Specification:

AXXOS Visualize – Tata Steel Halmstad

Table of Contents

1   Background

The customer wanted to be able to follow up during the day how they process for the day given what they have planned. To enable this, they wanted Visualize to show it. The initial solution was implemented and put in production and new requirements arose and they wanted to add a new column showing the planned amount for today and the planned amount recalculated in ton.

This specification replaces the below listed specifications.

- SpecificationAXVbc_TataSteelDistribution
- Requirement Tata steel AXV new column

2   Versions of this document

Version	Date	Name	Comment
1.0	2019-05-09	Tetiana Dynia	First version
2.0	2021-xx-xx	Stefan Brobeck	Added column Beläggning ton
3.0	2024-06-30	Magnus Johansson	Rewriting specification

3   Business need

➢ The customer want to follow up if they are behind the planned scheduled production for the day on each machine by visualize it using Vizualize.

---

4 Specification

4.1 Prerequisites

- Axv-Base platform should be used creating the customized visualize template.
- Axv-Base platform should be used to configure the visualize solution.

4.2 Business requirements

4.2.1 General requirements

- Brower supported should be Edge and Crome and later.
- Minimum resolution should be 1280x1024
- The solution should be able to manage resolution dynamically and adapt to the browser screen resolution.
- The page should have two options for theme, default or dark.
- Language support in Swedish and English.
- The solution should support to show either for time period today or time period current order

4.2.2 Layout main page

- Customer logo:
  - The customer logo should be uploaded to the solution using AXV-base standard logo feature
  - The place holder for the customer logo should be located in upper left corner.

- Current time:
  - Local site time should be shown on top of page
  - The place holder for local time should be located neatly and aligned with progress bar synchronized with the title place holder

- Title:
  - Axv-base standard title field in Axv-base configuration tools should be displayed as standard.
  - The Title should be editable using Axv-Base configuration tool.

- o The place holder for title should be located neatly and aligned with progress bar synchronized with the local time place holder

- The page should be able to display 8-9 machines (production places).
- Each machine should have one row of data
- On top of table the headings should be displayed

- Machine row:
    - o Each machine is represented by a row where data for the given machine.
    - o The background colors of the rows are changing between dark gray and light gray (light-dark-light-dark…).
    - o Each row contains of 6 sections; Machine, Progress bar, Capacity, Planned orders m, Planned orders ton, and Late WI.

- The first section of row has heading Machine (Swe: Maskin).

- The section Machine contains of 3 elements:
    - o The Machine name (6) is displayed as Production place name given by the production place id set in Axv-Base configuration tool for given machine row.
    - o Machine status (5) is displayed in color code for the current status of the production place given for the row.
    - o The status color should be:
        - ▪ When machine is in production then GREEN (#3fa83d).
            - • No downtime ongoing or an ongoing downtime with loss type=production (loss type=0).
        - ▪ When machine is in downtime then RED (#e6444d).
            - • Uncoded or coded downtime with loss type {Availability loss type, System loss type, performance loss type}
        - ▪ When no scheduled production then GRAY (#e0ded2)
            - • No scheduled production, i.e. no team assigned for calendar period, or a coded downtime with loss type excluded from OEE (planned downtime).
    - o Optional information (7) should be visualized below machine name in a font size like half the size machine name.
    - o Optional Information from Order or status description, setting [S3]
        - ▪ Current status Description. Possible statuses described in Table 1.
        - ▪ Order number for current order on given production place.
        - ▪ Product number for current order on given production place.
        - ▪ Product description for current order on given production place.
    - o When no order is active then the order information should be "No active order" (Swe: Ingen aktiv order)

- The second section of the row is the progress bar.
- The progress bar has two headings:
    - Produced today (Swe: Producerat idag) – Left aligned
        - Optional heading: Produced (Swe: Producerat)
    - Left to produce (Swe:Kvar att producera) – Right aligned
- The progress bar should have dark grey background.

- The section Progress bar contains of 4 elements:
    - Produced [9] – Calculated value "Produced" shown as an integer number.
    - Left to produce [11] – Calculated value "Left to produce" shown as an integer number.
    - Current situation [12] – Progress bar, color coded green/red.
        - Use calculated value "Produced"
        - Use calculated value "Planned amount".
        - It shows the percent of "Produced" compared to "Planned amount" where the percentage represents the percent of the bar filled from left to right. 0 persent is no bar and 100 percent is full bar.
        - Green if Produced >= Goal Produced
        - Red if Produced < Goal Produced
    - Expected situation [10] - Progress bar, color mid gray.
        - Use calculated value "Goal Produced".
        - Use calculated value "Planned amount".
        - It shows the percentage of "Goal Produced" compared to "Planned amount" where the percentage represents the percent of the bar filled from left to right. 0 percent is no bar and 100 percent is full bar.
        - The expected situation progress bar should have a height exceeding the progress bar of "Current situation" so it is visible below that progress bar.

- The third section of the row is the Capacity.
- The capacity has heading Capacity m (Swe: Kapasitet m).

- The capacity has one element.
    - Capacity – Calculated value.
        - The capacity is calculated from data entered by customer on page "Capacity" as Number of persons * Capacity.

- The fourth section of the row is the Planned amount.
- The planned amount has two headings:
  - Planned amount m (Swe: Beläggning m) in first column for this section.
  - Planned amount ton (Swe: Beläggning ton) in first column for this section.

- The planned amount has two elements.
  - Planned amount m – Calculated value Planned amount
    - The planned amount is calculated as the sum of the estimated amount for all orders with planned start time > today start of day and planned end time < today end of day.
    - When either planned start time or planned end time is not today, for that order the percentage of the planned time for today should be multiplied with the estimated amount for that order, see note 2 in section 5.1.
    - An order with Planned start time as NULL is not included in calculation
    - An order with planned amount < start of day and with planned end time as NULL is not included in calculation.
  - Planned amount ton – Calculated value Planned amount ton
    - The planned amount ton is calculated as Planned amount per order multiplied with the factor given by Total weight / Planned Amount per order and summed up.
    - Total weight is found as CS8

- The last section of the row is the WI not ended in time.
- The WI not ended in time has heading WI not ended in time (Swe: Försenade WI).
- The WI not ended in time has one element.
  - WI not ended in time – Concatenated string of semicolon separated order numbers.
    - The order number is added to the string when order is finished after planned end time

4.2.3 Capacity page

The capacity page should be used for the customer to every morning enter the capacity and number of persons on each machine.

- The page should be able to display 8-9 machines (production places).
- Each machine should have one row of data
- On top of table the headings should be displayed

- Each machine should be represented by 4 columns
  - Machine
    - Title: Machine (Swe: Maskin)
    - Data type: String

- - Data: Prodplace.description
  - o Person
    - Title: Persons (Swe: Personer)
    - Data type: Integer
    - Data: User input
    - If number of persion is 1.5 then user expect to enter 2.
  - o Capacity
    - Title: Capacity (Swe: Kapacitet)
    - Data type: Integer
    - User input
  - o Checkbox
    - Title: ?
    - Data type: ?
    - User input: ?

Separate page for setting of capacity. On this page we should be able to predefine the capacity for number of persons and capacity
Example:

Machine	Persons	Capacity	checkbox
SLTH1	1 person	1000	
	2 person	1500	
	3 person	3000	

Then on this page number of persons can be chosen, when that is done we show that capacity on visualize page.
If the number of persons is not changed we show the same amount for next day.
If the number of persons are changed during the day we show the new amount and calculations for others fields are changed based on new capacity.
So we do not take into account that we had for example 1 person half the day and 2 the other part, all will be changed and calculated based on two persons.

5 Functional specification

5.1 Formula calculated values and parameter binding

In AxV Base setting under time range the solution should support selecting between CurrentDay (standard) or CurrentOrder. Depending on the selected time range the formula will differ.

Parameter	Formulae when time range=CurrentDay	Formulae when time range=CurrentOrder
Machine name	ProdPlace.ProdplaceDes	ProdPlace.ProdplaceDes
Order number	Orders.Order_No	Orders.Order_No
Product number	Orders.ProductNo	Orders.ProductNo
Product description	Orders.ProductDes	Orders.ProductDes
Produced	Sum of Approved amount today	Sum of Approved amount on current order.
Left to produce	Sum of planned amount today - Sum of Approved amount today	Order.EstimatedAmount - Sum of Approved amount on current order.
Goal Produced	(Planned amount / Scheduled time for today) * Scheduled time till now	(Order.EstimatedAmount / Scheduled time for order) * Scheduled time till now
Planned time till now	Timediff(second, start of day, now) where all time is within scheduled time	Timediff(second, start of order, now) where all time is within scheduled time
Current situation	(Produced / Planned amount) / 100	(Produced / Planned amount) / 100
Expected situation	((Planned amount / Planned production time) * Planned time till now) / 100 [1]	((Planned amount / Planned production time) * Planned time till now) / 100
Capacity	Number of person * Capacity	Number of person * Capacity
Planned amount	Sum of Orders.EstimatedAmount for any orders with planned start time < end of day and planned end time> start of day. [2]	Sum of Orders.EstimatedAmount on current order. [2]
Planned amount ton	Planned amount * Total weight / Total planned amount [3]	Planned amount * Order.cs8 / Total planned amount [3]
Total planned amount	SUM(Order.EstimatedAmount)	Order.EstimatedAmount
WI not ended in time	Order.Ordernummber is adden I string when Order.Endtime > Order.EndtimePlanned	

Note[1]: An example how to calculate the Goal produced in progress bar

Start of scheduled time today	06:00
End of scheduled time today	22:00
Break today	1h

Scheduled today	(22-6) – 1 = 15h
Time now	08:20
Break till now	20 min
Scheduled time till now	8:20-6:00 – 0:20= 2h
Planned Amount Today	1500
Goal Produced	1500 * 2/15=200

Note[2]: When the planned start time of the order and/or planned end time of the order is not today, the percentage of estimated amount need to be calculated. Three example is given

Scenario 1:
Order is started yesterday (or earlier) and has planned end time as today.
Planned amount for given order is Order.EstimatedAmount - Produced till start of day.

Planned Start	25-06-2024 10:00
Today/current day	26-06-2024
Planned End	26-06-2024 14:00
Planned Amount on order	1000
Produced amount till start of today	300
Planned amount as of today	1000-300 = **700**

Scenario 2:
Order is started today and has planned end time as tomorrow (or later).
Planned amount for given order is:

$$Order.EstimatedAmount * \frac{(Scheduled\ time\ today}{(Scheduled\ time\ today+Scheduled\ Time\ tomorrow)).}$$

Planned Start	26-06-2024 14:00
Today/current day	26-06-2024
Planned End	27-06-2024 10:00
Scheduled time today	14:00 – 22:00=8h
Scheduled time tomorrow	06:00 – 10:00=4h
Planned Amount on order	1200
Planned amount as of today	1200*(8/(8+4))=**800**

Scenario 3:
Order is started yesterday (or earlier) and has planned end time as tomorrow (or later).

Planned Start	25-06-2024 18:00
Today/current day	26-06-2024
Planned End	27-06-2024 10:00
Scheduled time today	14:00 – 22:00=8h
Scheduled time tomorrow	06:00 – 10:00=4h

Produced amount till start of today	300
Planned Amount on order	1500
Planned amount as of today	(1500- 300) *(8/(8+4))=**800**

Note[3]: When a planned order has planned start and end time as today then the planned amount ton is the total weight. However when planned start or end time differ from today as described under note 2, then planed amount will be reduced to the amount calculated for today.