1. Transmission logic of orders

The WMS transmits all available picking lists. The MFS system manages the optimum operation of the orders to be executed, on the basis of batch data which will be determined. Data readiness + assigned prio. The MFS system manages orders in such a way that the workload per aisle and station is optimized.

1.1.Storage logic

The container must be stored as close as possible to picking location. In case of lack of space, we expect a separate area on the top levels of the racks. This is the type of far-away reserve that is selected for storage in case of lack of space in the aisle for the assigned article. This is a separate zone from the WMS level.

1.2.Logic of movements inside miniload installation.

The WMS provides a list of tasks to be performed (replenishment to picking location, and inside storage area). The MFS executes the orders in an optimal way for the installation. It selects possible movements that do not interfere with each other and that can be carried out successfully without impacting the rest of the executed orders.

2. Picking gallery

2.1. Reservation for urgent tote

We expect special space for urgent shipping totes which are waiting on the conveyor in front of the station. In the standard process, all shipping container spaces must be occupied by containers. It's possible that urgent tote can't be pushed to assigned picking station, because all places are occupied by different totes. Special priority number in the WMS, which can only be assigned manually by a person to tote, change number of waiting totes (X-1) in the assigned stations to urgent tote. This will allow to enter the picking station. If tote will be picked counter of capacity must be automatic changed to full number.

2.2.Counters for loop

We expect counter for loops. All counters must be adjustable per loop. Number of cycles must be available form MFS level.

2.3.Number of empty storage totes

We expect possibility to set how many empty storage totes can be located in miniload area. Counter must be separated by aisle.

2.4. Picking by two workers – ***update for appendix: D2027 - The concept of two workers on one picking stations.docx***

As it was mentioned in base file *(appendix: D2027 - The concept of two workers on one picking stations.docx)* we need possibility to have logged two workers on the same picking station. Process of picking will not change, it will be same as for one worker. WMS needs to receive following information from MFS:

- information which workers are logged on station,
- information about quantity of picked articles (summary from both workers),
- confirmation which articles were picked,
- information which articles were not picked (if such situation will appear).

However, we **do not need** the below actions, which were mentioned in base file:

- splitting picking list for two users,
- using different colors for separate workers,
- counting quantity separately for workers.

Functionality from MFS Level, which station can handle this option. We expect possibility to switch on/off this functionality per station.

2.4.1. Method of logging in – ***update for D2027 - New method of logging in.docx"***

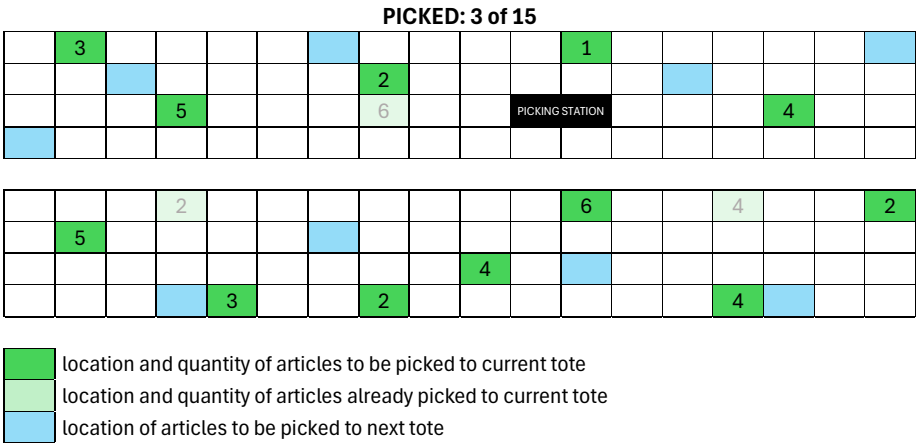
Referring to *appendix: D2027 - New method of logging in.docx* for logging in we want only to use option by RFID card. After scanning (card to RFID sensor) login will be displayed on the screen. If one user is logged, it's possible to login by second user. Logout for one person, and two persons have to be done by button on the master panel. Employee can login only by his card, but everybody can logout from the assigned station. Logging in at a second station while logged in at the previous station results in logging out of the previous station. All other logging out options are described in base file.

2.5. Picking visualization – ***update for appendix: D2027 - Picking visualization.docx***

In reference to *appendix: D2027 - Picking visualization.docx* for the tote which will be currently under picking we would like to keep visualization of locations from which the product is to be picked up, along with the quantity. We also still need to display a counter of picked lines in relation to the total number of picks (e.g. 3 of 15).

In case of two workers on picking station, process will be exactly same as for one worker but on the tablet we need to see logins of both workers. We no longer need separate colors for them.

In addition to above functionalities we would like to get a visualization of locations from where articles will be picked from next tote in queue. It is supposed to be done on same picture but in separate color. There is no need to see quantity at this step. Key of this functionality is to make workers know where there will be next product to be picked. Overview picture of picking visualization is below.



2.5.1. Errors management on picking visualization application – ***update for appendix: D2027 - Handling of shipping totes on the panel.docx***

On tablet apart from visualization we need possibility to manage errors related to totes. Responsibility for the management of tote after detecting an issue will be on MFS. We need at least two types of errors, which will be possible to choose on tablet:

- tote is full – when there will be no space for next articles,
- tote/article is damaged – when worker will find that in tote or article in tote is damaged.

Each of those errors needs to be communicated to WMS system and will be an initiator of specific action.

In case of choosing **tote is full** tote will be send to sequencer and will be processed forward with normal process flow. Rest of articles which were supposed to be in that tote have to be back to WMS as new list and will need to be assigned to next tote.

In case of choosing **tote/article is damaged** tote has to be taken off from installation by worker to avoid soiling installation. Taking tote off from picking station has to be confirmed

on tablet. In case when worker will not take out tote from installation but will push it into loop, tote has to be returned to station – there has to be a sensor which will not allow tote to enter installation. Tote with damaged article can not be taken back into installation and cannot be directed to NOK station as it may cause damage to the installation. WMS after receiving information about such error has to re-assign whole picking list to the next tote.

2.5.2. Other use cases for picking visualization application – ***update for appendix: Visualization of the workload of aisles on the top of rack***

Instead of having visualization of workload on the top of the aisles we would like to move this functionality to tablet on picking stations. In addition to functionalities described in *appendix: Visualization of the workload of aisles on the top of rack* we would like to use this option also as support to manage workers on station. Application has to be able to calculate workload and suggest workers where they are needed for next picking. It must take into consideration on which level in picking gallery are workers and direct them within one level.

2.6. Picking process

2.6.1. Four totes with goods directed to picking location.

In case of directing fourth tote to picking location (case of wrong number of totes in picking place) system MFS after attempting to deliver a tote, must direct tote to primary location. This error must be resolved by user, and after that storage tote can be delivered once again.

3. Reorganization

3.1. Reorganization based on forecast data

Reorganization processes are based on WMS data. System WMS has batch data based on forecast source. WMS selects the best place in the picking station to articles and gives MFS which totes from picking location must be taken by employee, and put on the conveyor. MFS is directing totes to new locations depended by heatmap. MFS must know how many totes were taken, and how many totes are still waiting for employee. Employee after collection of the totes has to confirm the moves by pressing a button on the panel in the picking location. Panel has to display how many totes are expected, but employee always empties the picking location to zero. Master panel has to display number of all totes expected in the picking station.

Commented [AM1]: I cannot make sense of this sentence. Could you please try to reword?

Commented [KJ2R1]: Employee allways should confirm, that he take totes from picking location.

Commented [AM3R1]: changed

4. Cancellation

This process is used in Rossmann for operational reasons (delay in picking, installation problem etc.) and there is a need that the user can delete part or whole order.

4.1. Cancellation of whole picking list

The user identifies the picking list they wish to cancel and selects the cancelation option in the WMS system using the dedicated transport management menu. WMS generates a request to cancel the entire picking list and sends it to the MFS system. MFS is responsible for managing the movement of goods and controlling the picking process. Once the request is received, MFS begins verifying the status of each item on the picking list.

MFS checks which articles on the list have not yet been completed. If articles are still in the picking process or awaiting picking, MFS immediately cancels their picking and releases them from further processing. Articles that have already been completed cannot be cancelled in the standard way. MFS must manage them in an appropriate manner.

Articles that have already been picked are redirected to a new staging location, specifically defined in the WMS system. Totes containing these completed articles are sent to the NOK station where they are further managed.

4.2. Cancellation of specified article on picking list

The user identifies a specific article on the picking list that requires cancellation. Then, using the appropriate option in the WMS system, the user initiates the cancellation process for that article. The WMS system generates a request to cancel a specific article and sends it to the MFS system, which manages the movement of materials in the warehouse. MFS verifies whether the selected article is still in the picking process or has already been picked. If the article has not yet been picked, MFS cancels its picking, removing it from the picking task list. If the article has already been picked, it cannot be possible to cancel it. MFS sends a confirmation to WMS informing whether it was possible to cancel the article.

5. Inventory control

5.1.Totes without movements.

We expect to be able to control containers stored with a date longer than (X). For such containers we expect to be able to re-stock to a new location. Functionality from the MFS level.

5.1.Shelf Occupied/empty

We expect to be able to control the occupied shelf from MFS level. User can send the shuttle vehicle to blocked place, and direct unknown tote to NOK station. We need special menu in MFS for this process.