INCONTROL ENTERPRISE DYNAMICS®

Warehouse Suite
Demo Wizard
Simulation of Warehouses

Quick Guide

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Introduction

INCONTROL ENTERPRISE DYNAMICS®

When to apply Simulation?

Simulation is applied when processes are:

- Complex
- Dynamic
- Uncertain / Stochastic

And gives decision support when:

- Real systems don’t exist
- Real changes and testing has high impact
- Discussions start

Introduction

What are the advantages of Simulation?

In order to:

- Provide insights in processes & investments
- Improve utilization and capacity
- Improve customer satisfaction
- Reduce risks
- Save money

Introduction

What is the purpose of the Warehouse Wizard?

- Fast modeling of a warehouse layout
- Easy way to create a simple real life model
- No simulation experience necessary

Explanation of the Wizard

Overview(1)

The Warehouse Wizard consists of the following 5 pages:

- Welcome page
- Infrastructure
- Transporters
- Products
- Orders

Explanation of the Wizard

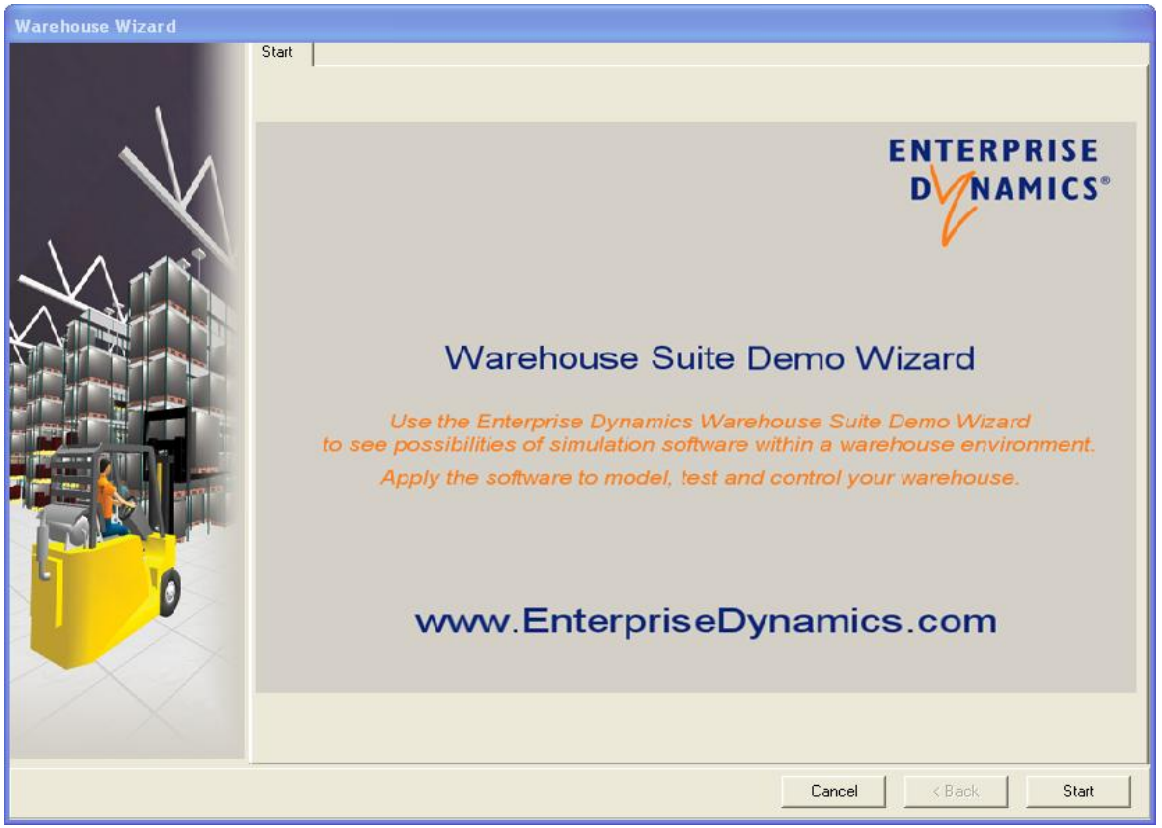
Overview(2)

In general:

- Every page contains default values
- This Demo version has limitations for user inputs
- These limitations will be displayed when the user moves the mouse curser over an input field
- By pressing the Start / Next – Button the next Wizard page will be displayed
- By pressing the Back – Button the user can go backwards to previous pages and change values there again
- By pressing the Finish – Button on the last Wizard page the model will be created

Explanation of the Wizard

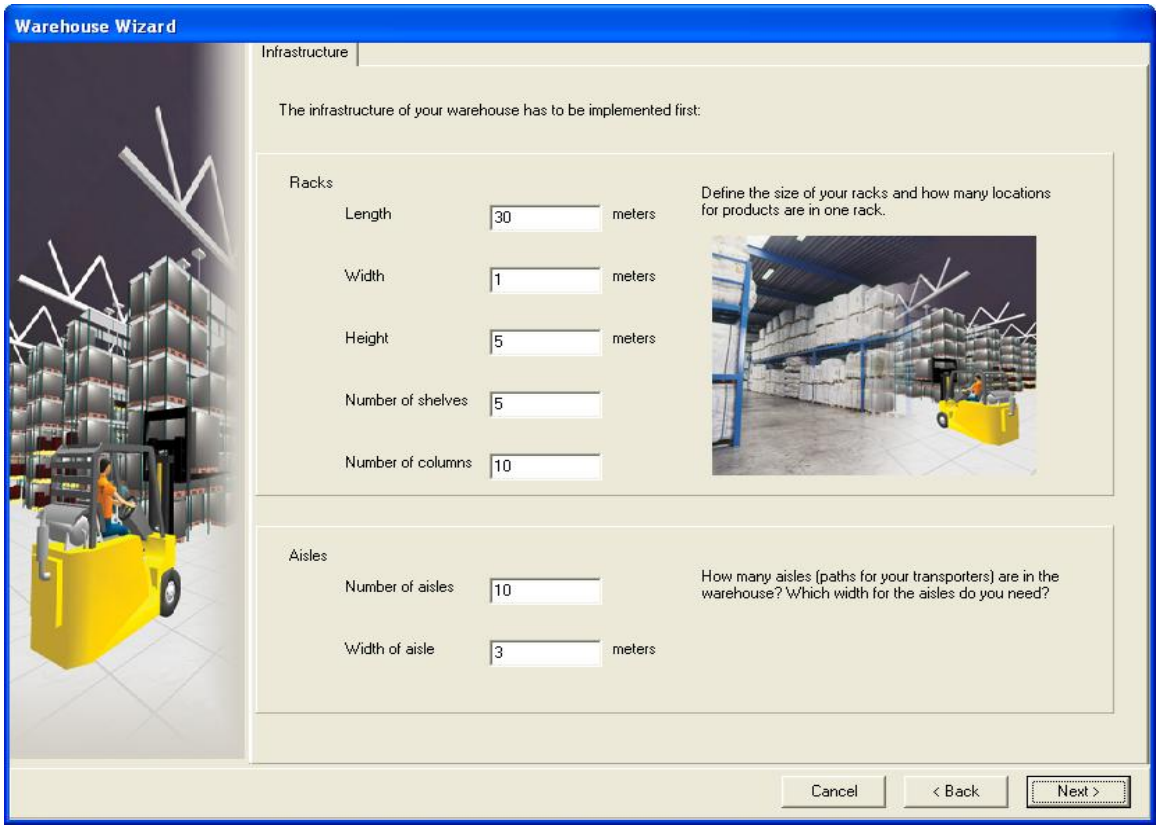
Welcome page



Press the Start Button to go to the next page

Explanation of the Wizard

Infrastructure(1)



Explanation of the Wizard

Infrastructure(2)

The Layout of the warehouse is the first step.

In the upper part of this sheet the user defines the dimensions and subdivisions of the racks.

Each rack will be described by the following parameters:

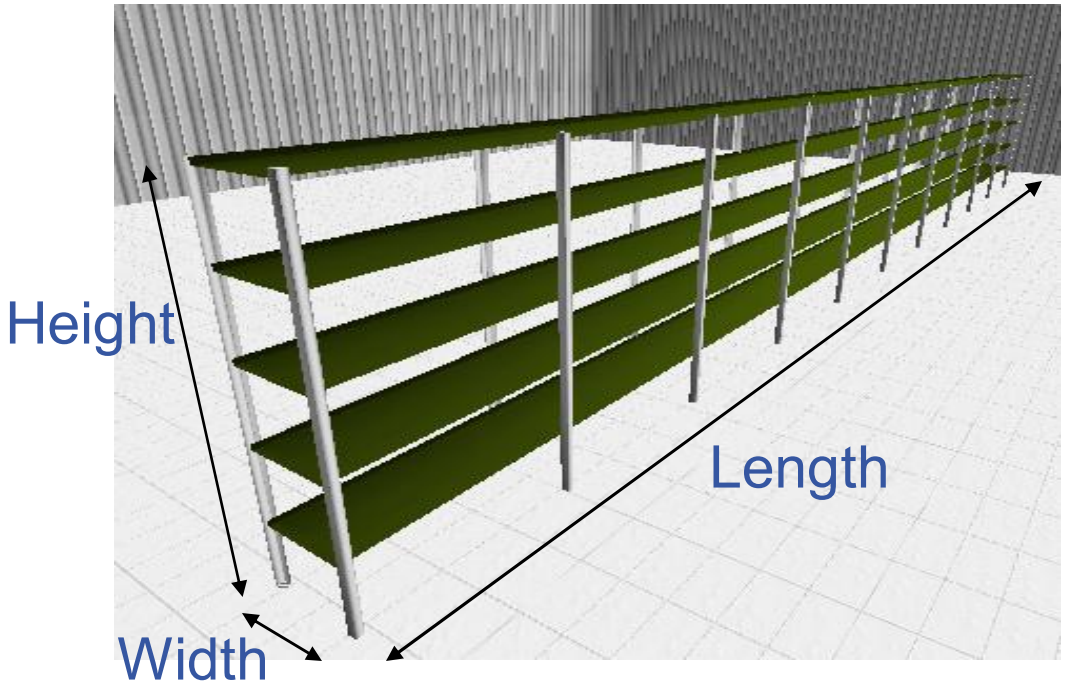
- Length (in meters)
- Width (in meters)
- Height (in meters)
- Number of shelves
- Number of columns

Explanation of the Wizard

Infrastructure(3)

Rack:

- Length
- Width
- Height

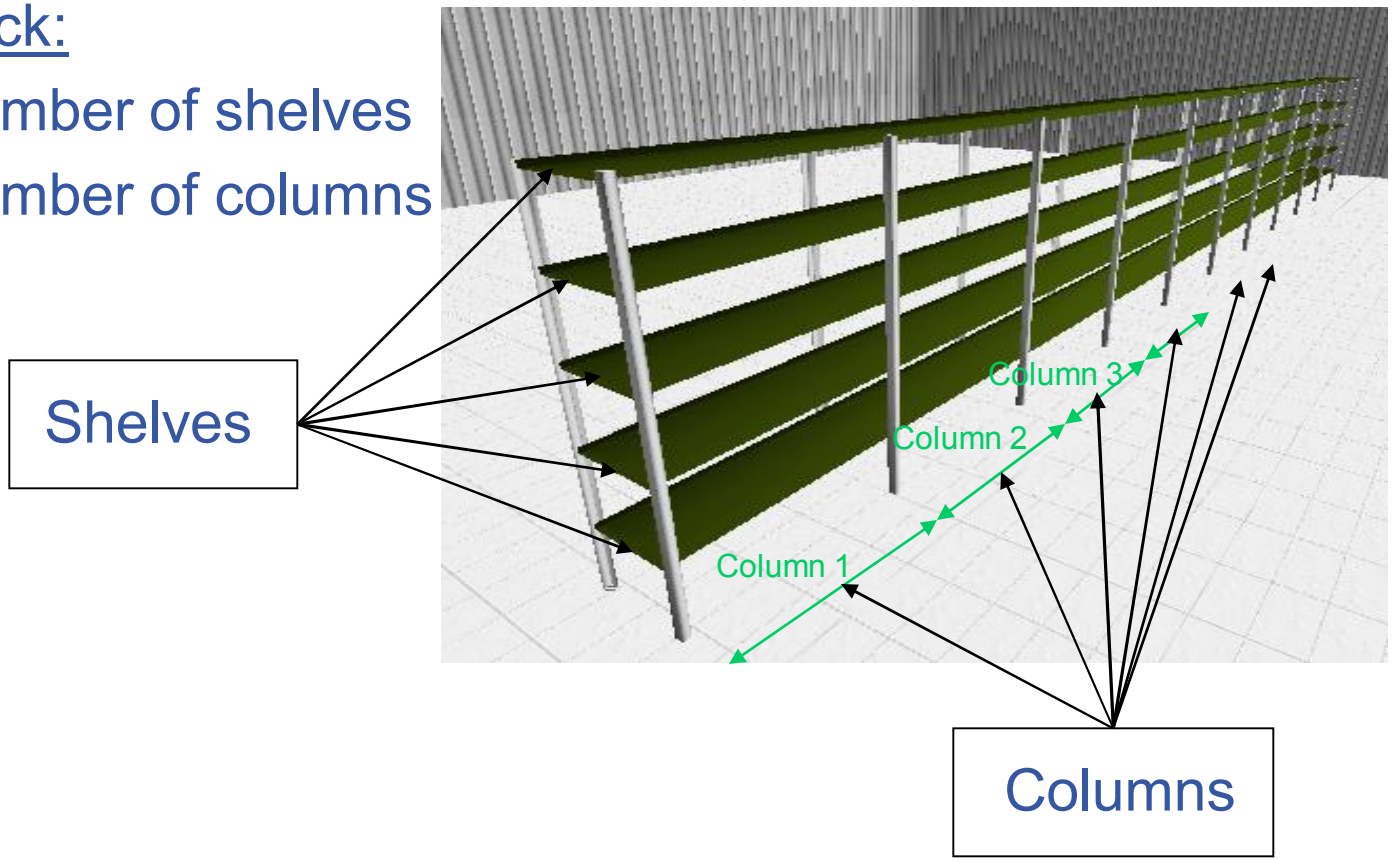


Explanation of the Wizard

Infrastructure(4)

Rack:

- Number of shelves
- Number of columns



Explanation of the Wizard

Infrastructure(5)

In the lower part of this sheet the user will define the number of racks and the aisles between the racks.

An aisle is a path where picking and placing will take place between two racks.

The aisles will be described by the following parameters:

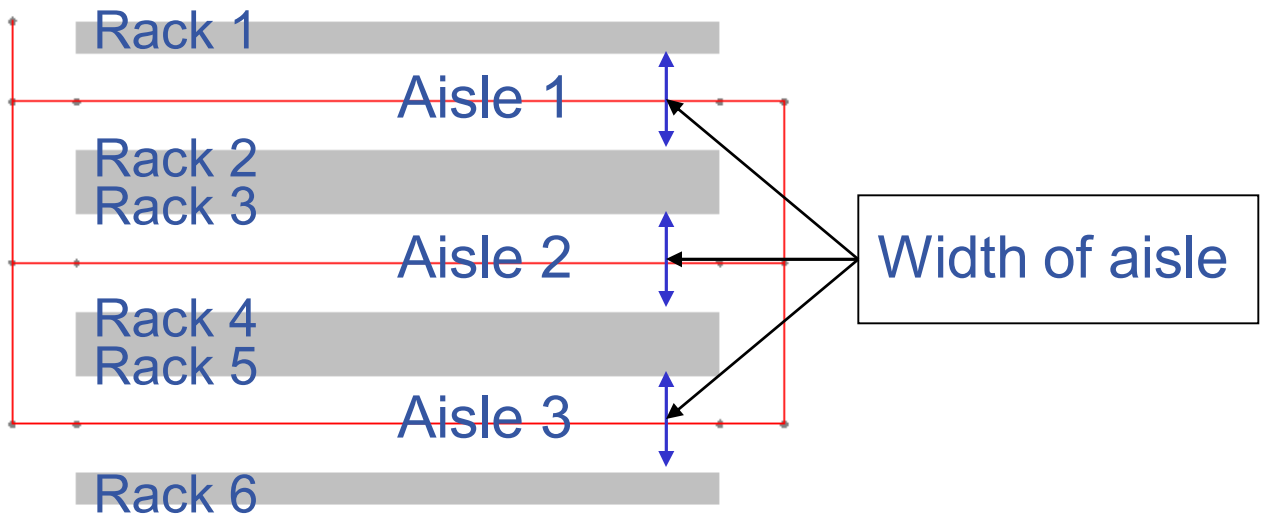
- Number of aisles
- Width of aisle (in meters)

Explanation of the Wizard

Infrastructure(6)

Aisles:

For example, if you choose Number of aisles: 3 with a certain Width of aisle, you will later, after finishing the Wizard, get a 2D top view Layout like below.



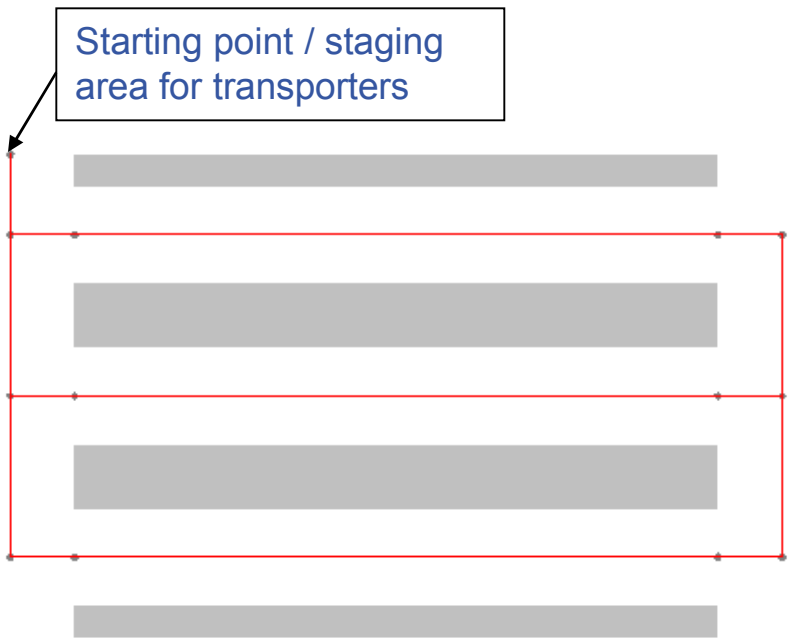
Explanation of the Wizard

Infrastructure(7)

Next to the Layout, the travel paths for picking and placing will be created (see red lines).

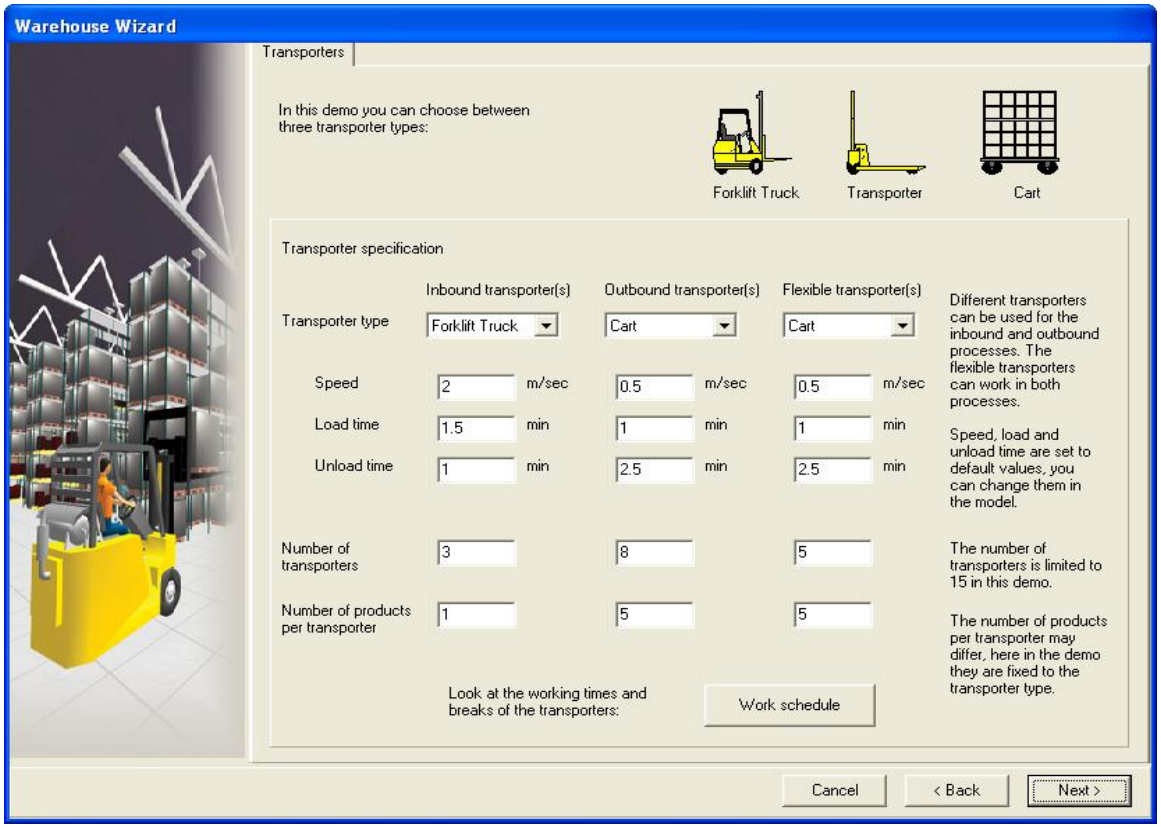
Travel paths system:

- Starting point for the transporters
- Travel paths in the middle of an aisle
- Moving around the racks



Explanation of the Wizard

Transporters(1)



Explanation of the Wizard

Transporters(2)

The defining of the transporters is the second step.

There are transporter teams to define for the 3 different possibilities:

- Inbound transporters

  Inbound means all transporting activities bringing and storing goods in the warehouse (racks)

- Outbound transporters

  Outbound means all transporting activities taking goods out of the warehouse

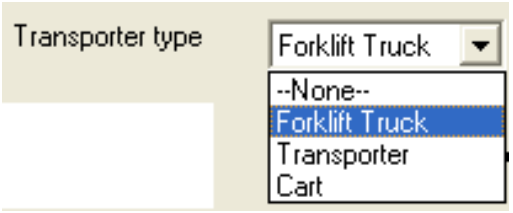
- Flexible transporters

  These transporters can do both, inbound and outbound activities

Explanation of the Wizard

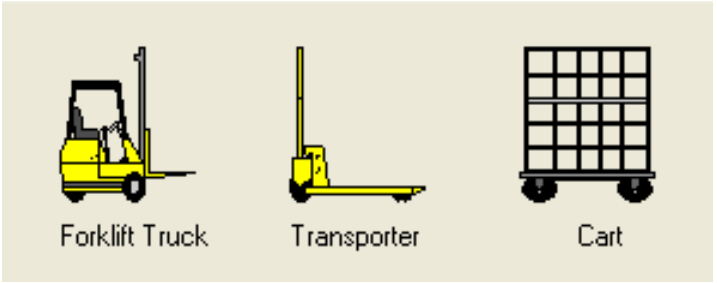
Transporters(3)

For each (Inbound, Outbound or Flexible) transporter a transporter type can be selected in the related Combo Box



At the moment there are 3 different transporter types available:

- Forklift Truck
- Transporter
- Cart



Explanation of the Wizard

Transporters(4)

Transporter types:

- Each transporter type has some specific parameters like Speed, Load Time and Unload time
- These parameters are predefined with (in this Demo-Version) not changeable values
- For each transporter type and each group like Inbound, Outbound or Flexible, the user can define the Number of transporters and the number of products a transporter can carry (Number of products per transporter)

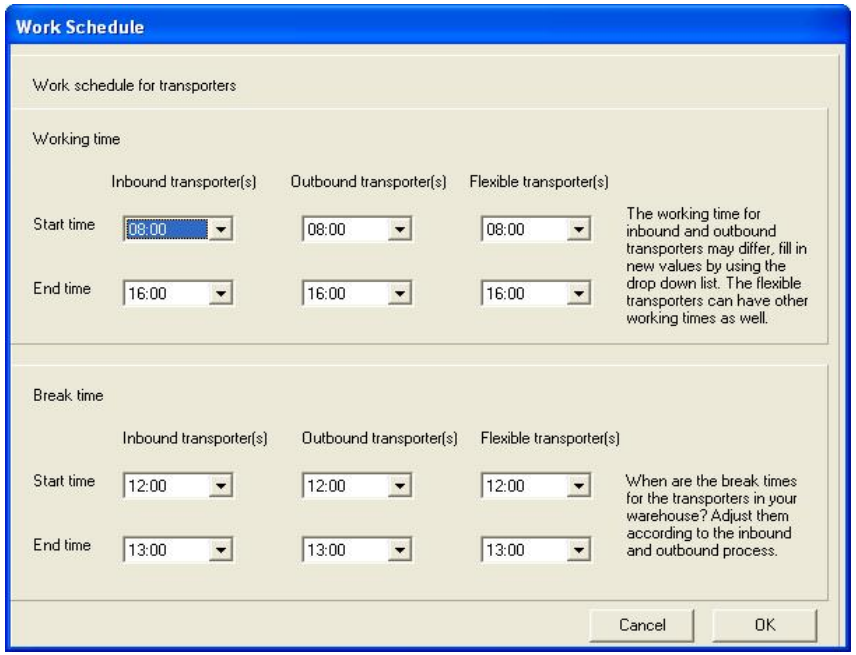
Explanation of the Wizard

Transporters(5)

By pressing the Button Work schedule a window appears.

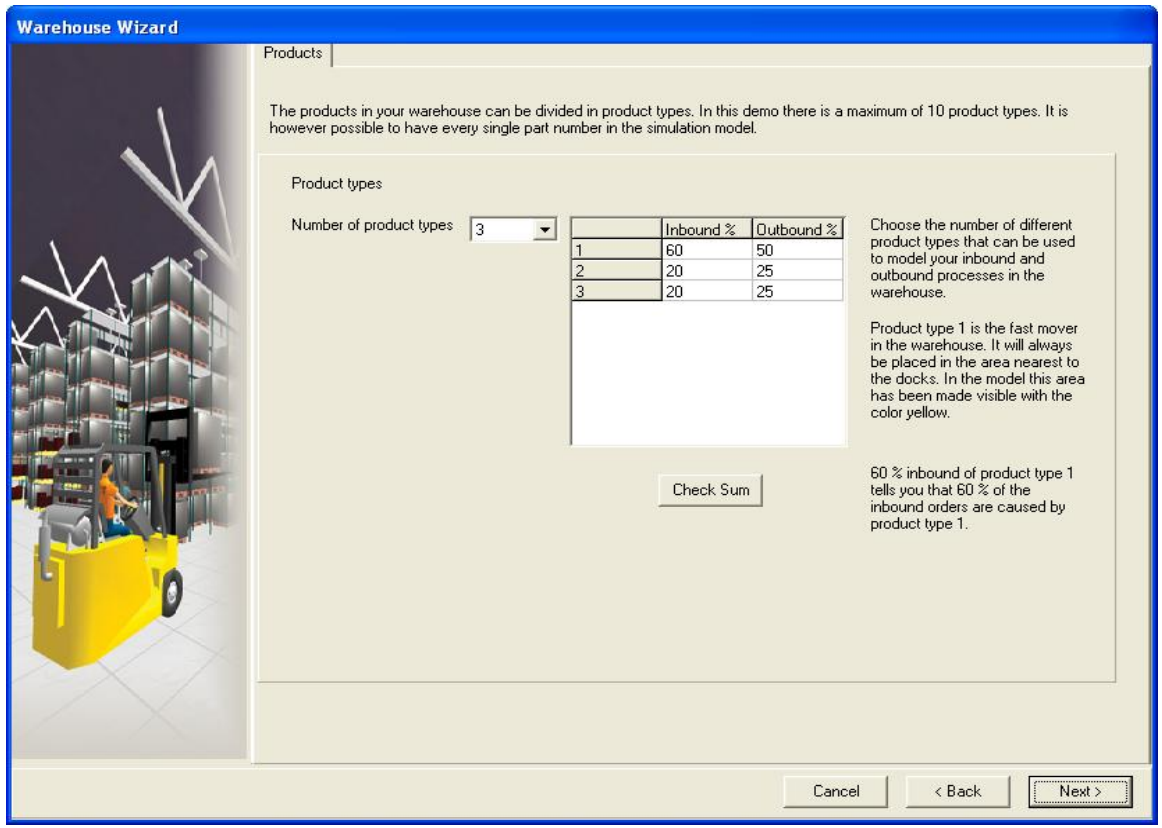
For all groups and types the following settings can be changed:

- Start and End time for working
- Start and End time for Break / Lunch



Explanation of the Wizard

Products(1)



Explanation of the Wizard

Products(2)

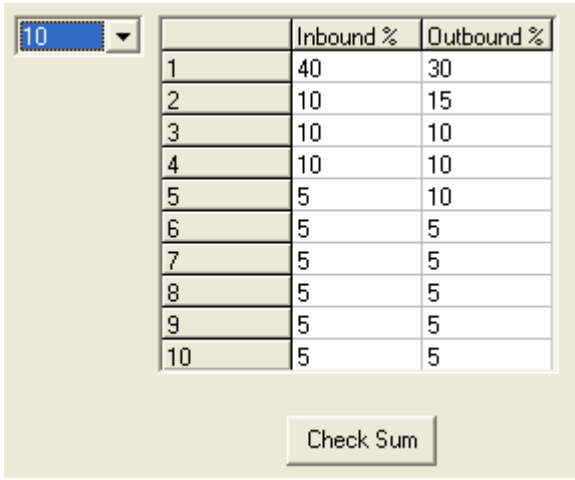
- The defining of the products is the third step.
- Different types of products can be defined in that page.
- For the Demo-Version there is a limitation of 10 different products.
- The Number of product types can be changed in the Combo Box
- According to the number the user has chosen the different product types can be seen in the table next to it.

Explanation of the Wizard

Products(3)

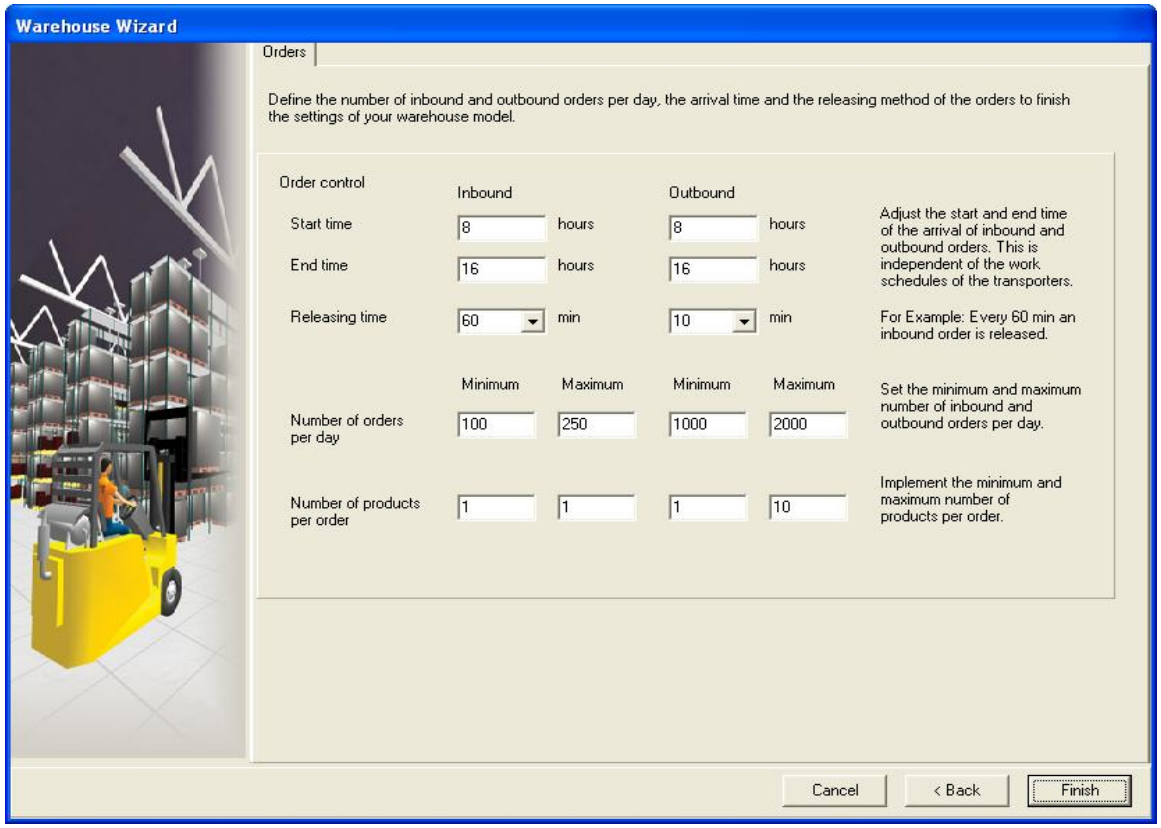
Product Table

- Number of different products
- Default percentage rate for each product type, that indicates how often a certain product type has to be dealt with for Inbound and Outbound transport.
- Percentage rates can be changed. The user has to make sure that the sum of all percentages for Inbound or Outbound has to be 100 %.
- The Button Check Sum helps the user to calculate the sum of all values in the Inbound and Outbound column



Explanation of the Wizard

Orders(1)



Explanation of the Wizard

Orders(2)

The defining of the orders is the last step.

- The first part defines the start and end time for Inbound and Outbound when orders come in and are accepted (These times are independent from the working times of the transporters).
- The releasing time defines the period of time in which orders are collected and freed. After this period of time the transporters work on this released bundle of orders.

Explanation of the Wizard

Picking / Placing Strategy(1)

Process:

- Orders come in
- Orders are collected and put in bundles during the releasing time
- Bundles are collected according to aisle numbers

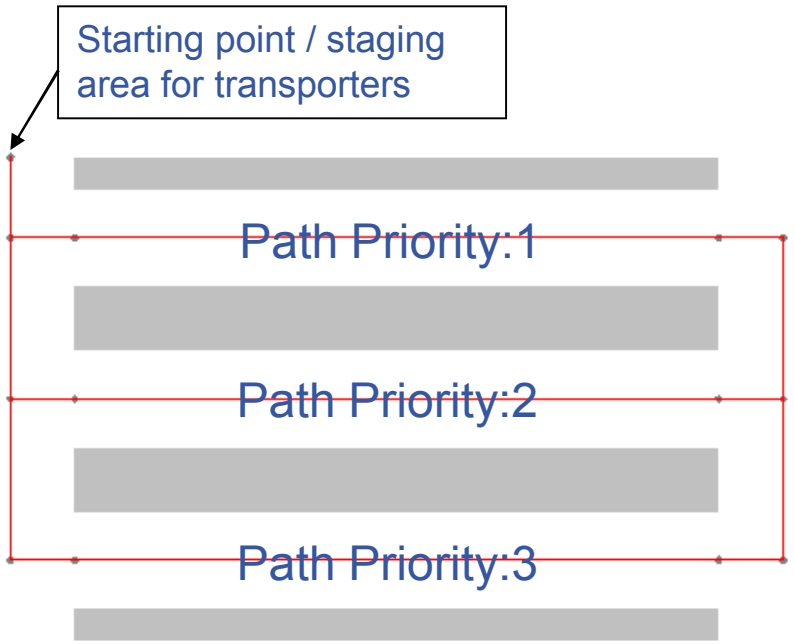
  (if possible every order in a bundle should have the same aisle number)
- The bundles are given to workers (after releasing time has passed!)
- The workers start working on their bundle

Explanation of the Wizard

Picking / Placing Strategy(2)

Transport path priority

- The transport paths have their own priorities with increasing values by a growing distance to the Starting point (Path Priority 1 means highest Priority!)
- Workers start working on their bundle of orders beginning with the path with highest priority.



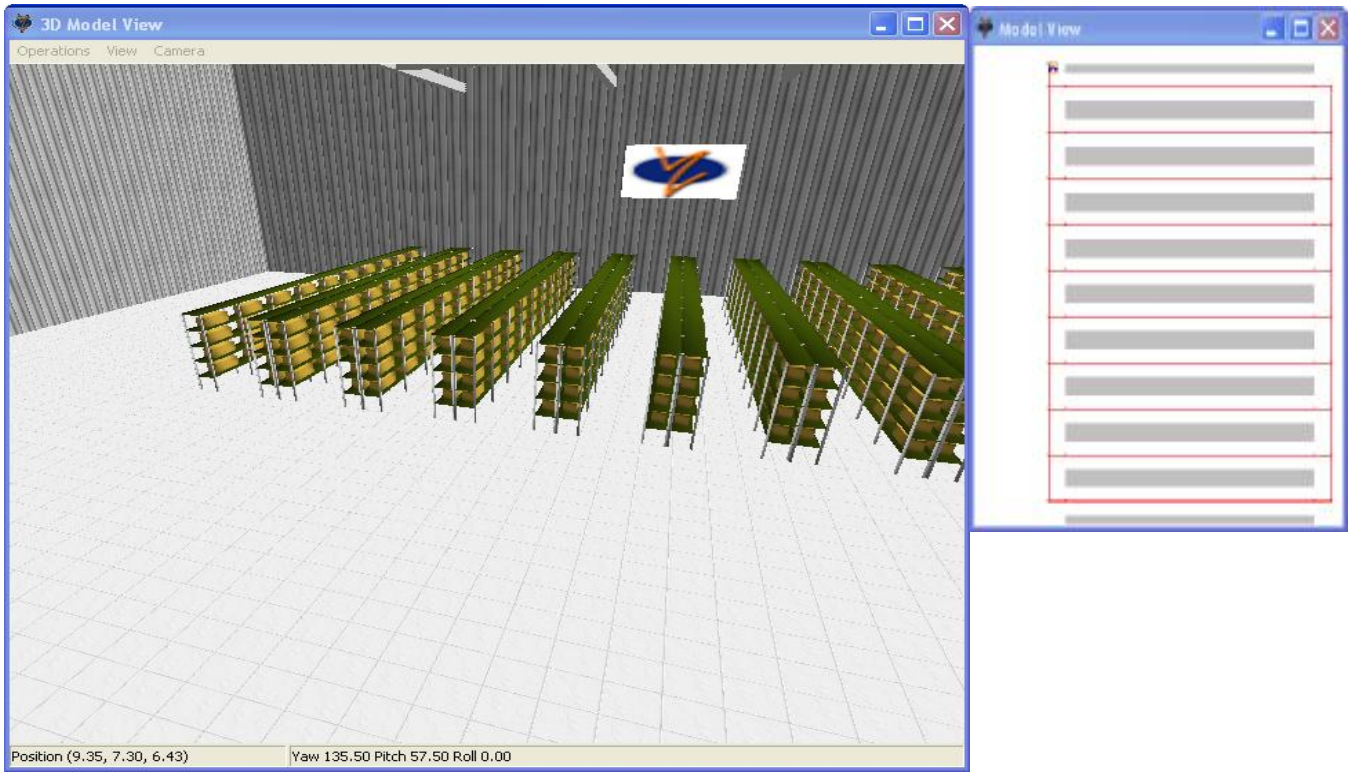
Results

After pressing the Button Finish the user gets the following results from the Warehouse Wizard:

- Layout of a warehouse in 2D and 3D
- Runnable simulation model
- Utilization Graph of the transporters

Results

Layout in 2D and 3D (1)



Results

Layout in 2D and 3D (2)

- 2D top view of warehouse with racks and transport paths
- 3D animation with surrounding warehouse building

Mouse Controls for 2D and 3D windows:

- Press and hold left Mouse Button lets you move around
- Press and hold left and right Mouse Button lets you zoom

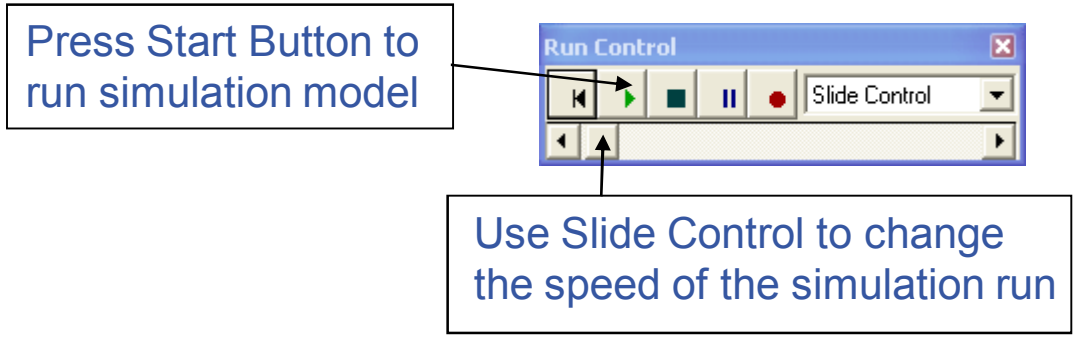
Mouse Control for 3D window only:

- Press and hold right Mouse Button lets you change the point of view

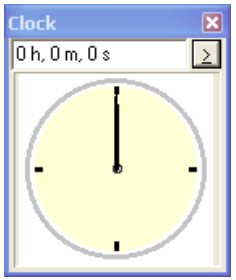
Results

Runnable simulation model

- By using the Run Control window you can start the simulation model



- The clock displays the actual time



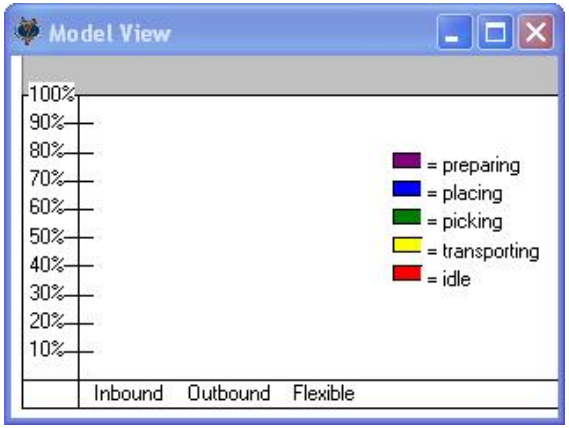
Remember:

The simulation starts at 00:00, but the first activity will take place when the workers start (e.g. 08:00 AM)

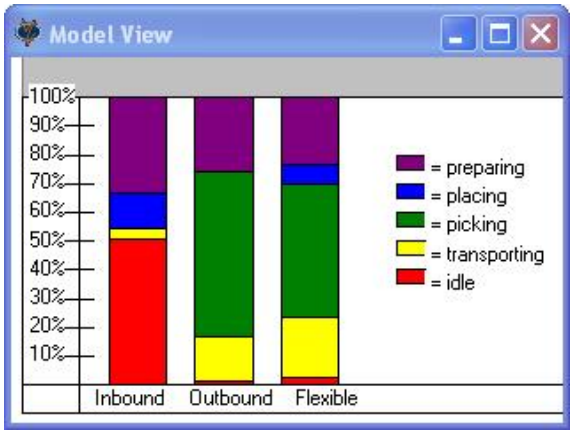
Results

Utilization Graph of the transporters

- With the utilization graph you can see the activities of your workers during the day



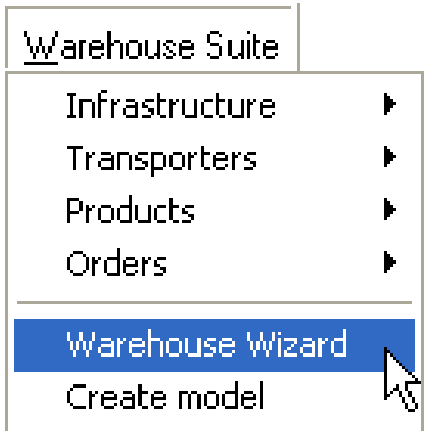
at start



during simulation run

Restart Warehouse Wizard

If you want to change or modify your settings you can start the Warehouse Wizard again.



Choose **Warehouse Wizard** in the menu Warehouse Suite to change your current settings. The Warehouse Wizard will pop-up again.