **downtime causes** are all those causes that lead to a stop in production.
Causes can be of different kind (*failure*, *scheduled* or *slowdown*) and have been organized in three different depths, helping to define more and more in detail the cause of stop

Downtime causes – Lev. 1

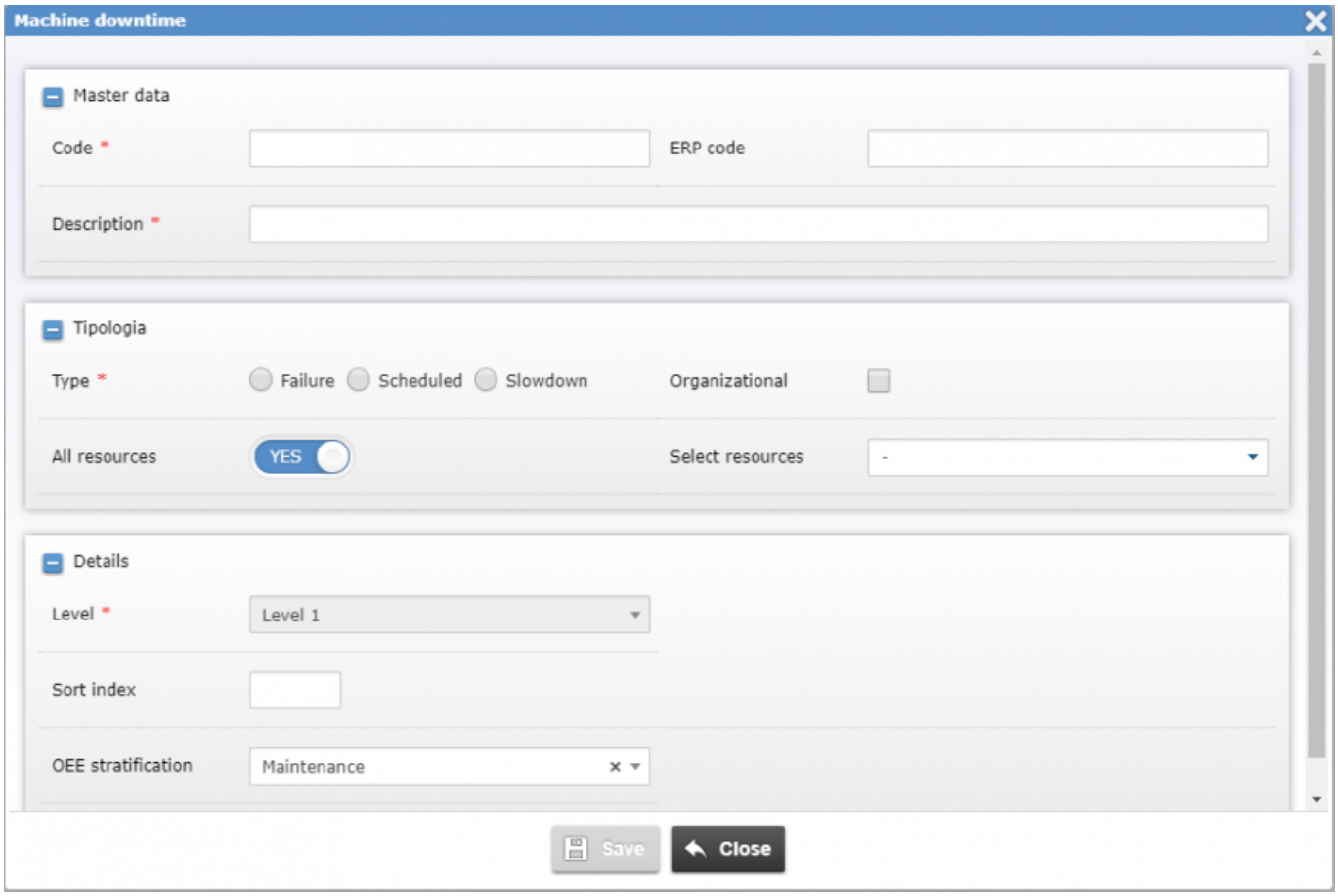
This section shows the list of causes for first level.
Each item in the table specifies an identifier code, a description, the type (failure, scheduled or slowdown), the level (1st, 2nd or 3rd).



Code	Description	Type	ERP code	Organizational	Level	Sort index
U03	Unplanned - Network Problems	Failure			Level 1	1
U01	Unplanned - Machine (Reason Known)	Failure			Level 1	2
U04	Unplanned - Machine (Unknown Reason)	Failure			Level 1	3
U02	Unplanned - Tooling	Failure			Level 1	4
U05	Unplanned - Material/Quality	Failure			Level 1	5
P02	Planned - Lunch	Scheduled			Level 1	6
P05	Planned - Startup	Scheduled			Level 1	7
P07	Planned - Meetings	Scheduled			Level 1	8
P01	Planned - Break	Scheduled			Level 1	9
P03	Planned - No Orders/No Shift/No Work	Scheduled			Level 1	10
P08	Planned - Cleaning	Scheduled			Level 1	11
P06	Planned - Shutdown	Scheduled			Level 1	12
P04	Planned - TPM/Maintenance	Scheduled			Level 1	13
P09	Planned - Trials	Scheduled			Level 1	14
P10	Planned - Tooling	Scheduled			Level 1	15
O01	No Material Available	Failure		✔	Level 1	16
O03	Training/Information	Failure		✔	Level 1	17
O02	Operator Absence	Slowdown		✔	Level 1	18
U06	Unplanned - Equipment Adjustment	Slowdown			Level 1	
U07	Unplanned - Process Adjustment	Slowdown			Level 1	
U08	Unplanned - Unscheduled Cleaning	Slowdown			Level 1	

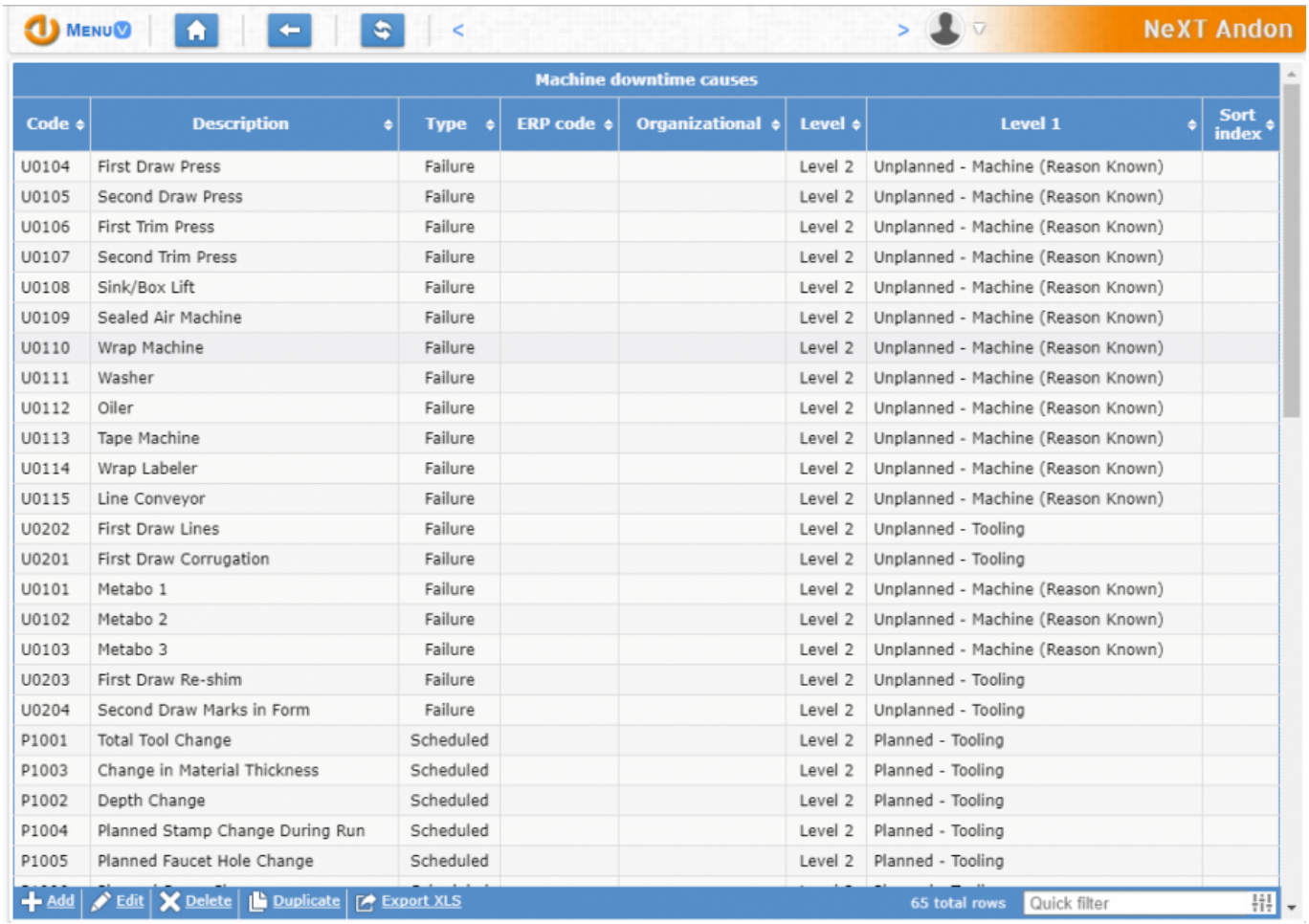
The user who has the rights to edit this section can add new downtime causes or edit/delete existing ones, or export this table in Excel format.
Adding a new downtime causes, the user will have to set some values such as:

- Code and ERP code
- A description of the downtime causes (Ex. «Planned – Lunch»)
- A type («Failure», «Scheduled» or «Slowdown»)
- If it is or not, an organizational causes
- The resource (line) involved
- The level
- Sort of index
- OEE stratification (the user have to select a reason of the stop. See also the paragraph «**Reports**»)



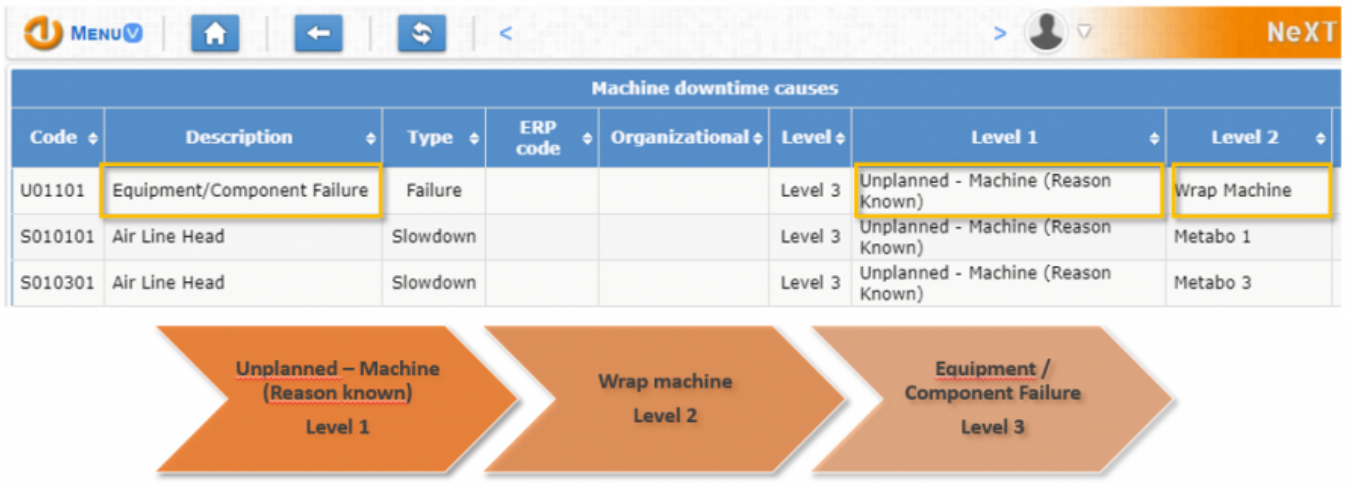
Downtime causes – Lev. 2 & 3

The tables relating to the downtime causes of 2nd and 3rd levels are similar to each other, *but are different from the table of the downtime causes of 1st level*.



Code	Description	Type	ERP code	Organizational	Level	Level 1	Sort index
U0104	First Draw Press	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0105	Second Draw Press	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0106	First Trim Press	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0107	Second Trim Press	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0108	Sink/Box Lift	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0109	Sealed Air Machine	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0110	Wrap Machine	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0111	Washer	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0112	Oiler	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0113	Tape Machine	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0114	Wrap Labeler	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0115	Line Conveyor	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0202	First Draw Lines	Failure			Level 2	Unplanned - Tooling	
U0201	First Draw Corrugation	Failure			Level 2	Unplanned - Tooling	
U0101	Metabo 1	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0102	Metabo 2	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0103	Metabo 3	Failure			Level 2	Unplanned - Machine (Reason Known)	
U0203	First Draw Re-shim	Failure			Level 2	Unplanned - Tooling	
U0204	Second Draw Marks in Form	Failure			Level 2	Unplanned - Tooling	
P1001	Total Tool Change	Scheduled			Level 2	Planned - Tooling	
P1003	Change in Material Thickness	Scheduled			Level 2	Planned - Tooling	
P1002	Depth Change	Scheduled			Level 2	Planned - Tooling	
P1004	Planned Stamp Change During Run	Scheduled			Level 2	Planned - Tooling	
P1005	Planned Faucet Hole Change	Scheduled			Level 2	Planned - Tooling	

In these tables there is a column reporting the description of the previous level («Level 1» or «Level 2»): in this way it is clear at what level, each sub-level belongs.

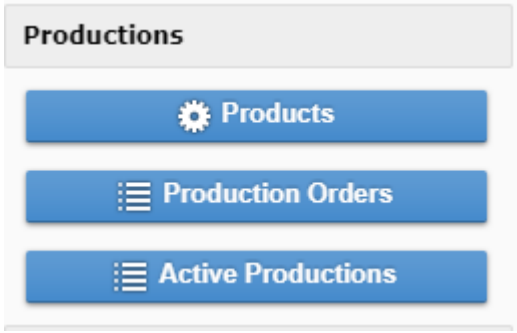


Code	Description	Type	ERP code	Organizational	Level	Level 1	Level 2
U01101	Equipment/Component Failure	Failure			Level 3	Unplanned - Machine (Reason Known)	Wrap Machine
S010101	Air Line Head	Slowdown			Level 3	Unplanned - Machine (Reason Known)	Metabo 1
S010301	Air Line Head	Slowdown			Level 3	Unplanned - Machine (Reason Known)	Metabo 3

Productions

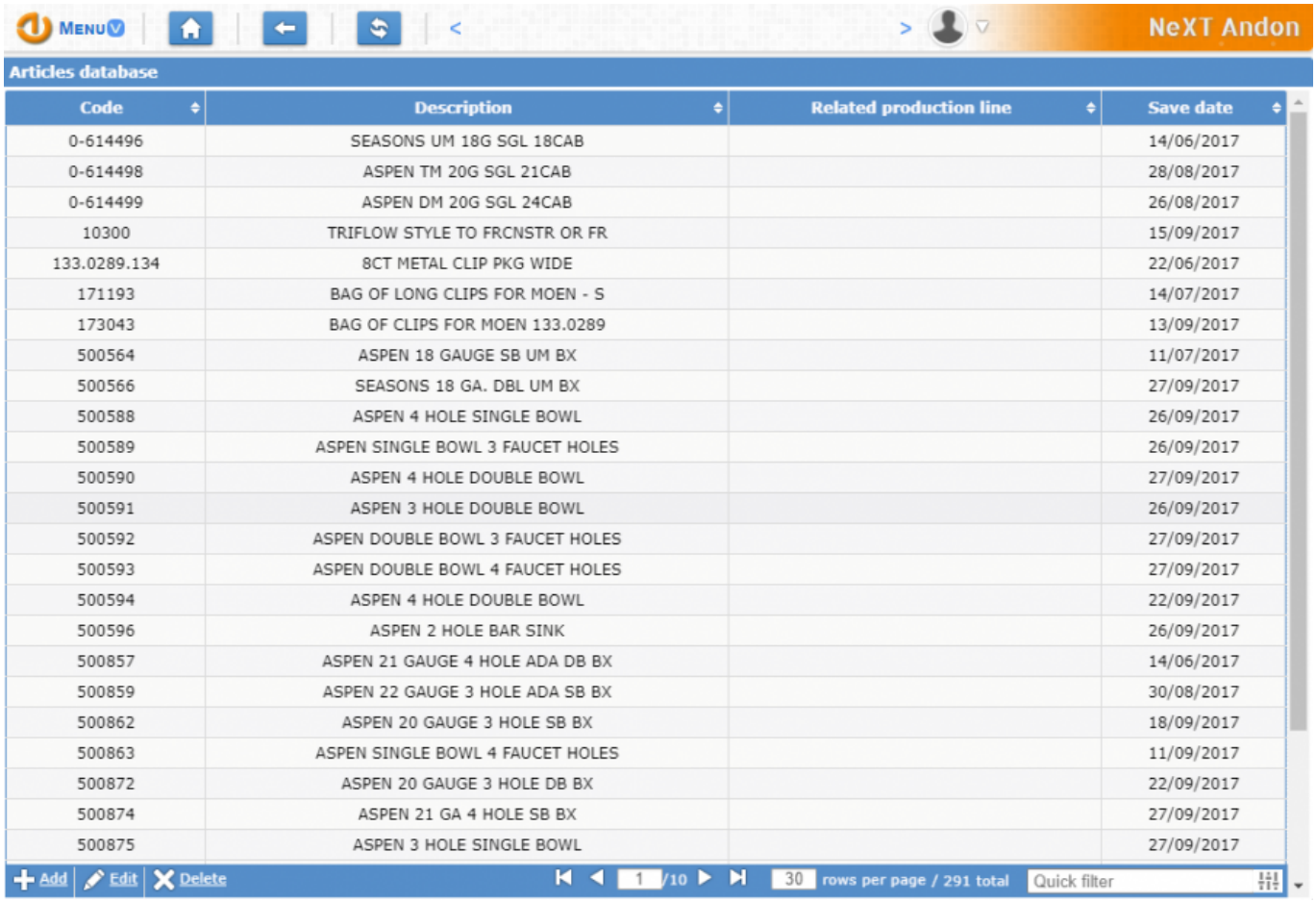
In this section, the user will be able to manage all the products and related production orders and to view and

modify the active productions.



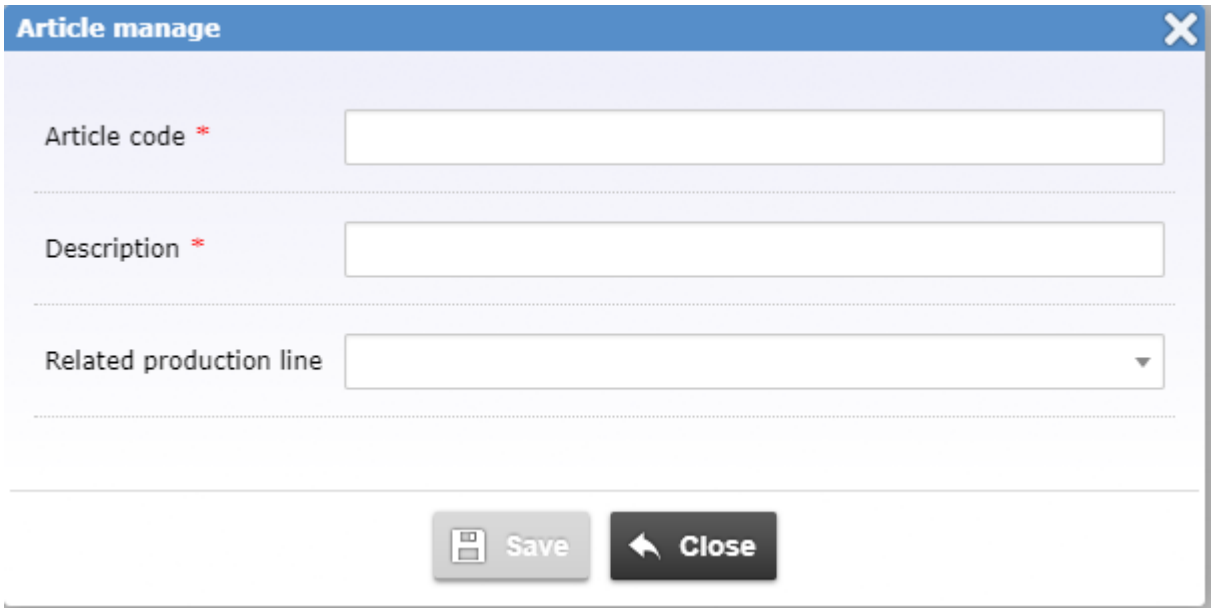
Products

This section shows the list of all products.



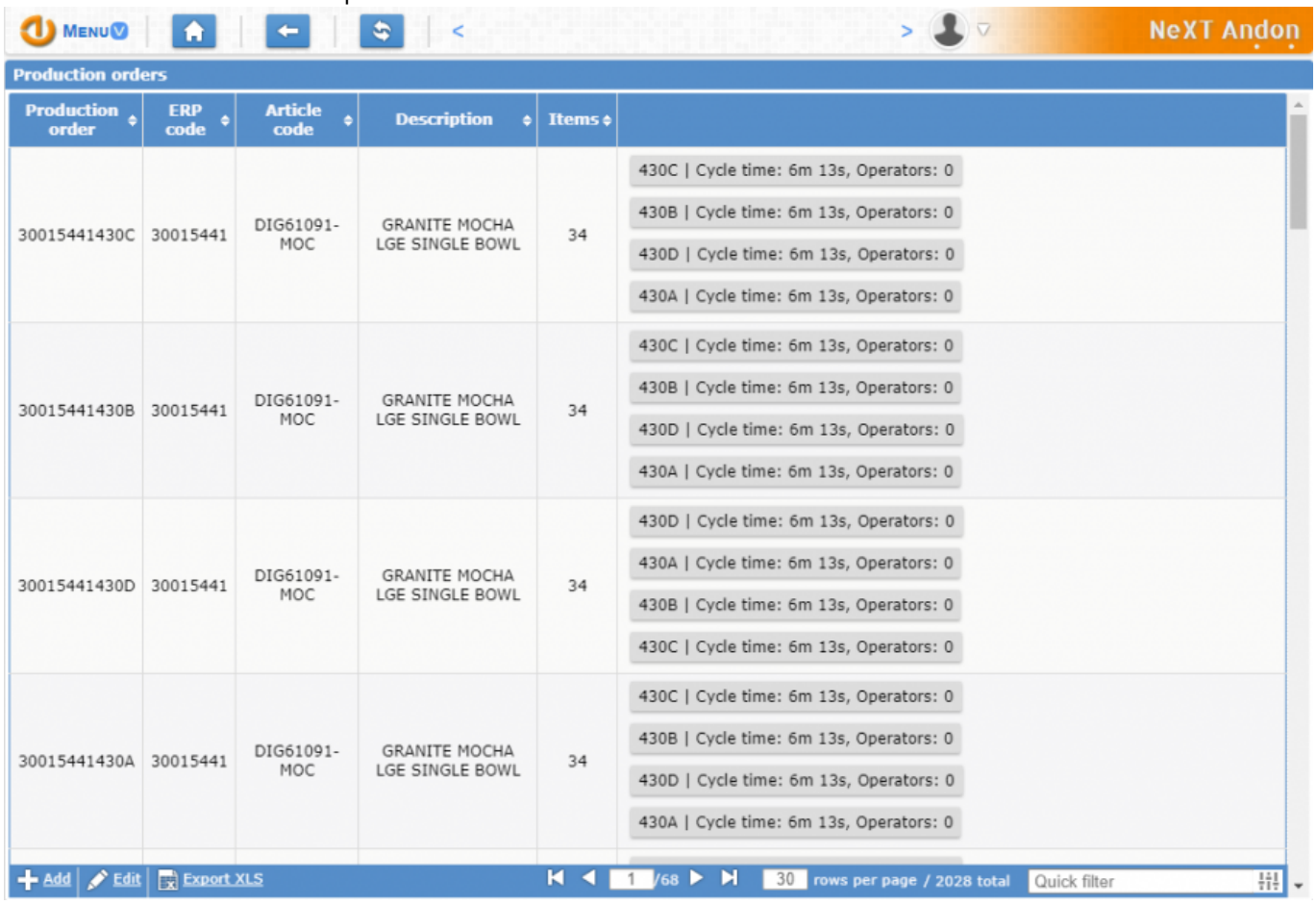
Adding a new product or editing an existing one, the user will have to set some values such as:

- a code
- a description
- the related production line (optional)



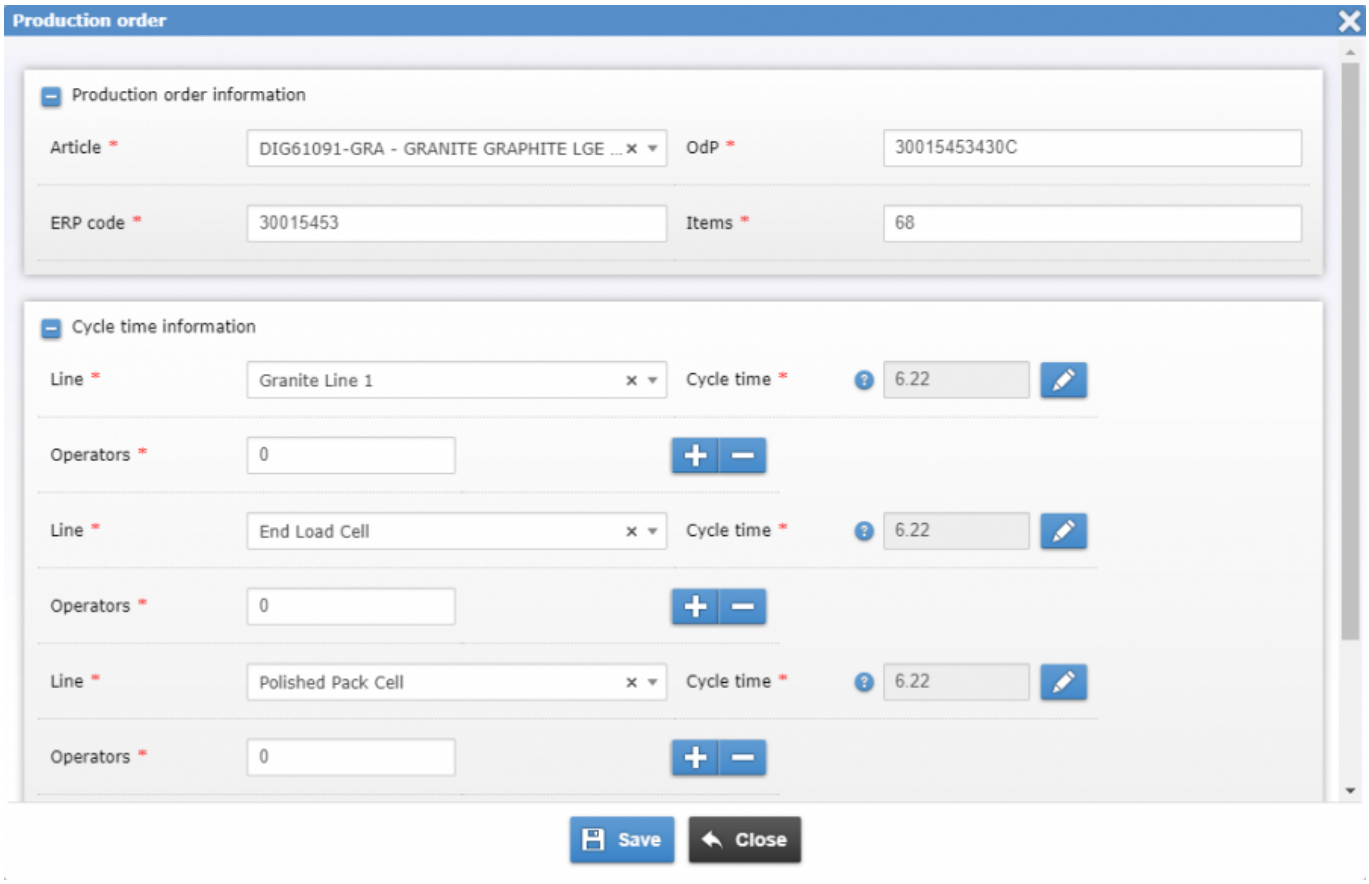
Production order

This section shows the list of production orders.



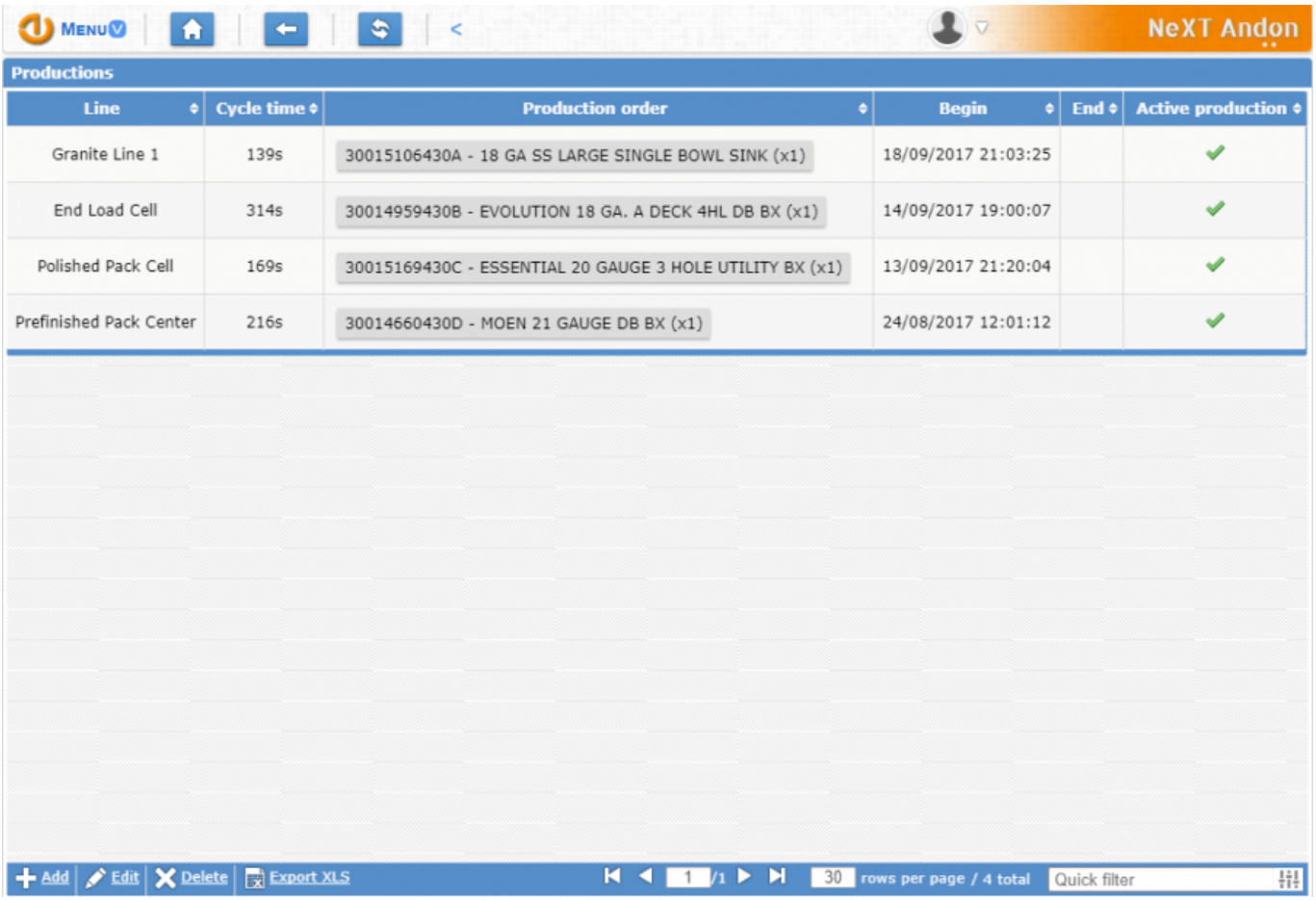
The information in this table relates to:

- the article
- the code of the production order
- the ERP code
- the number of items provided
- the lines where it is possible to work the article, its cycle time and the number of workers involved



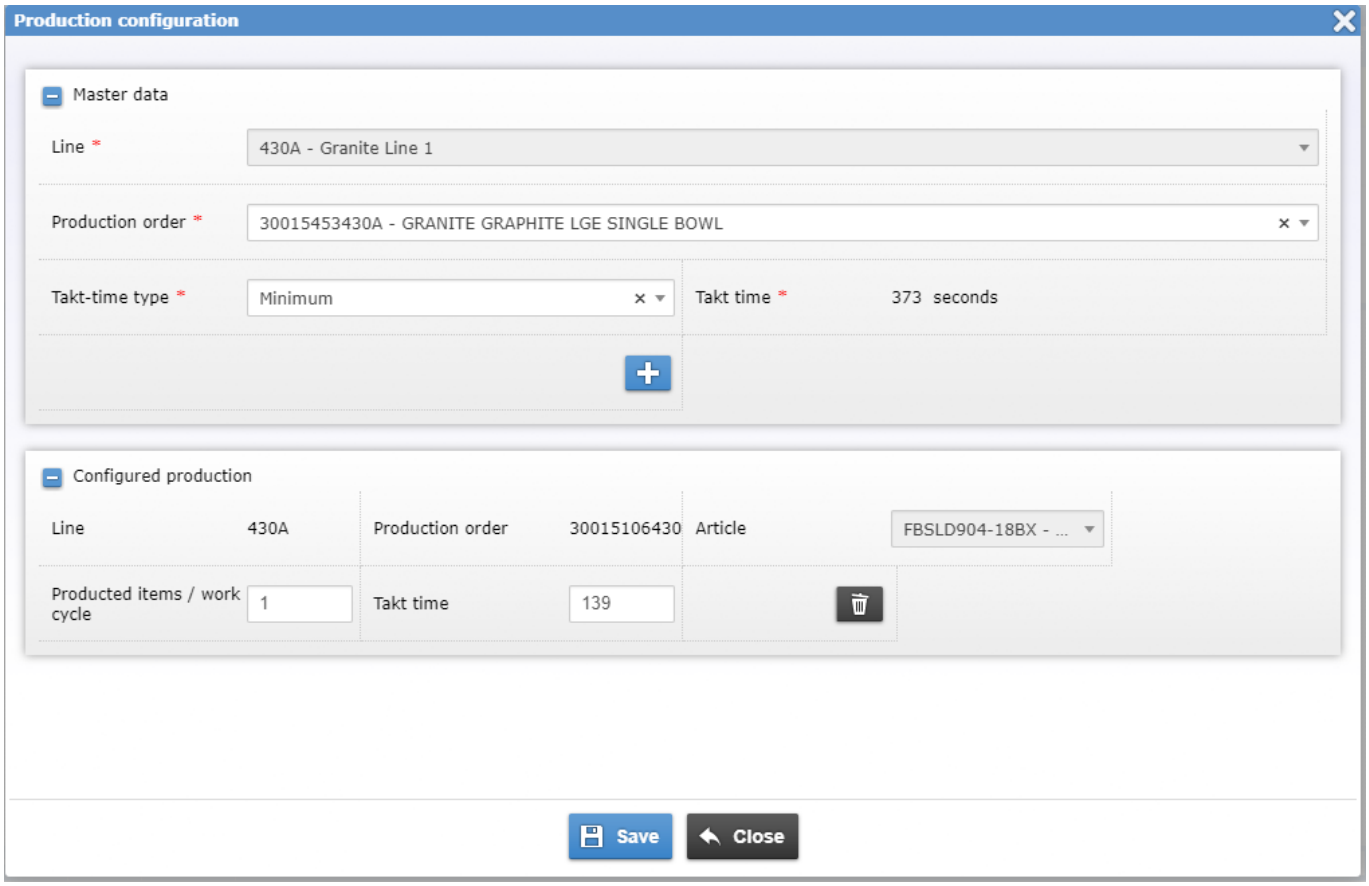
Active productions

This section shows the list of active productions at this time.
The information in this table relates to the production order being processed in each line, the cycle time and the start time.



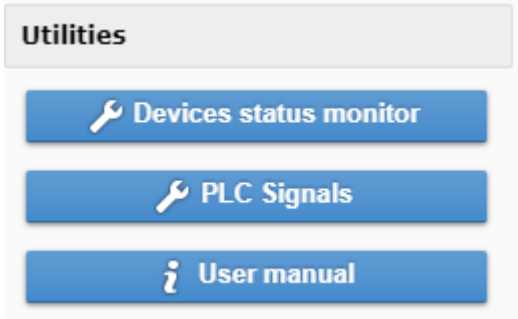
Adding a new active production or editing an existing one, the user will have to provide some data:

- the line
- the production order
- the takt time



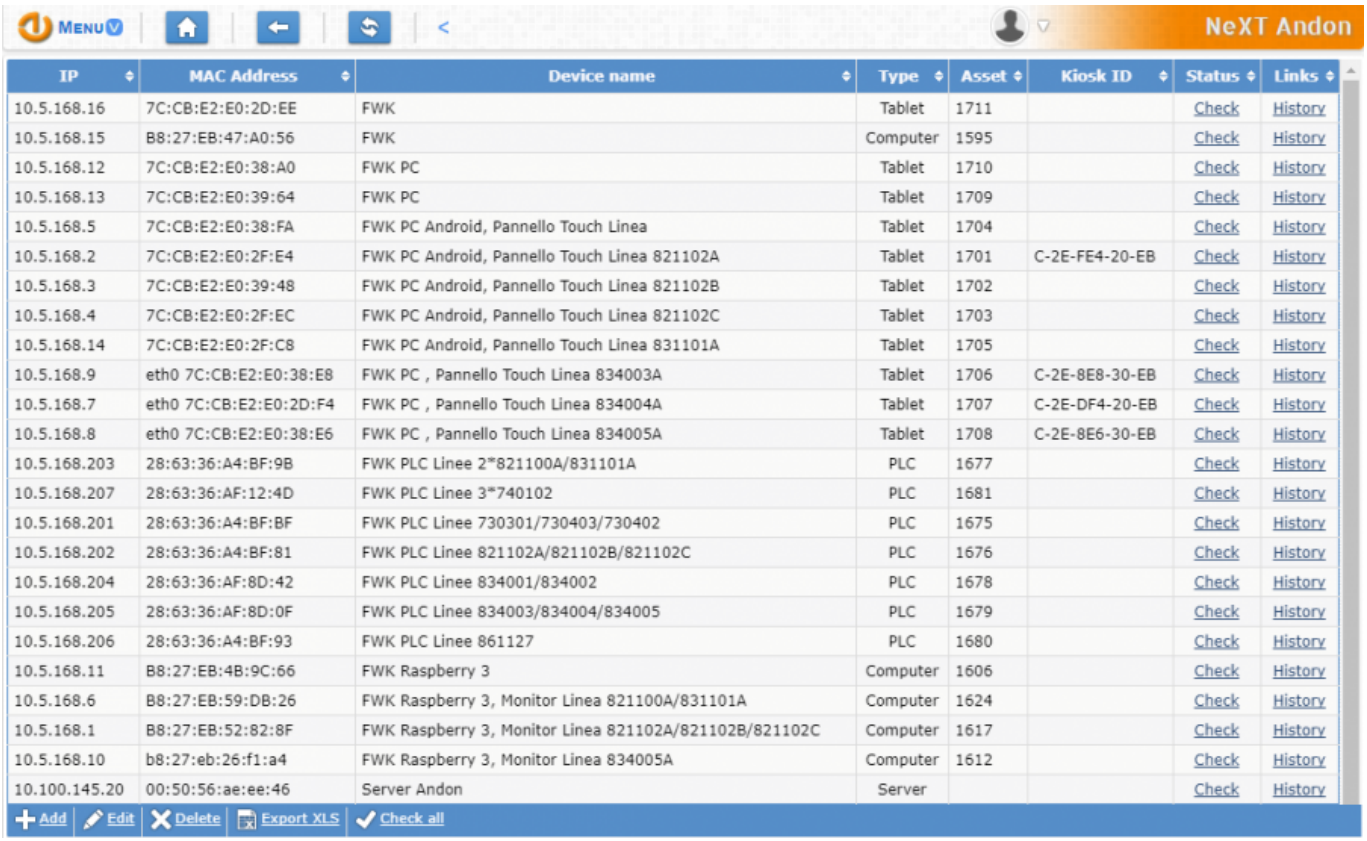
Utilities

The "**Utilities**" menu allows the user to navigate some aspects of hardware



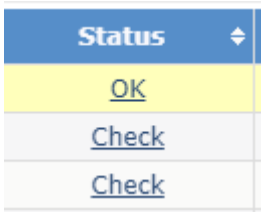
Devices status monitor

This section shows the list of all devices involved in the NIS system.
For all devices it is possible to know: *IP address*, *MAC address*, *Name*, *Type* (Tablet, PLC, Computer), *Asset* (NeXT ID), *ID Kiosk*, *Status and History*.



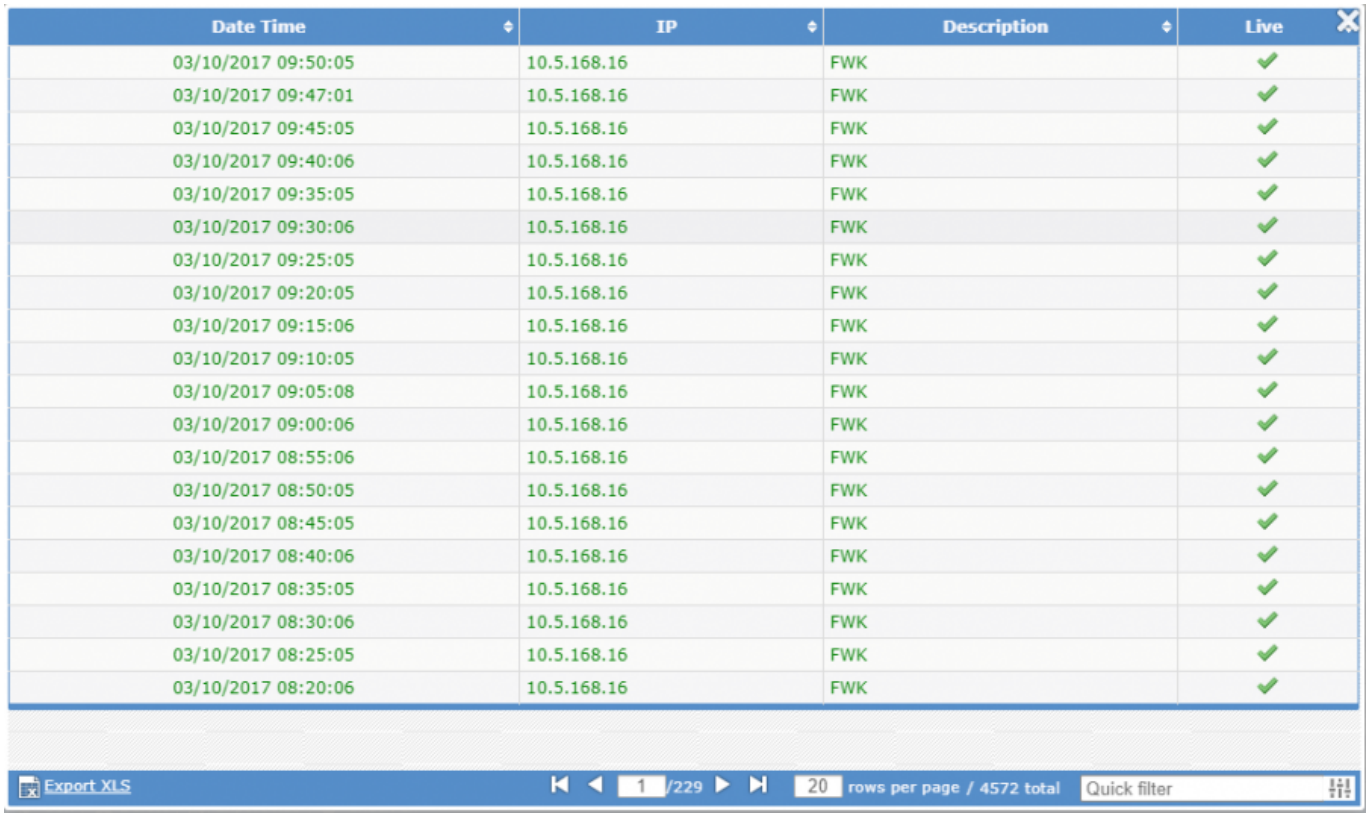
IP	MAC Address	Device name	Type	Asset	Kiosk ID	Status	Links
10.5.168.16	7C:CB:E2:E0:2D:EE	FWK	Tablet	1711		Check	History
10.5.168.15	B8:27:EB:47:A0:56	FWK	Computer	1595		Check	History
10.5.168.12	7C:CB:E2:E0:38:A0	FWK PC	Tablet	1710		Check	History
10.5.168.13	7C:CB:E2:E0:39:64	FWK PC	Tablet	1709		Check	History
10.5.168.5	7C:CB:E2:E0:38:FA	FWK PC Android, Pannello Touch Linea	Tablet	1704		Check	History
10.5.168.2	7C:CB:E2:E0:2F:E4	FWK PC Android, Pannello Touch Linea 821102A	Tablet	1701	C-2E-FE4-20-EB	Check	History
10.5.168.3	7C:CB:E2:E0:39:48	FWK PC Android, Pannello Touch Linea 821102B	Tablet	1702		Check	History
10.5.168.4	7C:CB:E2:E0:2F:EC	FWK PC Android, Pannello Touch Linea 821102C	Tablet	1703		Check	History
10.5.168.14	7C:CB:E2:E0:2F:C8	FWK PC Android, Pannello Touch Linea 831101A	Tablet	1705		Check	History
10.5.168.9	eth0 7C:CB:E2:E0:38:E8	FWK PC , Pannello Touch Linea 834003A	Tablet	1706	C-2E-8E8-30-EB	Check	History
10.5.168.7	eth0 7C:CB:E2:E0:2D:F4	FWK PC , Pannello Touch Linea 834004A	Tablet	1707	C-2E-DF4-20-EB	Check	History
10.5.168.8	eth0 7C:CB:E2:E0:38:E6	FWK PC , Pannello Touch Linea 834005A	Tablet	1708	C-2E-8E6-30-EB	Check	History
10.5.168.203	28:63:36:A4:BF:9B	FWK PLC Linee 2*821100A/831101A	PLC	1677		Check	History
10.5.168.207	28:63:36:AF:12:4D	FWK PLC Linee 3*740102	PLC	1681		Check	History
10.5.168.201	28:63:36:A4:BF:BF	FWK PLC Linee 730301/730403/730402	PLC	1675		Check	History
10.5.168.202	28:63:36:A4:BF:81	FWK PLC Linee 821102A/821102B/821102C	PLC	1676		Check	History
10.5.168.204	28:63:36:AF:8D:42	FWK PLC Linee 834001/834002	PLC	1678		Check	History
10.5.168.205	28:63:36:AF:8D:0F	FWK PLC Linee 834003/834004/834005	PLC	1679		Check	History
10.5.168.206	28:63:36:A4:BF:93	FWK PLC Linee 861127	PLC	1680		Check	History
10.5.168.11	B8:27:EB:4B:9C:66	FWK Raspberry 3	Computer	1606		Check	History
10.5.168.6	B8:27:EB:59:DB:26	FWK Raspberry 3, Monitor Linea 821100A/831101A	Computer	1624		Check	History
10.5.168.1	B8:27:EB:52:82:8F	FWK Raspberry 3, Monitor Linea 821102A/821102B/821102C	Computer	1617		Check	History
10.5.168.10	b8:27:eb:26:f1:a4	FWK Raspberry 3, Monitor Linea 834005A	Computer	1612		Check	History
10.100.145.20	00:50:56:ae:ee:46	Server Andon	Server			Check	History

Through the column «**Status**» the user can to check the status of the device, if it is working or not.



Status
OK
Check
Check

The "**History**" feature allows the user to see the history of the device's status. These are automatically recorded every 5 minutes.



Date Time	IP	Description	Live
03/10/2017 09:50:05	10.5.168.16	FWK	✔
03/10/2017 09:47:01	10.5.168.16	FWK	✔
03/10/2017 09:45:05	10.5.168.16	FWK	✔
03/10/2017 09:40:06	10.5.168.16	FWK	✔
03/10/2017 09:35:05	10.5.168.16	FWK	✔
03/10/2017 09:30:06	10.5.168.16	FWK	✔
03/10/2017 09:25:05	10.5.168.16	FWK	✔
03/10/2017 09:20:05	10.5.168.16	FWK	✔
03/10/2017 09:15:06	10.5.168.16	FWK	✔
03/10/2017 09:10:05	10.5.168.16	FWK	✔
03/10/2017 09:05:08	10.5.168.16	FWK	✔
03/10/2017 09:00:06	10.5.168.16	FWK	✔
03/10/2017 08:55:06	10.5.168.16	FWK	✔
03/10/2017 08:50:05	10.5.168.16	FWK	✔
03/10/2017 08:45:05	10.5.168.16	FWK	✔
03/10/2017 08:40:06	10.5.168.16	FWK	✔
03/10/2017 08:35:05	10.5.168.16	FWK	✔
03/10/2017 08:30:06	10.5.168.16	FWK	✔
03/10/2017 08:25:05	10.5.168.16	FWK	✔
03/10/2017 08:20:06	10.5.168.16	FWK	✔

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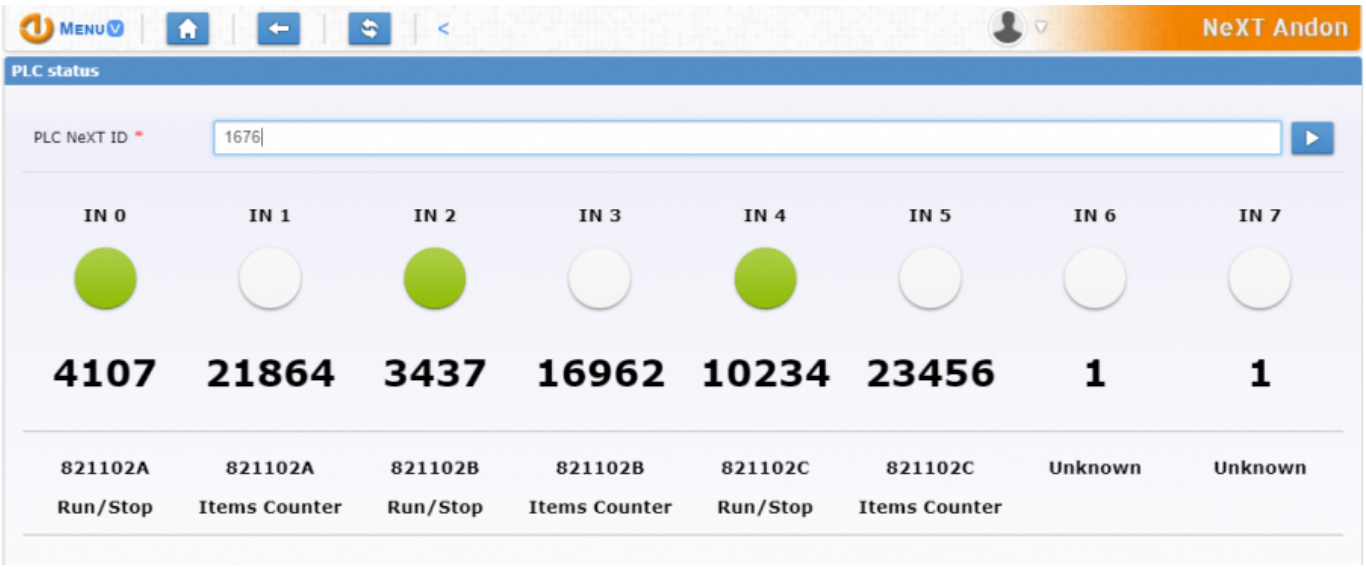
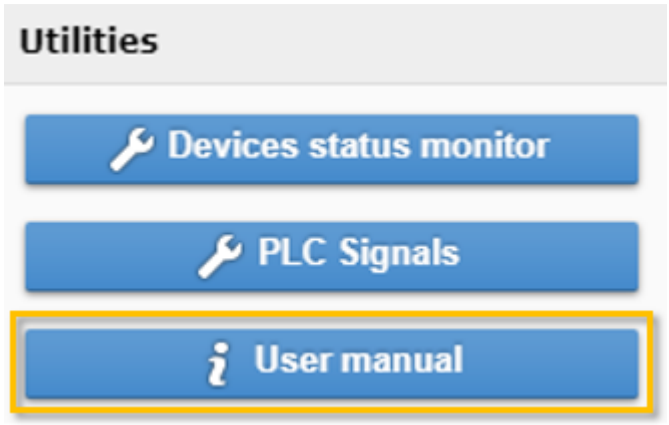
PLC signals

This function allows the user to monitor the signals of a specific PLC.
Entering the **PLC Asset Code** (*PLC NeXT ID*) will display all PLC inputs. For each input we can know the type of signal associated and the number of received signals.
Green color means that the signal is 1 (the machine is running or a pieces is counted); white color means that the signal is 0 (the machine is stopped or a piece is not completed)



This function allows the user to open the *NIS system guide* in a web version.

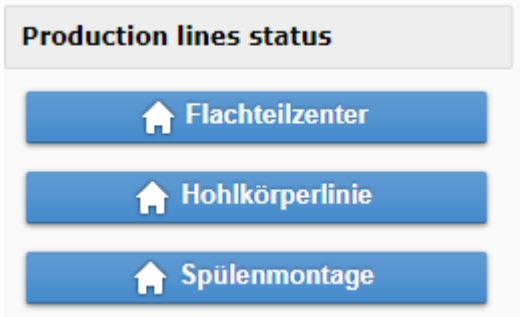


Reports

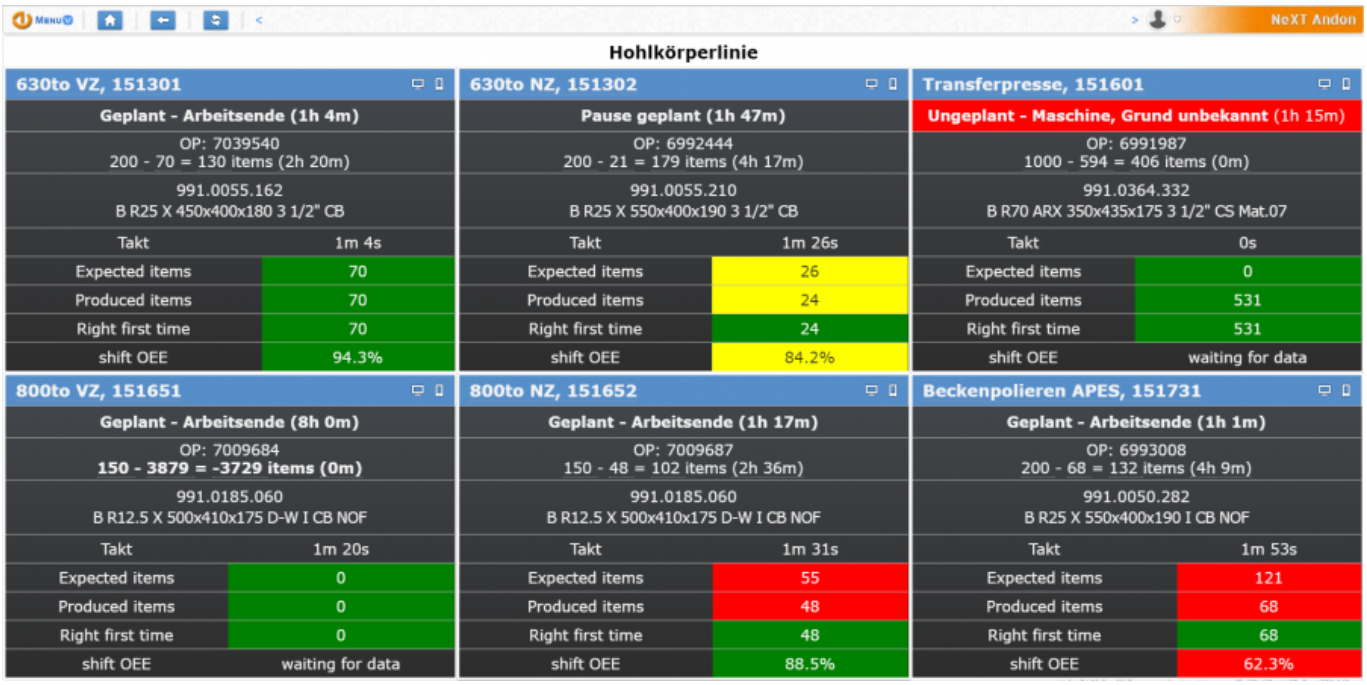
Through the NIS web application the user can view some reports.

Production line status

This section shows the list of departments involved in the NIS system.

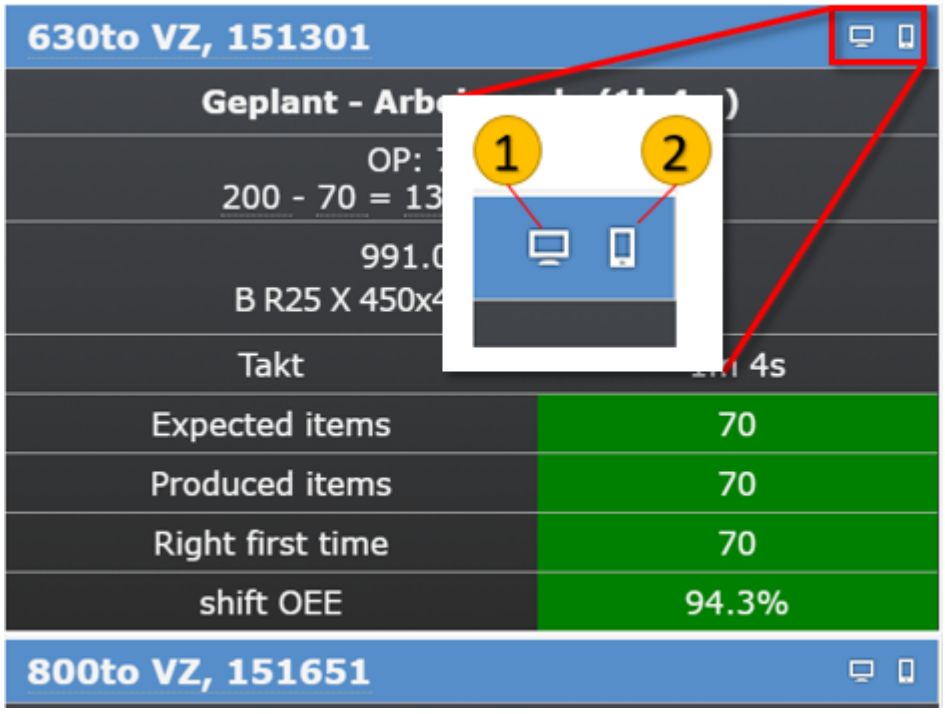


By clicking on one of the departments (for example, «*Hohlkorperline*»), the user can see a summary of the real time efficiency of the lines (six in this case) in that department.

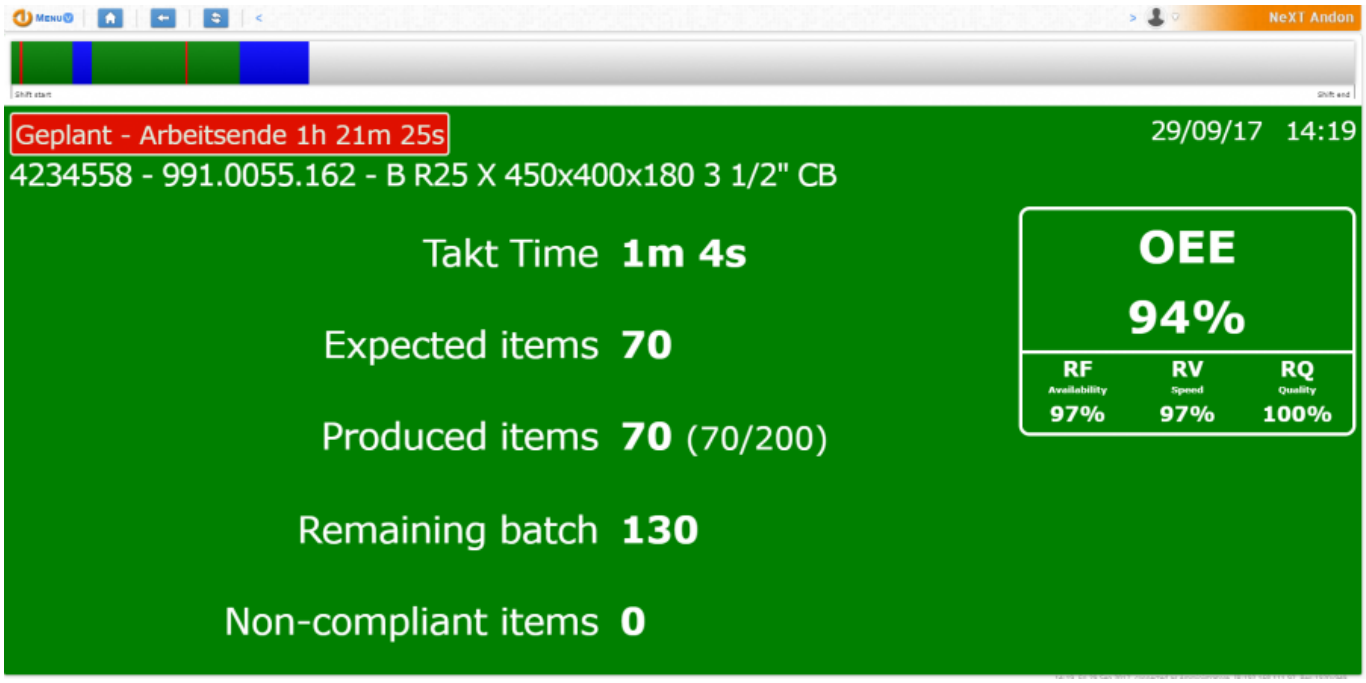


At the top on the right of each box there are two buttons:

- the button on the left (1) allows to display the TV LED screen;
- the button on the right (2) allows to display the touch panel screen.



(1) This is an example of a TV LED screen, present on each line.
The detailed description of the information shown on the LED TV can be found in the paragraph «**The Andon board interface**»

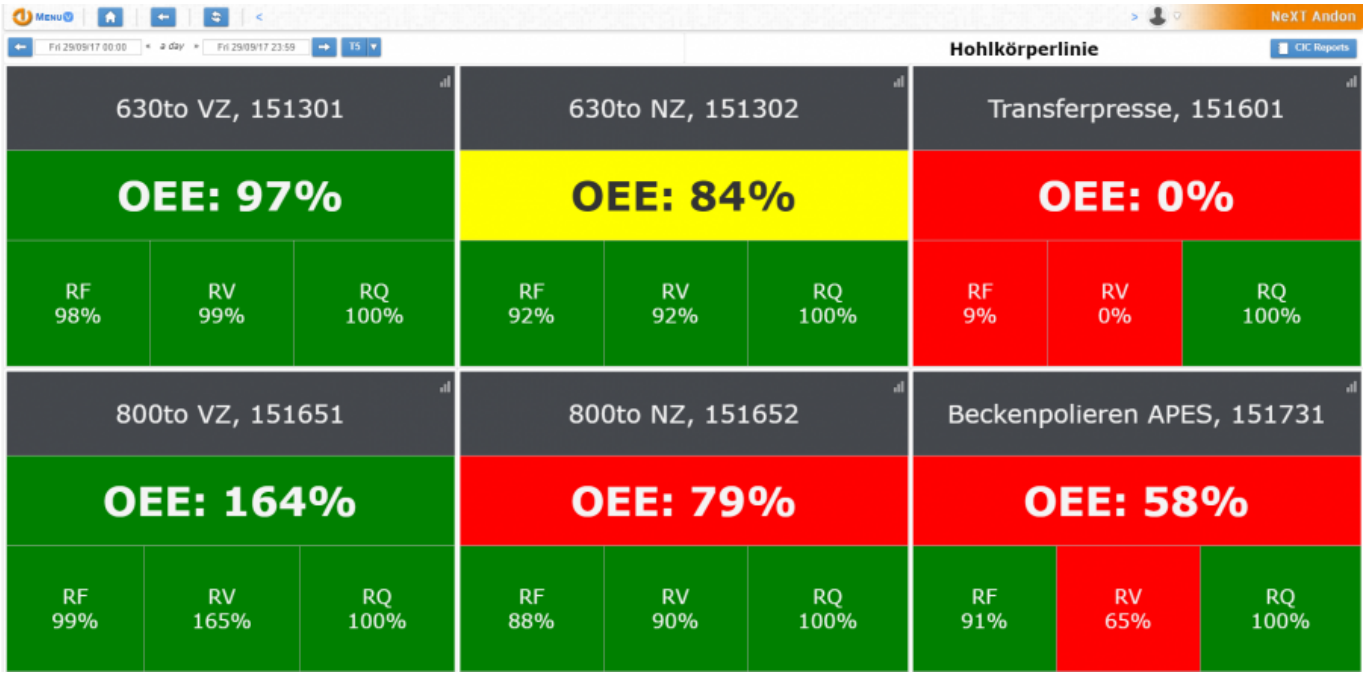


(2) This is an example of a touch panel screen, present on each line.
The detailed description of the touch panel interface can be found in the paragraph «**The touch panel interface**»

Efficiency

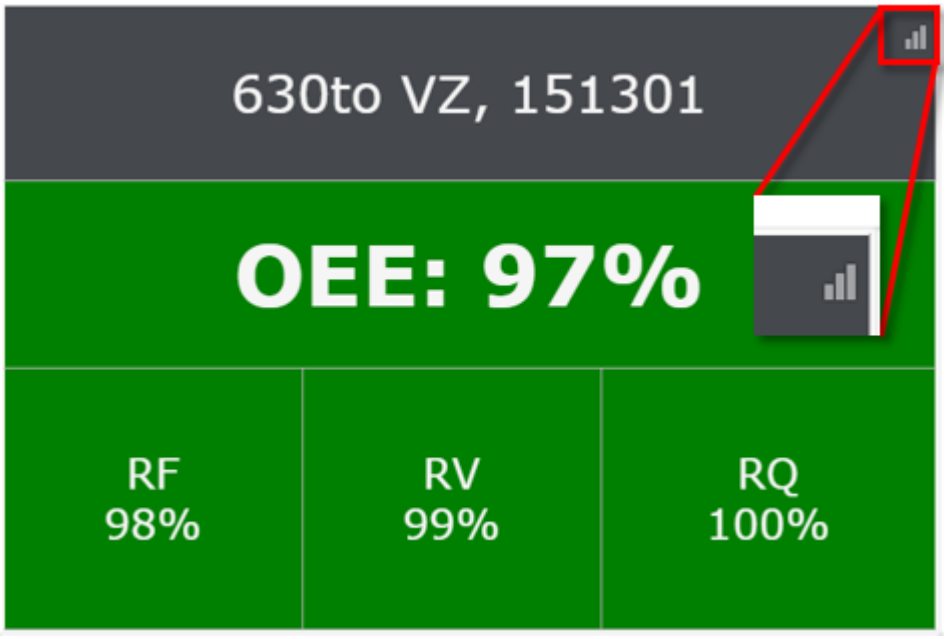
This section shows the list of departments involved in the NIS system.

By clicking on one of the departments (for example, «Hohlkorperline»), the user can see a summary of the Overall Equipment Effectiveness (OEE) value

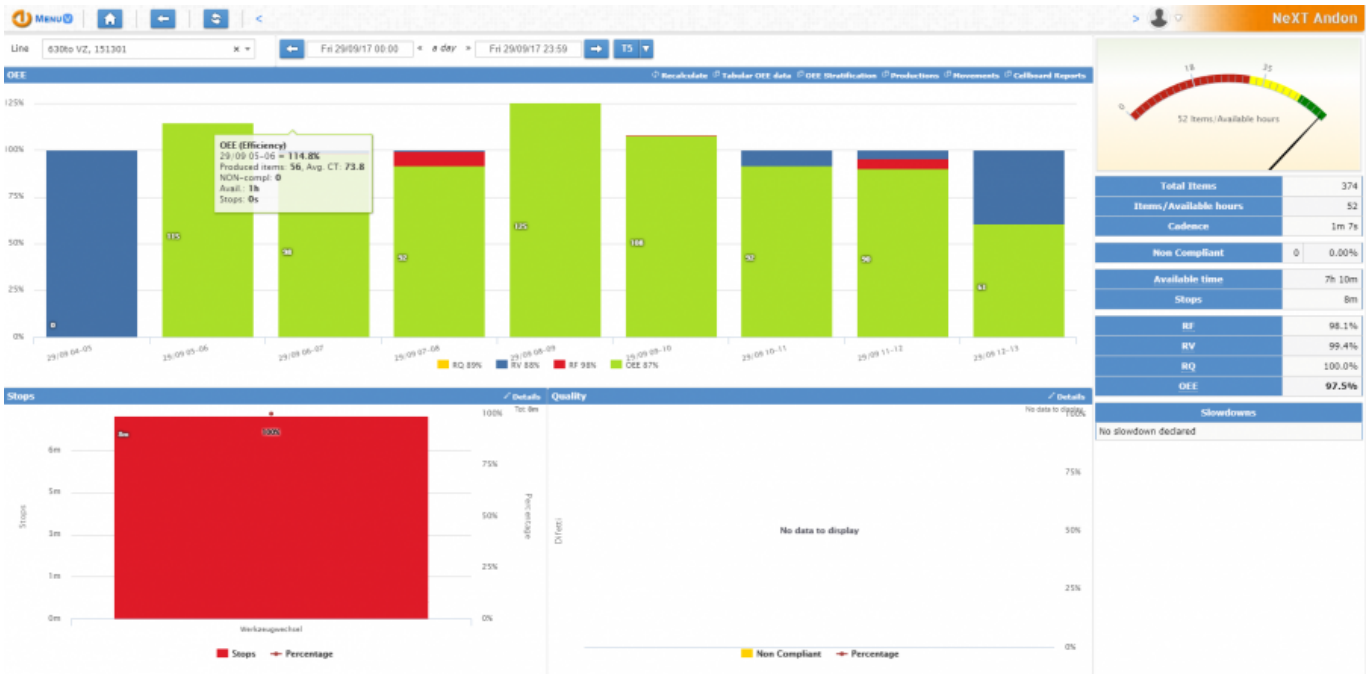


At the top on the right of each box there is a button. It allows:

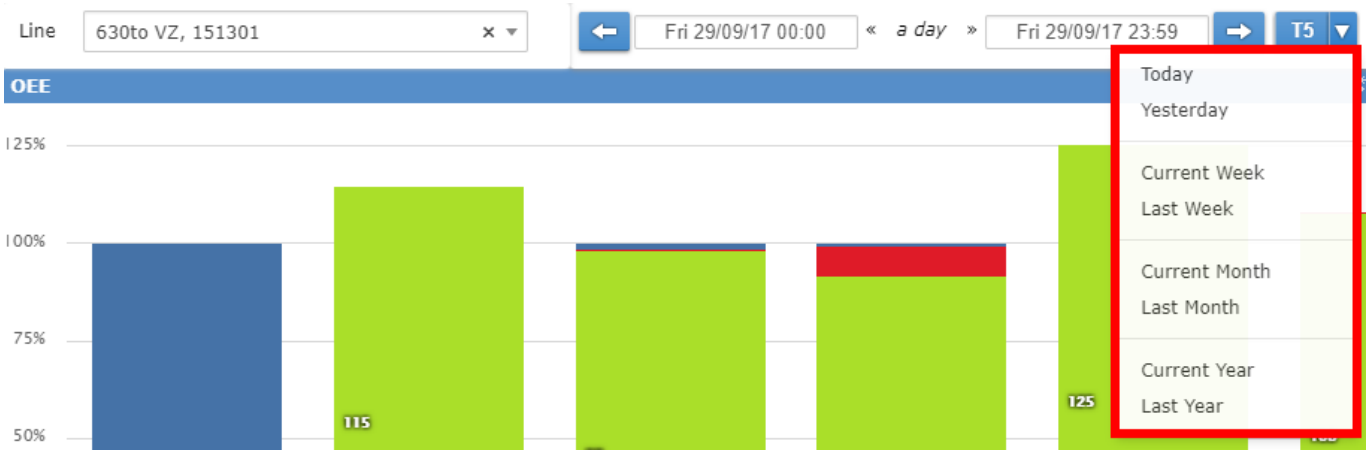
- to display the OEE value of that line, in a certain period
- to access to some reports



Thie following image shows the OEE interface. By default, it shows the OEE value of the current day, hour by hour, starting from the beginning of the shift.



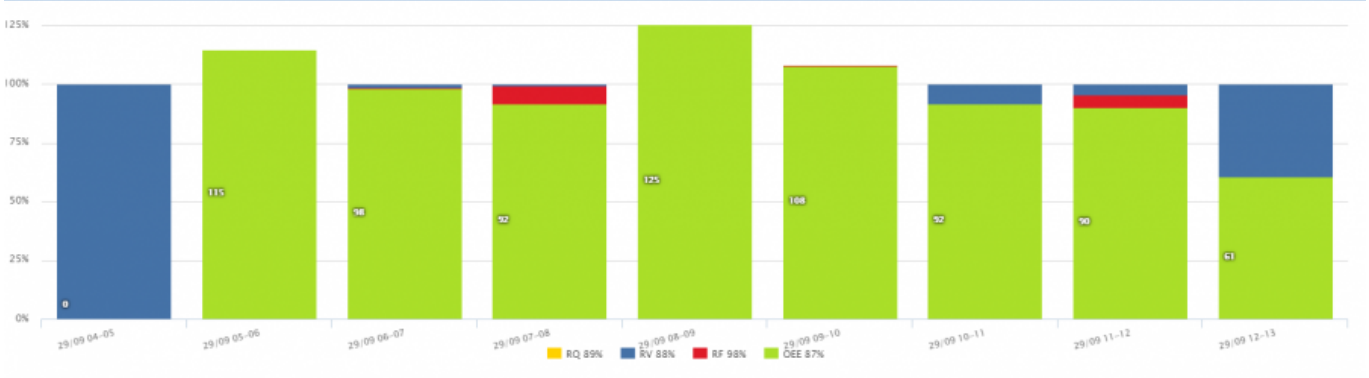
At the top of the interface the user can choose the line to be analyzed, the time span to view (today, yesterday, current week, last week, current month, last month, current year last year).



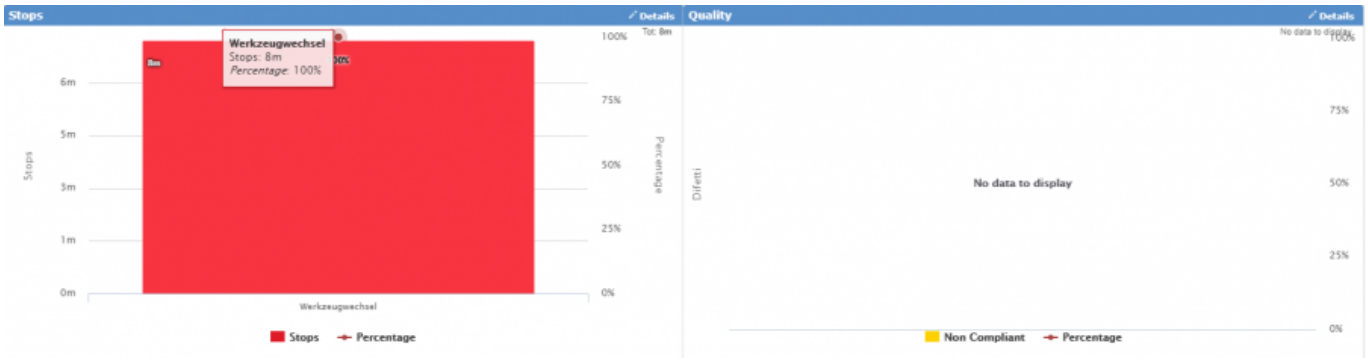
Below, we find a series of buttons that allow the user to view a series of reports.
This topic will be discussed in the paragraph «**Reports**».

In the middle of the interface, a series of histograms show the OEE value, hour by hour.
The different colors refer to:

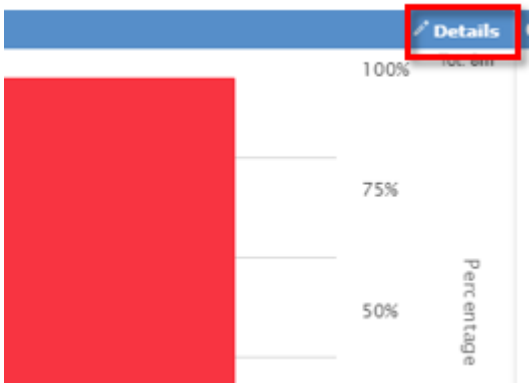
- Yellow: stop for a quality problem (scrap)
- Blue: speed loss
- Red: stop machine
- Green: the OEE



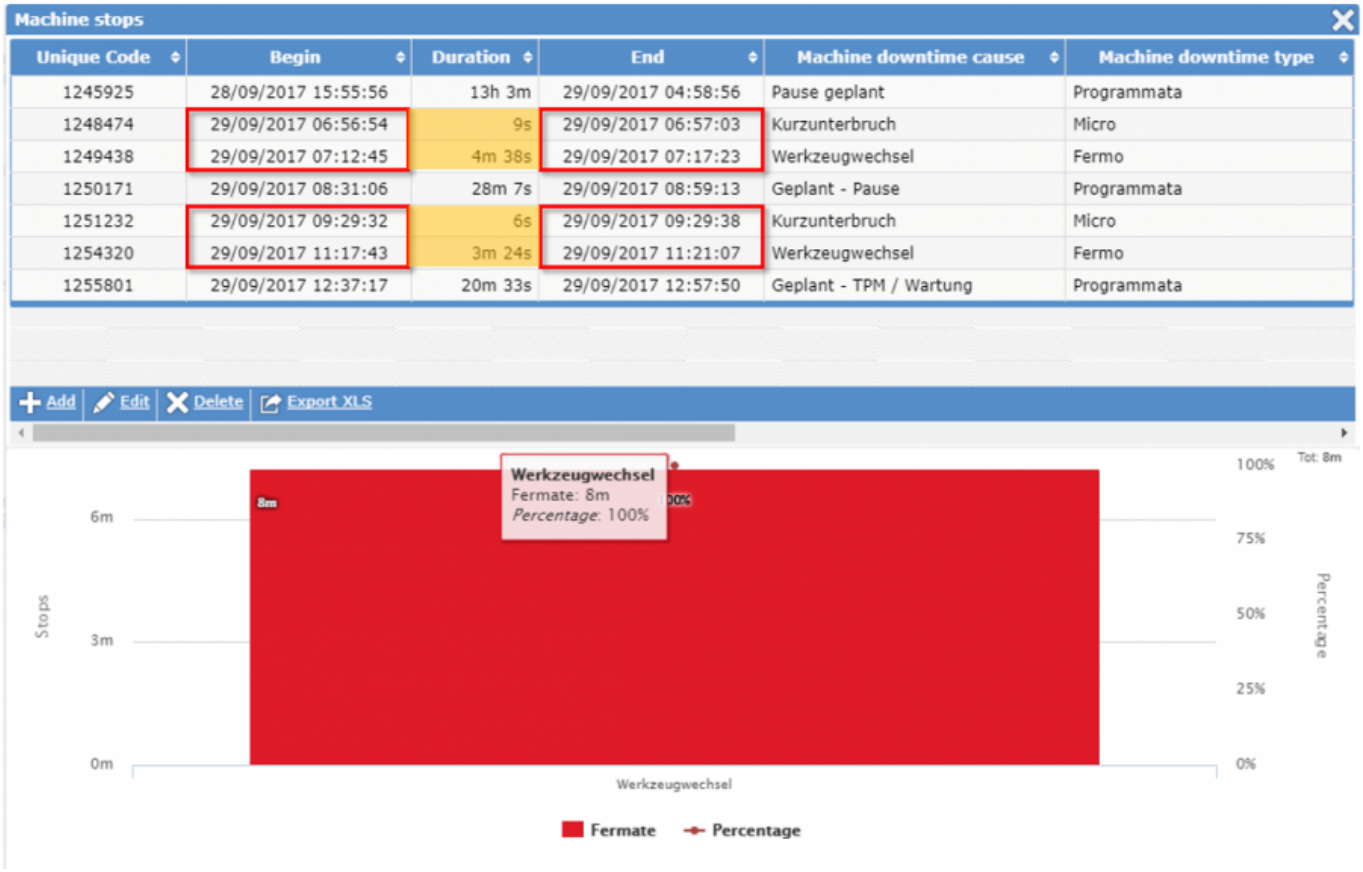
At the bottom of the interface you can see **details** about losses due to machine stops and scraps.
The duration of each stop is immediately visible.



By clicking on «**Details**» you can deepen the knowledge by going to see the start and end of each stop.



Here the user can see the stops (not scheduled) that contribute to the amount of minutes we saw in the previous screen. For each stop we know the start time and the end time.
The user can export this table in excel format.



In the following chart, the user can find a variety of information.

- total items produced
- items processed for one hour
- cadence
- non-compliant items
- time available
- stop minutes
- RF: Machine efficiency
- RV: efficiency of machine availability
- RQ: Object quality efficiency
- OEE

Total Items		374
Items/Available hours		52
Cadence		1m 7s
Non Compliant	0	0.00%
Available time		7h 10m
Stops		8m
RF		98.1%
RV		99.4%
RQ		100.0%
OEE		**97.5%**

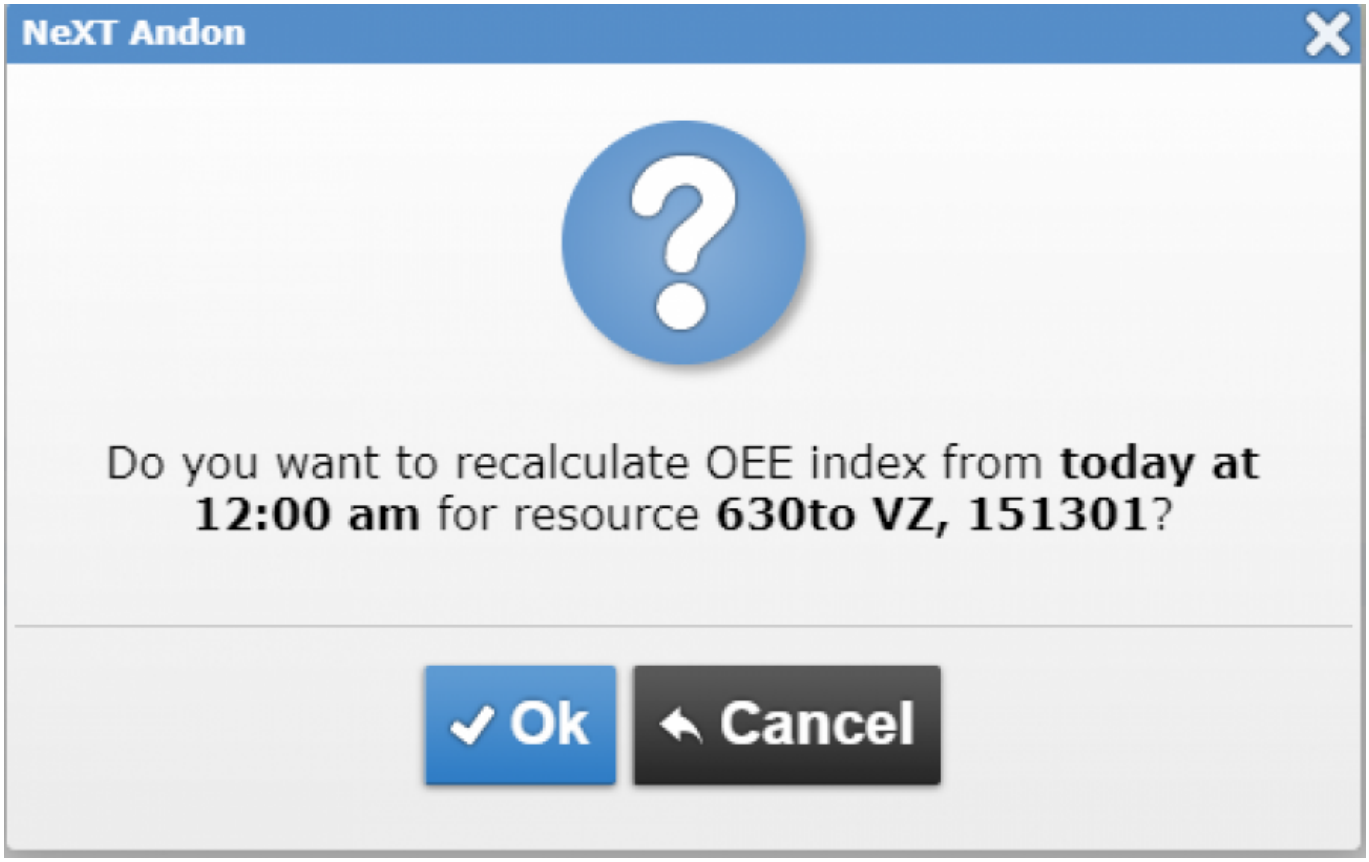
Slowdowns
No slowdown declared

Reports

From the OEE interface, the user can view a series of specific reports

Recalculate

The "**Recalculate**" function allows the NIS system to recalculate the OEE.
For example, this function is very useful if, at a later time, the cause of a stop has to be changed: from a stop programmed to an unplanned stop.
This change affects the calculation of OEE, so a recalculation is required.



Tabular OEE data

This feature allows the user to view all OEE data in tabular form. This table can also be exported to Excel format.

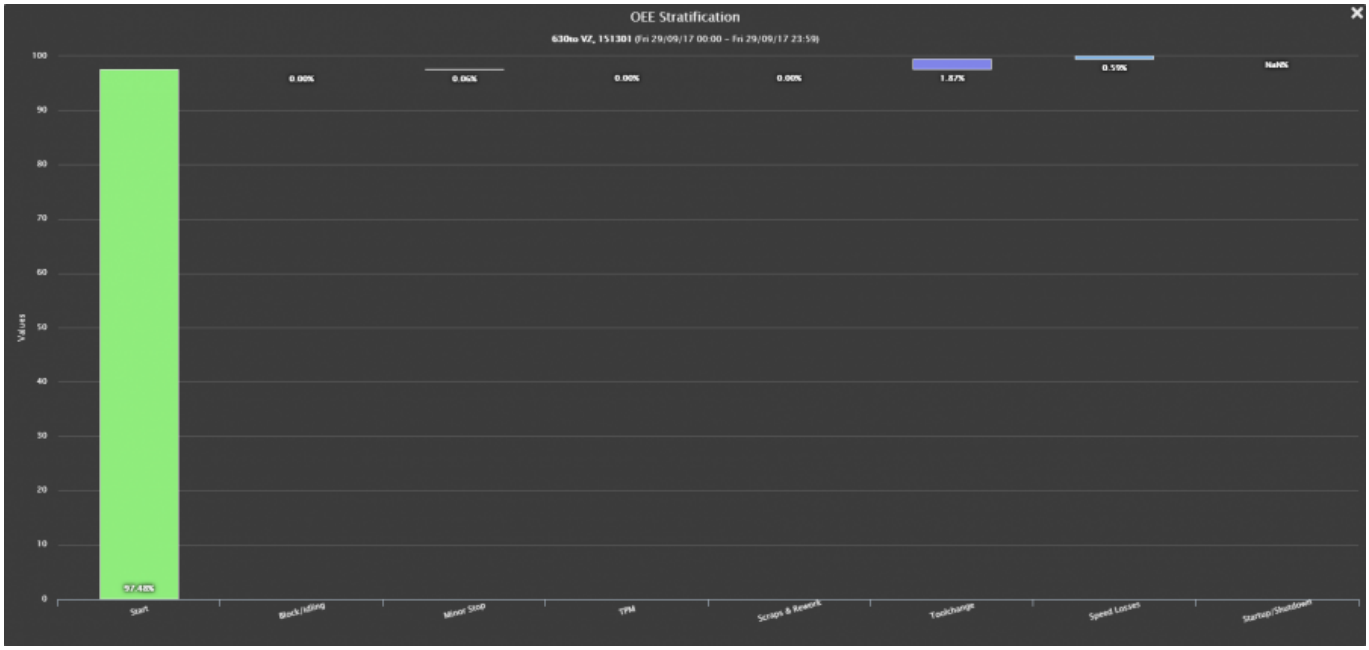
Tabular OEE data

Date Time		Availability		Machine downtime		Cycle time	Q.ty	NON-compl	RF	RV	RQ	OEE	RF loss	RV loss	RQ loss
29/09/2017	05:00:00	01m	64s	00m	0s	0s	0	0	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
29/09/2017	06:00:00	01h 00m	3600s	00m	0s	73.8s	56	0	100.00%	115.00%	100.00%	115.00%	0.00%	-15.00%	0.00%
29/09/2017	07:00:00	01h 00m	3600s	00m	9s	73.8s	48	0	100.00%	99.00%	100.00%	98.00%	0.00%	1.00%	0.00%
29/09/2017	08:00:00	01h 00m	3600s	04m	278s	64.8s	51	0	92.00%	99.00%	100.00%	92.00%	8.00%	0.00%	0.00%
29/09/2017	09:00:00	31m	1913s	00m	0s	64.8s	37	0	100.00%	125.00%	100.00%	125.00%	0.00%	-25.00%	0.00%
29/09/2017	10:00:00	01h 00m	3600s	00m	6s	64.8s	60	0	100.00%	108.00%	100.00%	108.00%	0.00%	-8.00%	0.00%
29/09/2017	11:00:00	01h 00m	3600s	00m	0s	64.8s	51	0	100.00%	92.00%	100.00%	92.00%	0.00%	8.00%	0.00%
29/09/2017	12:00:00	01h 00m	3600s	03m	204s	64.8s	50	0	94.00%	95.00%	100.00%	90.00%	6.00%	4.00%	0.00%
29/09/2017	13:00:00	37m	2244s	00m	0s	64.8s	21	0	100.00%	61.00%	100.00%	61.00%	0.00%	39.00%	0.00%

Export XLS 9 total rows Quick filter

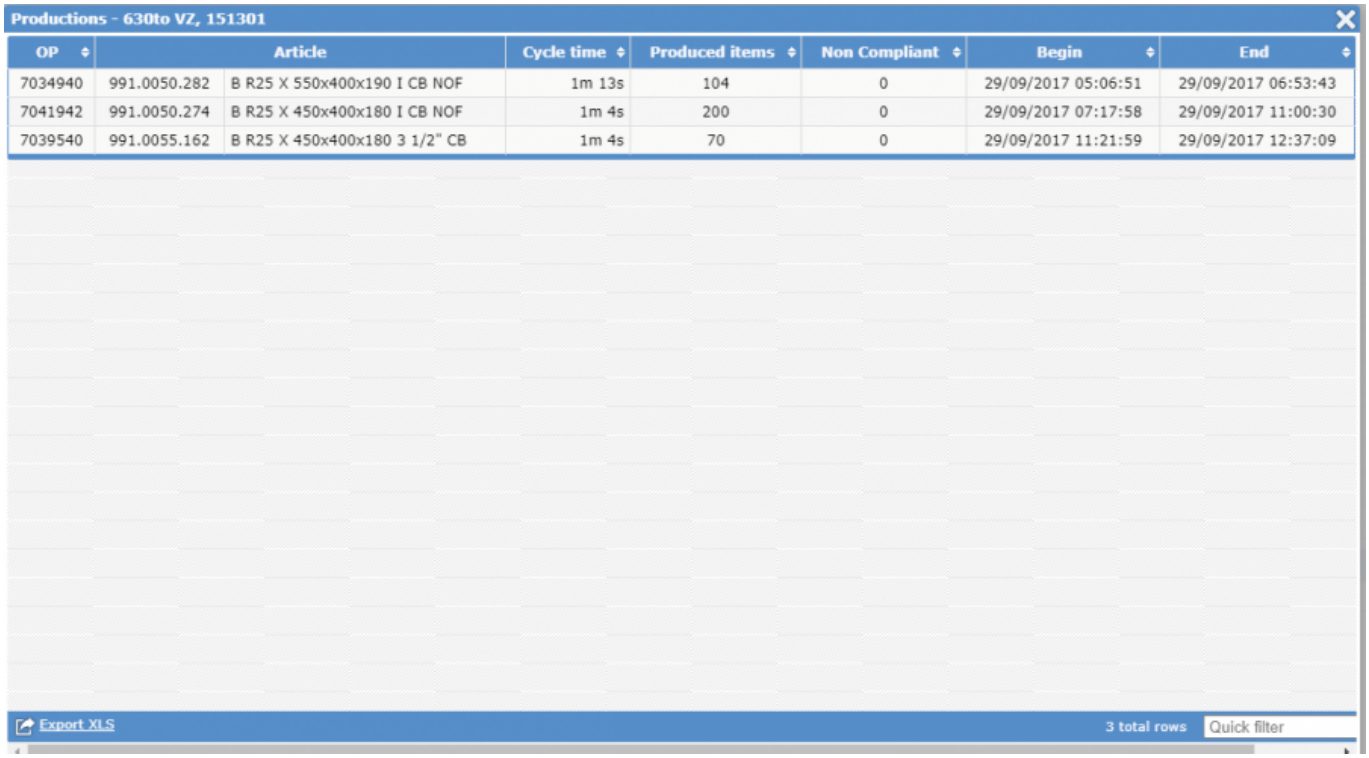
OEE stratification

The "**OEE stratification**" function allows the user to view all causes of stop (block, minor stop, TPM, Scraps & Rework, Toolchange, Speed Losses, Startup / Shutdown) and the value of the OEE.
The goal is achieved using a graph that highlights the most frequent stops in the selected time span.



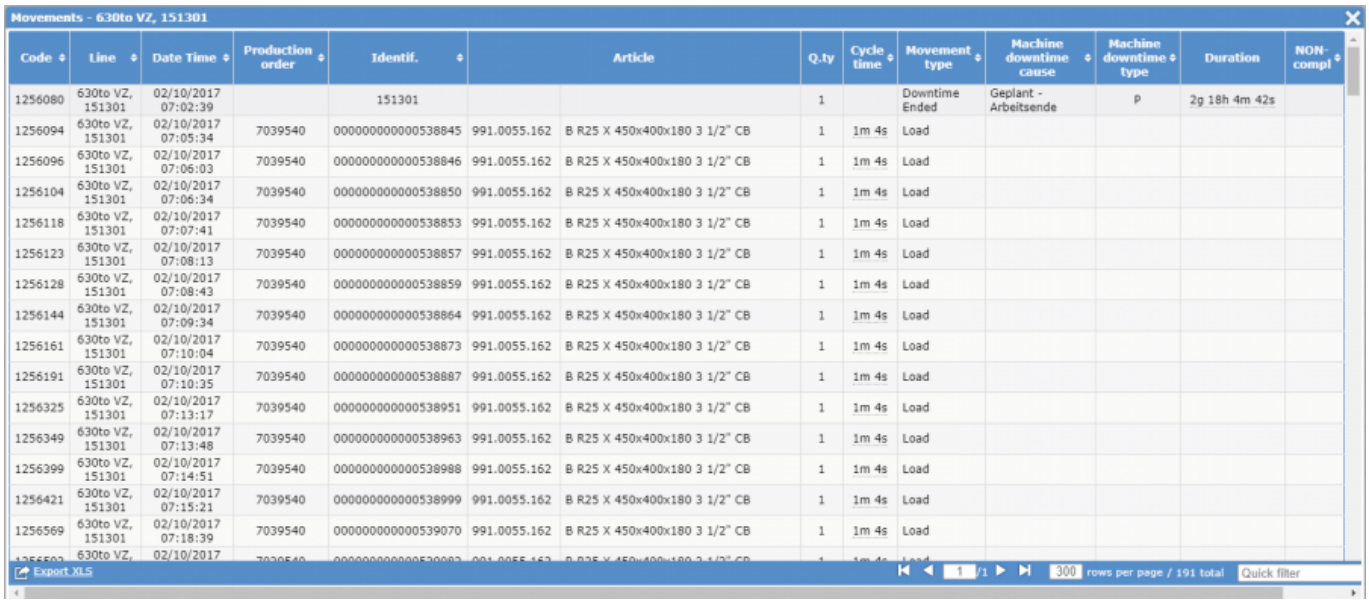
Productions

This function allows the user to view a list of productions made in the selected time frame in a table format. The user can read the order of production, the article code, the cycle time, the number of items produced, the number of non-compliant items, the start time of processing, the end time of processing.



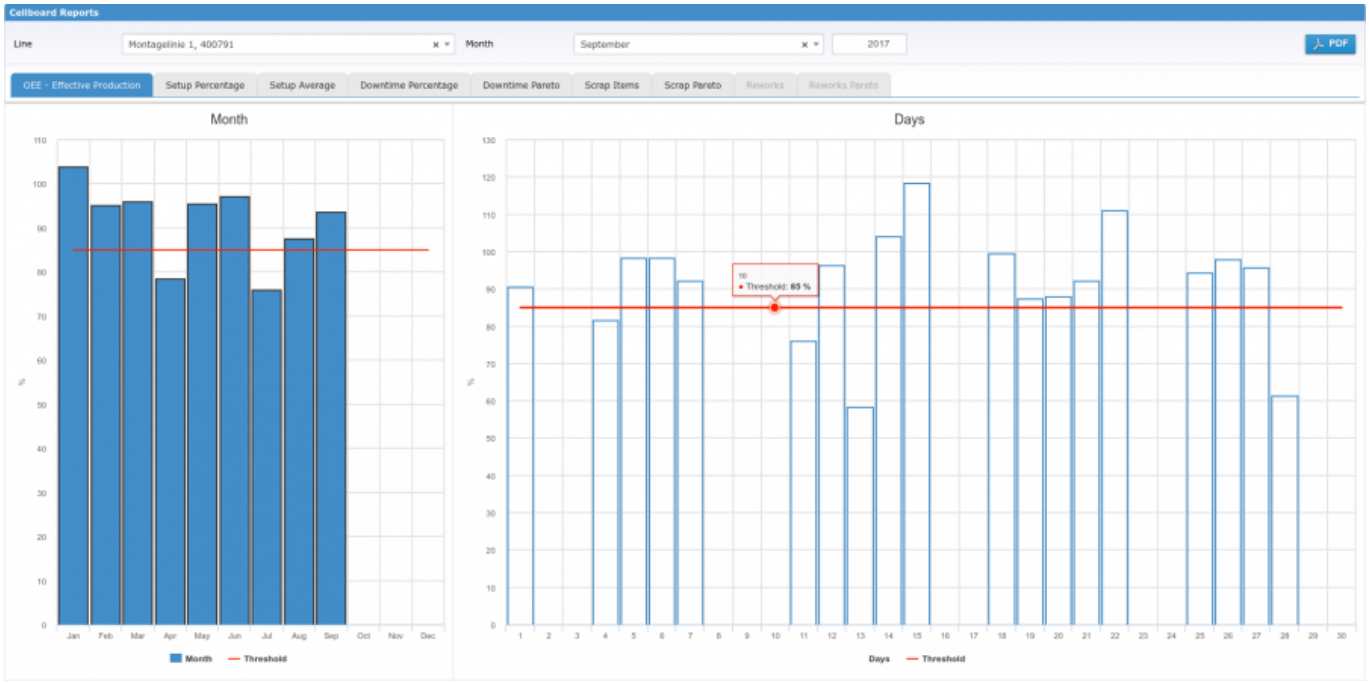
Movements

This function allows the user to view the entire list of events, in the time interval selected: produced items, cycle time, type of movement (load or downtime), cause of downtime, type of downtime, duration of downtime, non-compliant items.



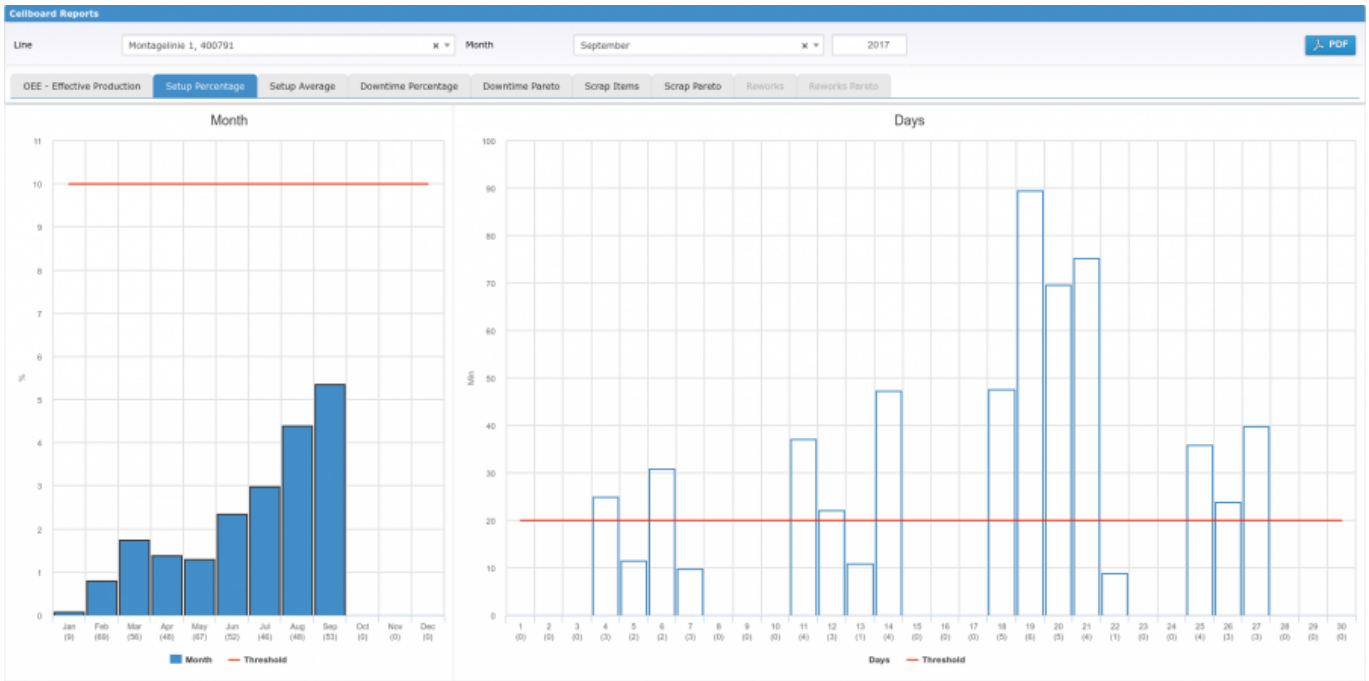
Cellboard Reports – OEE effective production

In this report, the user can see the monthly and daily OEE value (relative to the selected month).
In red, the user can see the treshold limit configured under "*Production lines*" in the "*Environment*" menu.



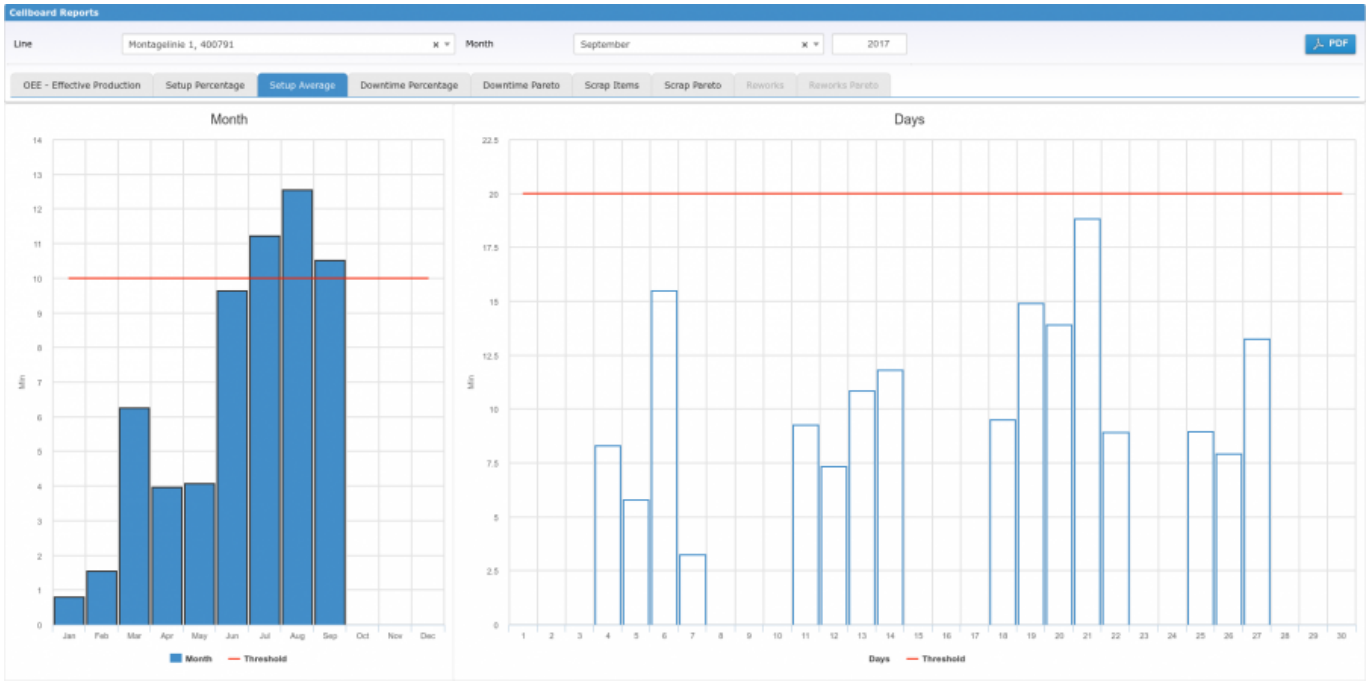
Cellboard Reports – setup percentage

This function reports, on the left, as a percentage, the length of setup (tooling) over the entire time span (monthly).
On the right, this function shows, the time in minutes of setup, compared to the entire time span (daily).



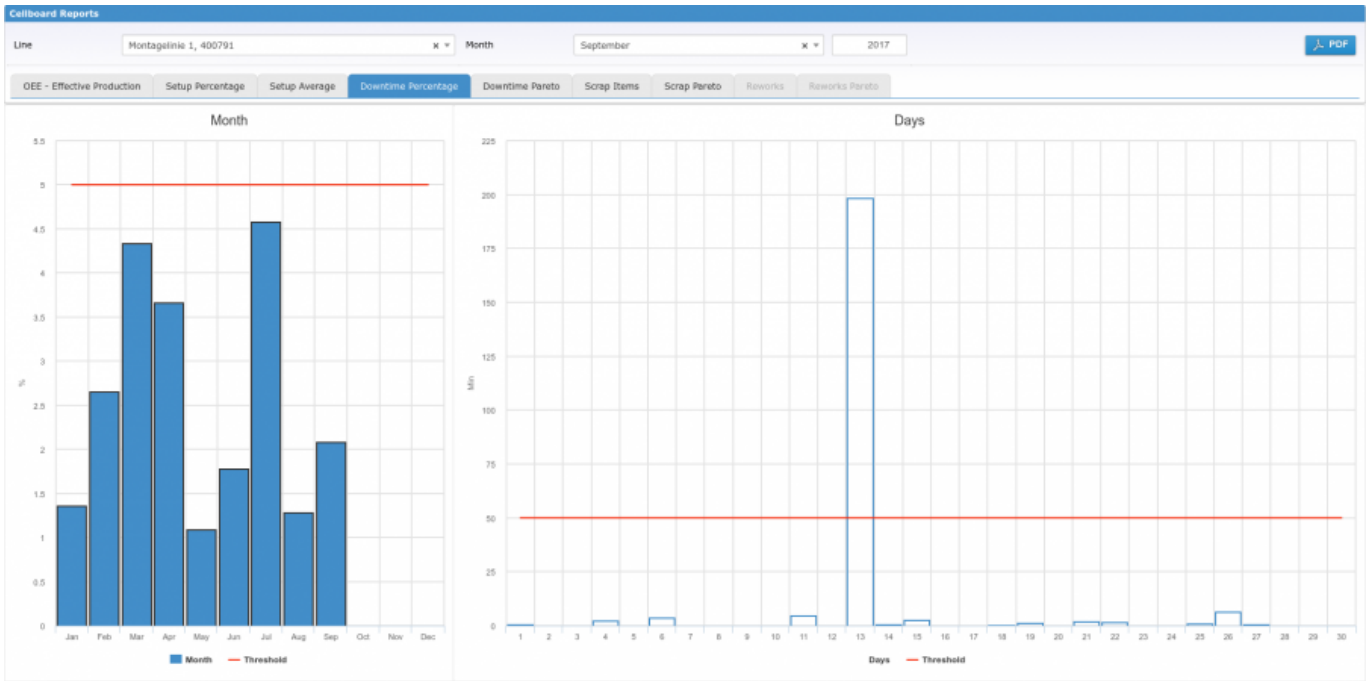
Cellboard Reports – setup average

This function shows the average length of the setup (tooling) in minutes, each month (on the left) or day by day in the selected month (on the right).



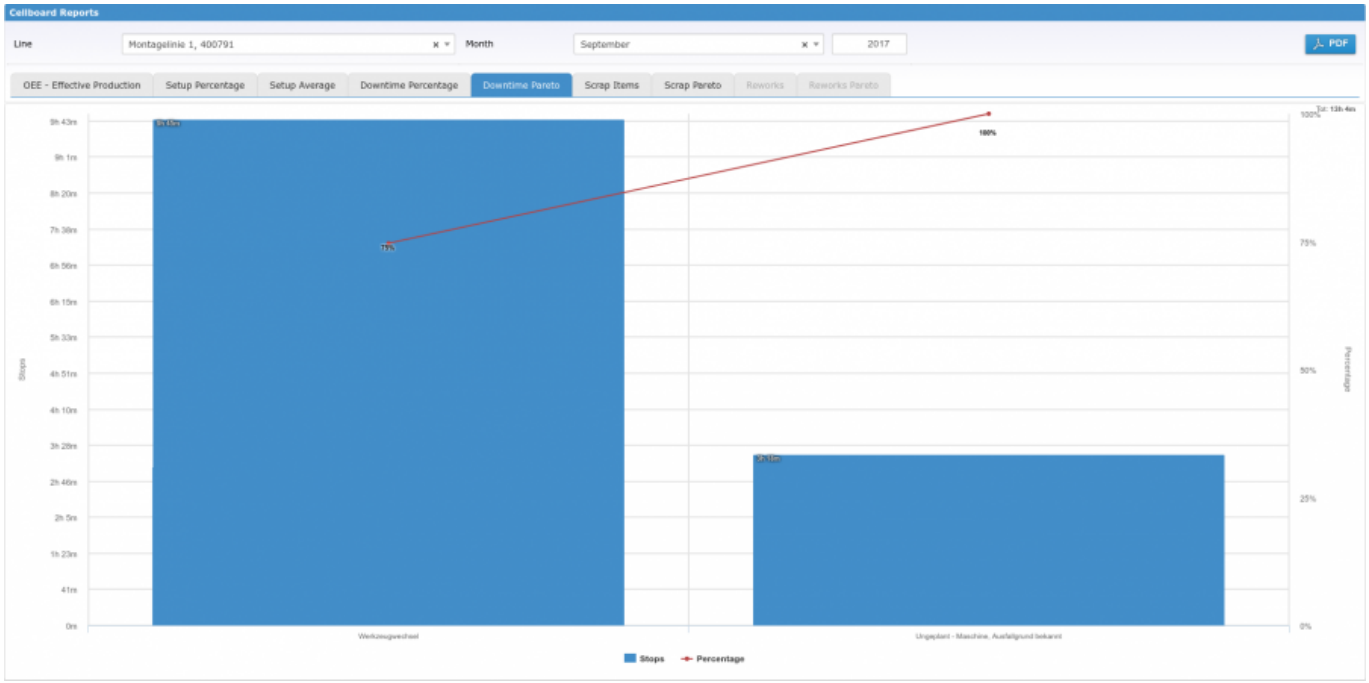
Cellboard Reports – downtime percentage

This function reports, on the left, as a percentage, the length of downtime over the entire time span (monthly). On the right, instead, this function shows, the time in minutes of downtime, compared to the entire time span (daily).



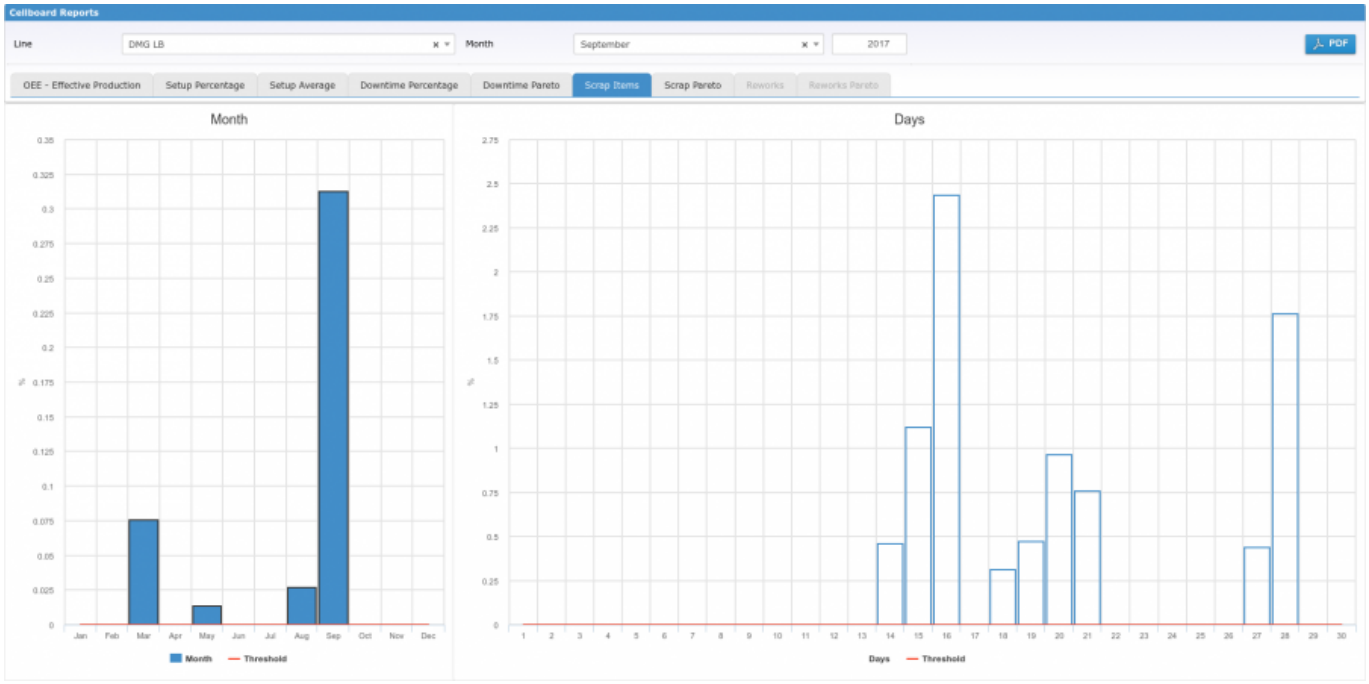
Cellboard Reports – downtime Pareto

This function shows the various causes of downtime that have occurred, in percentage, using the Pareto graph.



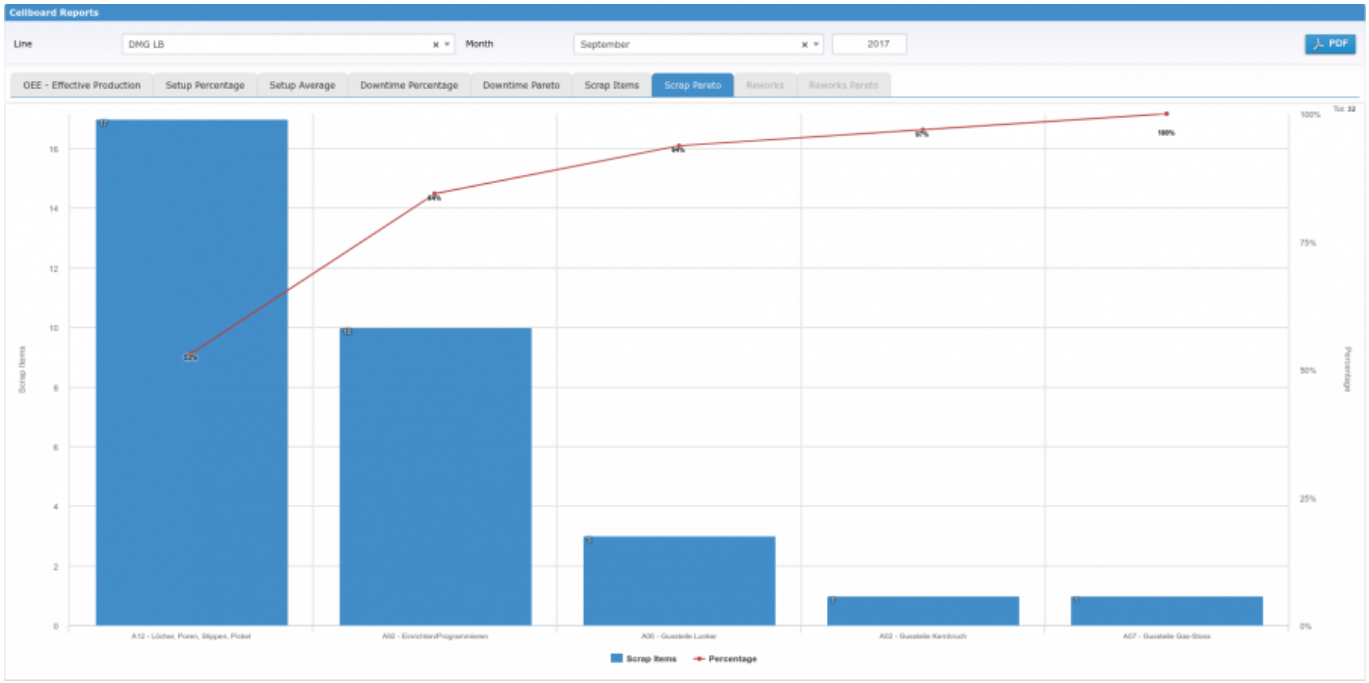
Cellboard Reports – scrap items

This function reports, as a percentage, the length of scrap items over the entire time span (monthly on the left, daily on the right).



Cellboard Reports – scrap Pareto

This function shows the various causes of quality problems that have occurred, in percentage, using the Pareto graph.



OEE overview

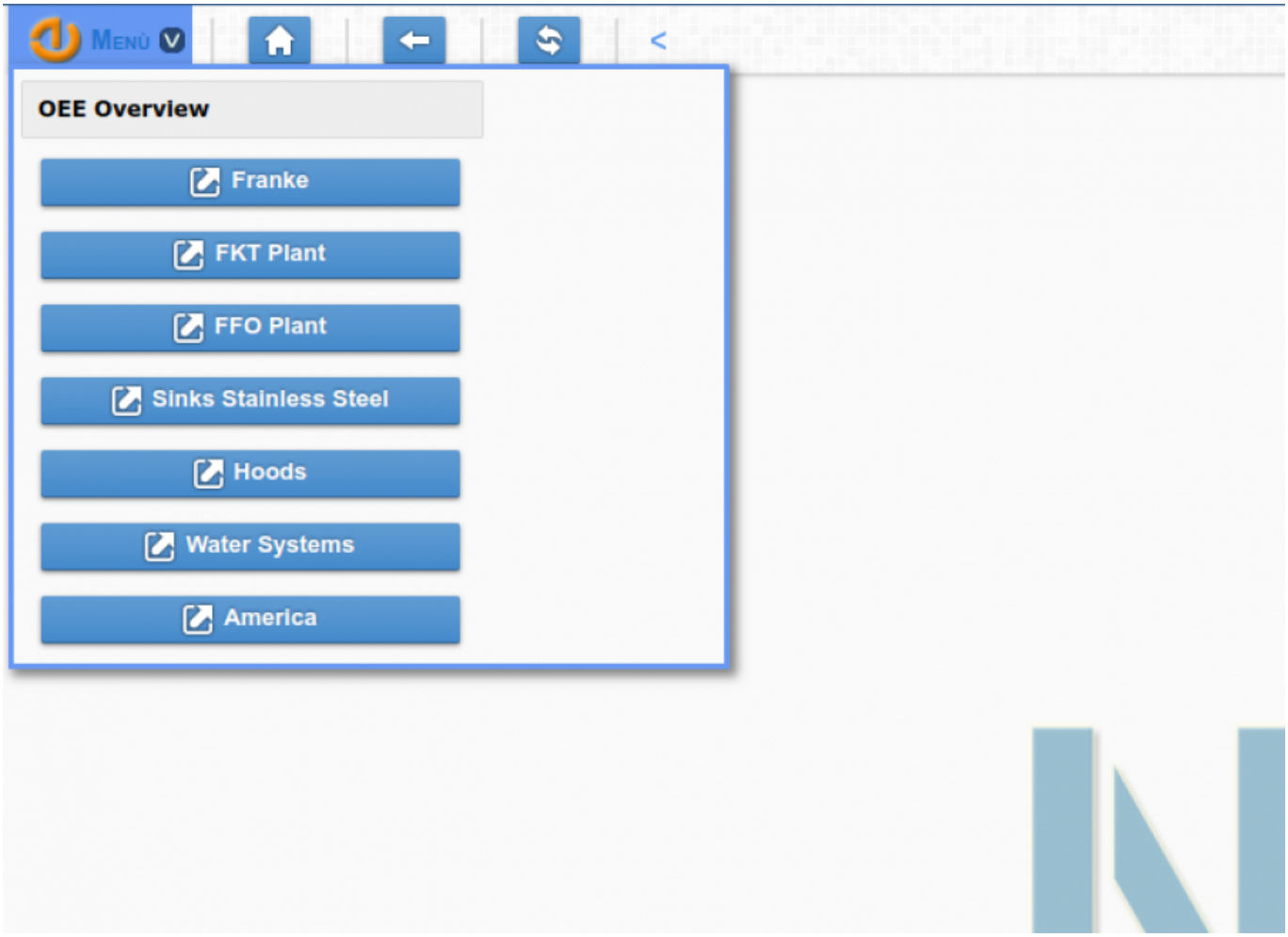
How does it works

The OEE overview is the central application for management. It allowed:

- hierarchical organization of the Franke group based on macro areas
- step by step focus on macro areas, plants, departmens, production resources
- data warehouse used for computation

The hierarchical order is:

- Franke
- macroarea (eg "Sinks stainless steel")
- plants
- departments
- production lines



Once you click on a macro area, you can see:

- the plants that are part of it (sub-locations).
- the monthly OEE value (with graph)
- the last day OEE value (with graph)

Sub-locations tabular summary

- OEE of selected month with trend indicator (related to the previous month) and % variation
- OEE of last day with trend indicator (related to the previous day) and % variation
- direct access to detailed information of the single sub-location

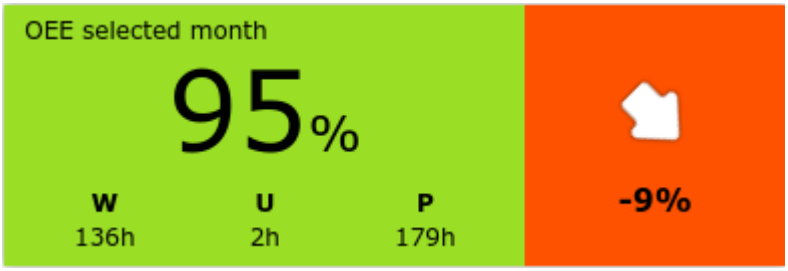
Sub-locations	OEE selected month			OEE Last day			
	%	Trend	Δ %	%	Trend	Δ %	
Plant FKT CH Aaarburg	53%	↑	15%	60%	↓	-10%	
Plant FBS DE Deutschland	58%	↑	45%	58%	↓	-32%	
Plant FIP	49%	↑	26%	52%	→	3%	

OEE of selected month

- W: worked time (hours)
- U: unplanned stops (hours)
- P: planned stops (hours)
- colors are based on OEE thresholds (same as andon boards)

Trend percentage between current selection and previous period

- selected month ⇒ previous month
- colors are based on predefined percentage values (-10%, -5%, 0, +5%, +10%)

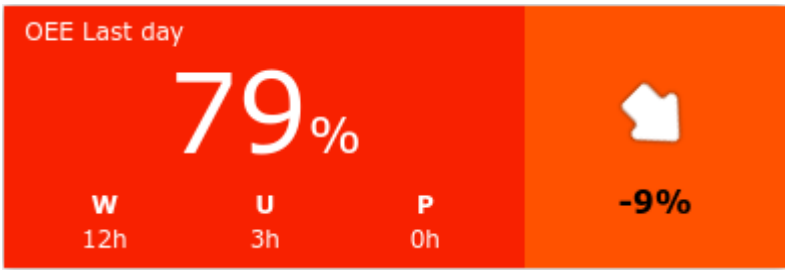


OEE of last day

- W: worked time (hours)
- U: unplanned stops (hours)
- P: planned stops (hours)
- colors are based on OEE thresholds (same as andon boards)

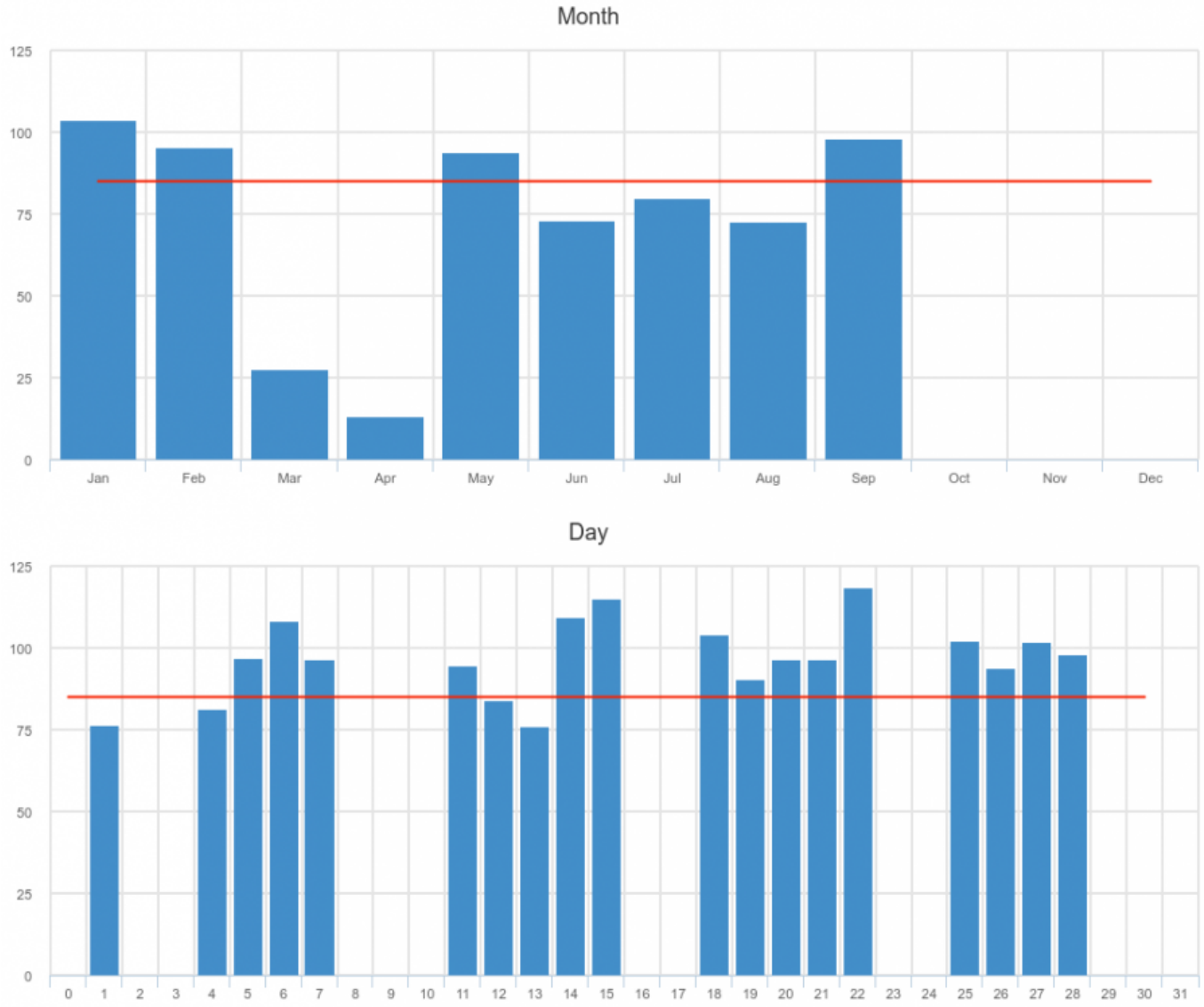
Trend percentage between current selection and previous period

- last month ⇒ the day before
- colors are based on predefined percentage values (-10%, -5%, 0, +5%, +10%)



Sub-locations graph summary

- monthly OEE
- daily OEE related to the selected period (month, year)
- thresholds defined for C.I.C. reports



The OEE

Definition

OEE (Overall Equipment Effectiveness) measures how close you are to perfect production (manufacturing only good parts, as fast as possible, with no stop time). OEE correlates **real production** with the **ideal production** planned.
The difference between these two values represents the loss of production in terms of:

- **RF = Availability (Time)**
- **RV = Performance (Speed)**
- **RQ = Quality**

There are three kind of losses:

- **Availability Loss**: an availability score of 100% means that the process is always running during

planned production time (the time your process is scheduled to run). Any time the process is not running due to an unplanned stop (e.g., some type of mechanical failure) or a planned stop (e.g., cleaning) is an Availability Loss

- **Performance Loss**: a performance score of 100% means that the process is running as fast as possible. Performance can be calculated as the ratio of **Actual Run Rate** to **Theoretical Maximum Rate** (the design capacity of a machine or process)
- **Quality Loss**: a quality score of 100% means that the process is only making good parts. Quality is the ratio of **Good Material** to **All Material**. Some process applications only produce good materials, while others may have Quality Loss due to non-conforming materials.

How to calculate the OEE

The OEE is simplified in the multiplication of the indexes described above, then **OEE = RF x RV x RQ**

- Availability (RF) = ? Run Time / ? Planned Production Time, that is » **RF=(d-s)/d** [d=time availability; s=stops];
- Performance = ? (Ideal Cycle Time × Total Parts) / ? Run Time that is » **RV=(CtxNp)/(d-s)** [Ct= cycle time; Np=Number of pieces];
- Quality = ? Good Parts / ? Total Parts, that is » * **RQ=(Np-Nc)/Np** [Nc= non-compliant pieces]

NIS classifies stop-cause in **3 classes**:

- **Not programmed Stop (F)**: it's required a causalization of stop
- **Programmed Stop (P)**: the worker set the begin and the end of this kind of stop using touch panel
- **Micro-stop (M)**: it's not required a causalization of the stop