



HOME

User Manual

DELMIA Process Engineer®

## Work Positions - Application



# Foreword

This describes Process Engineer operation and basic functions you need to be familiar with when dealing with work positions.

While developing these functions we have made every effort to create a clearly organized, easy-to-understand program structure.

A user-friendly interface as well as a clear menu guide will enable you to quickly learn how to operate the program and to get familiar with its functions so that you can carry out your planning tasks in a quick and reliable way.

Nevertheless, there will certainly be some things that we could do even better. If you have any suggestions for improving our software, please be sure to let us know.

We look forward to receiving your constructive feedback. It helps us to make it even easier for you to work with the Process Engineer functions.

The same holds true for the manual that you are now reading. If, at any point when using these instructions, you feel you are not being provided with the clear, unambiguous, and proper guidance necessary to work with this application, please be sure to let us know. We look forward to receiving your comments and tips.

Please feel free to call, send us an E-mail, or contact our user hotline.

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# 1. Introduction

This manual explains how to use the Process Engineer Work Positions for your planning purposes.

## 1.1 How to Use this Manual

This manual enables you to get familiar with the operation and functions of the Work Positions. This manual briefly describes:

- How to Create and Edit a Work Position
- Menus available for the Work Position

This user manual shows you how to check a work position under ergonomic aspects. Use the following elements of anatomy for evaluation purposes:

- 3D-Model of a Human Being
- Reach Ranges
- Vision Fields



### Note

*When handling the Work Position functions, please also refer to the general introduction to Process Engineer in the General Introduction Manual.*



Click [General Introduction](#) to access the manual.

## 1.2 Documentation Conventions and Symbols

The symbols used in this manual are intended to provide you with keys to the contents in an immediately understandable manner.



This symbol is used to introduce key concepts that are covered in the sections immediately following this symbol. As a result, this symbol most frequently appears at the beginning of chapters or sections.



### Note

*This symbol is used to mark notes, which provide you with additional information you need to have for further work. You will either find the Note sign at the beginning of a chapter or in a particular text passage in the chapter. Texts bearing this sign are additionally marked with **Note**. The text is always in italics.*




### Caution

*This symbol indicates that the text that follows describes particular circumstances that you must avoid to avoid potential errors with the operation of the program or harm to data. You will either find the Caution sign at the beginning of a chapter or near a particular text passage in the chapter. Texts that are introduced by this sign are additionally marked with **Caution**. The text is always in italics.*

### Example

This symbol marks examples which serve to illustrate a certain situation.

- 1) This symbol marks the individual operational steps involved in a particular operating instruction. Operating instructions describe operational steps, for example, how to open a menu or execute a function.
- This symbol marks listed subjects. The symbol for listed subjects can be either used to structure a continuous text or to list main subject keywords.
- This symbol marks list inside a bulleted or numbered list.
-  This symbol marks cross reference information that is available in another manual.

## 1.3 New Functions in Work Positions

No new functionality has been added for this release.

## 2. Work Positions

### 2.1 Overview

Work positions are to be designed ergonomically. To do this, firstly, the operational functions and movement sequences must be arranged in such a way that the health aspects are taken into full consideration and secondly, all the equipment at a work position must be easy to operate. You can use the following anatomical elements to check the ergonomic aspects of a work position:

- 3D-Model of a Human Being
- Reach Ranges
- Vision Fields

When designing a work position, different aspects have to be considered:

#### External Dimensions

The **minimal** size of a worker is decisive – even a small worker can reach all his tools.

#### Internal Dimensions

The **maximum** size of a worker is decisive – even a large worker can sit comfortably at the desk without hurting his legs.

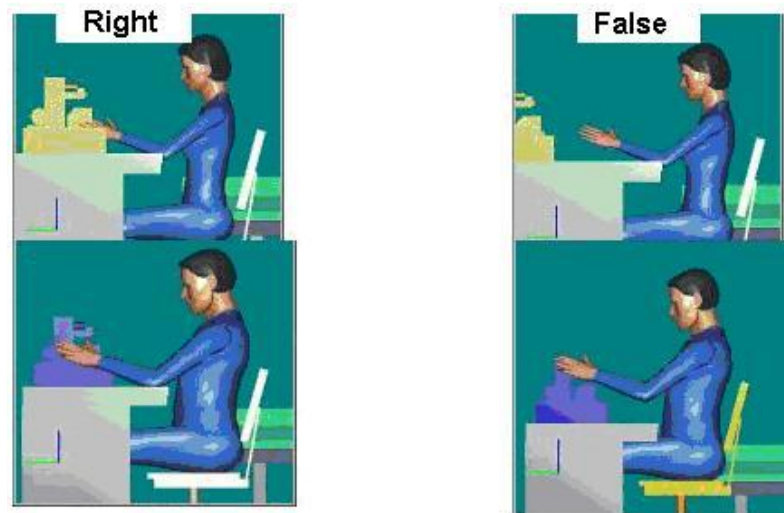
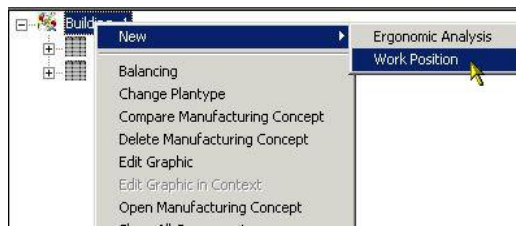


Figure 1: Internal and External Dimensions of Work Positions

### 2.2 Creating a Work Position

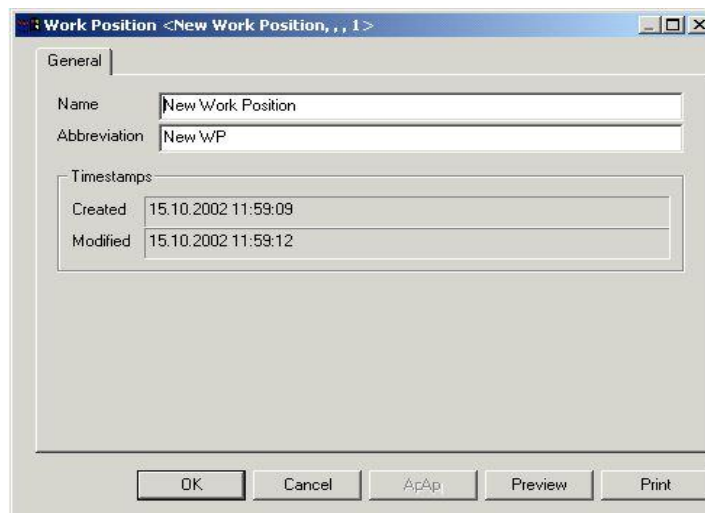
Work positions are generated so that ergonomic data can be specified for a work position. Once you have created a new work position, it is integrated in the graphic (resource structure layout). You can generate a new work position even with an open graphic. This new position is automatically integrated and displayed in the graphic.

## 2.2.1 Generating a New Work Position



**Figure 2: Generating a New Work Position**

- 1) Change from the PPR Navigator over to the resource view to generate a new work position.
- 2) Open the context menu at the highest level, then click **Work Position**. Please refer to the [Figure 2](#).



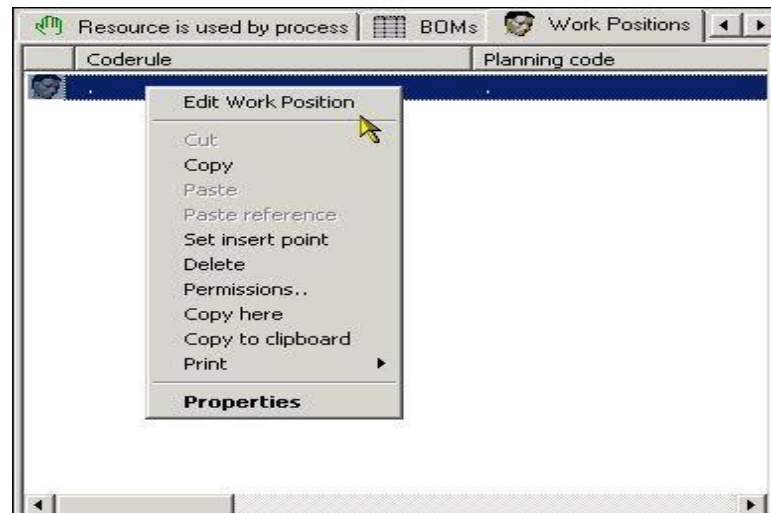
**Figure 3: Creating a New Work Position – Dialog Box**

- 3) Enter the general work position data in the dialog box. The new work position has now been created and is ready for editing. Editing requires the respective dialog box to be open. Confirm the entries with **OK**. Please refer to the [Figure 3](#).

## 2.2.2 Editing Work Position

Open the **Work Position Editing** dialog box in the object list.





**Figure 4: Opening Editing Dialog Box in Object List**

Thus, you can open the dialog box for each generated work position.

- 1) Select the work position tab containing the new work position in the object list to open the editing dialog box.
- 2) Select the new work position from the object list and open the context menu. *Please refer to the [Figure 4](#).*
- 3) Click **Edit Work Position**. The editing dialog box is displayed. *Please refer to the [Figure 5](#).*

### **Deleting a Work Position**

- 1) Open the context menu to delete existing work positions from the object list.

## **2.2.3 Editing Work Position Dialog Box**

Use this dialog box to specify the ergonomic work position data. To edit the dialog box, *Please refer to the [Editing the Work Position Fields](#).*

Figure 5: Editing the Work Position

## 2.2.4 Editing the Work Position Fields

### Selecting the Nationality

Here, you can select the nationalities. The size of the human being models depends on the nationality selected.

Figure 6: Work Position: Nationality

### Selecting a Gender

Select between male and female Genders.

Figure 7: Gender Work Position

### Selecting a Percentile

Select between 5<sup>th</sup>, 50<sup>th</sup>, and 95<sup>th</sup> percentiles. Please refer to the [Figure 8](#).

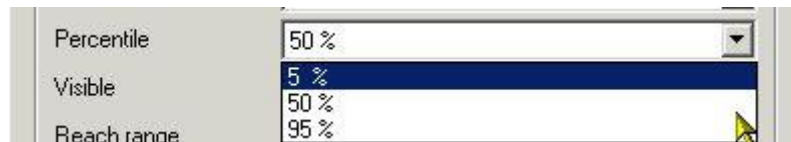


Figure 8: Percentile Work Position

## 2.2.5 Percentile Description

There is a value for each percentile that refers to the body height and all other anthropometrical data of the human being. There is a value for each gender. In addition, there are separate table values for different nationalities. The [Figure 9](#) shows a characteristic line representing the distribution of male body heights in Germany.

### Frequency

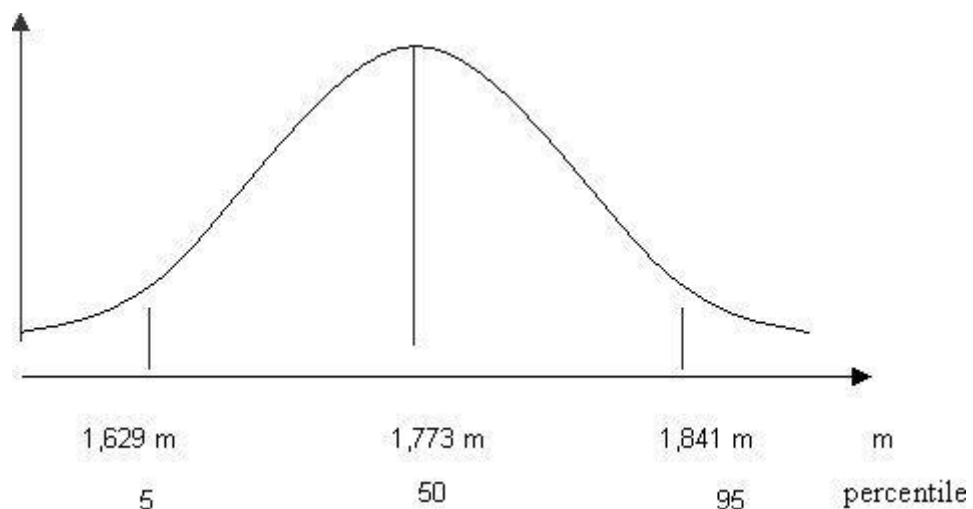


Figure 9: Normal Distribution of Percentiles

The **5<sup>th</sup>** male **percentile** corresponds to a body height of 1.629m.

The **50<sup>th</sup>** male **percentile** corresponds to a body height of 1.773m.

The **95<sup>th</sup>** male **percentile** corresponds to a body height of 1.841m.

These values are specified in the DIN standard 33402 and refer to the male German population. They are average values for men aged between 16 and 60. Similarly, there are table values for women, too. There are similar tables in other countries as well (*Please refer to the [Nationality](#)*).

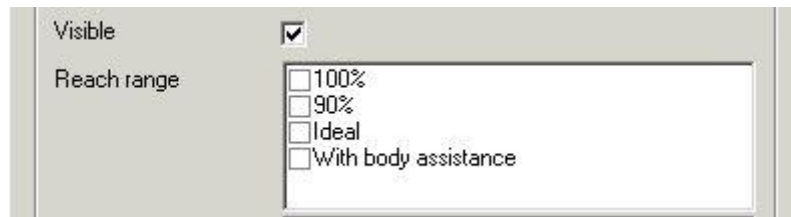
Data calculation dates back to the seventies. In the meantime, human beings have become increasingly taller. With our human being models, we have taken this effect (known as acceleration) into consideration.

### Displaying in a Visible Manner

The human being model is displayed in the graphic if the **Visible** field is activated. *Please refer to the [Figure 5](#)*.

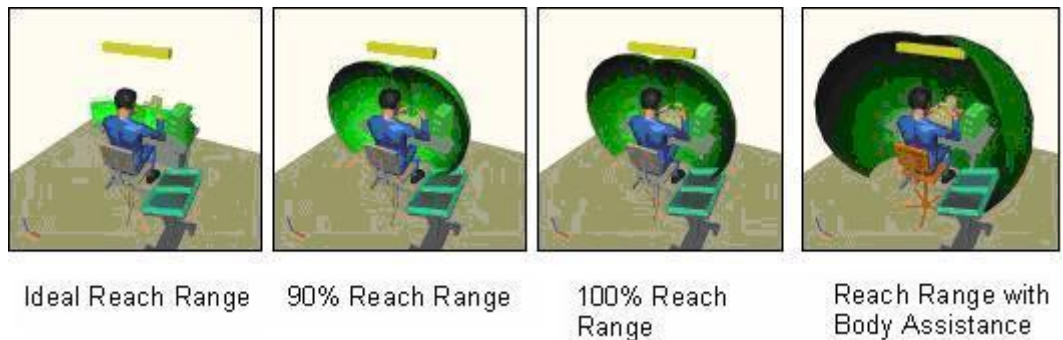
### Selecting a Reach Range

A reach range is visualized in the graphic if one of the different reach range types is activated.



**Figure 10: Earlier Reach Range Settings**

The reach range depends on the worker's arm length and the position of his shoulder joints – the different percentile values for men and women are specified analog to the body heights in the 33402 DIN standard.



**Figure 11: Earlier Reach Ranges**

The **100% reach range** shows the area in which the worker can reach things with extended arms (extended arms, closed fist around a cylinder with a diameter of 60mm). Take a look at yourself and you will realize that your arm is not normally extended – the elbow is often slightly bent. The range reach thus decreases. The remaining available area is shown in the **90% range reach**. It is clear that, from an ergonomic point of view, it is not so ideal for the worker to have to reach for things at the very top, at the very bottom or far to the side. The ideal reach range shows the best working area.

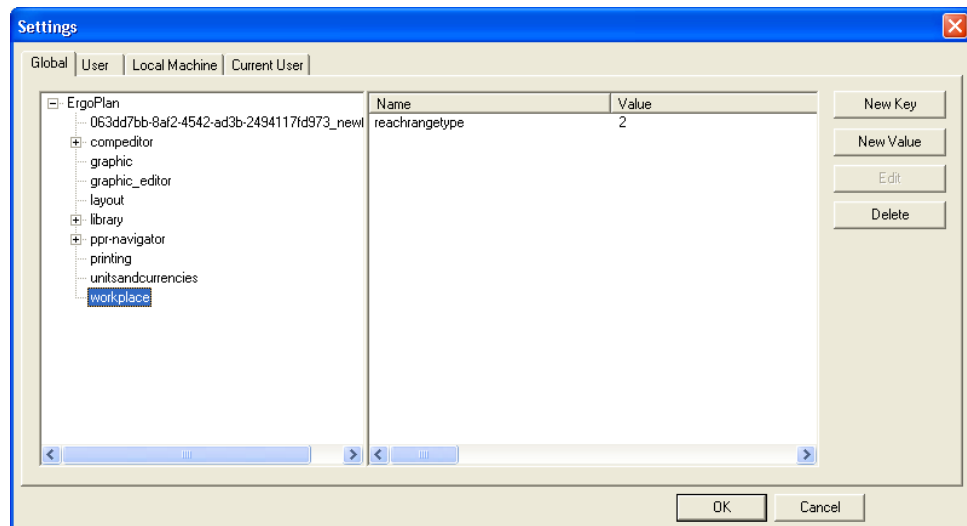
However, depending on the size of the parts used at a work position, there is no doubt that tools and parts containers etc. cannot always be placed in an ideal or 100% range reach. Using the **reach range with body assistance**, you can visualize the area where components can be reached by the worker e.g. by bending forward. Sometimes, if the worker is in your vision field, you cannot see whether or not he is able to reach all things. Take the worker out (*Please refer to the [Figure 11](#)*). To display the reach ranges, the human being model need not be visible.

### Implementation of New Reach Ranges

The new reach ranges are: Small, Big, and Physiological Maximal.

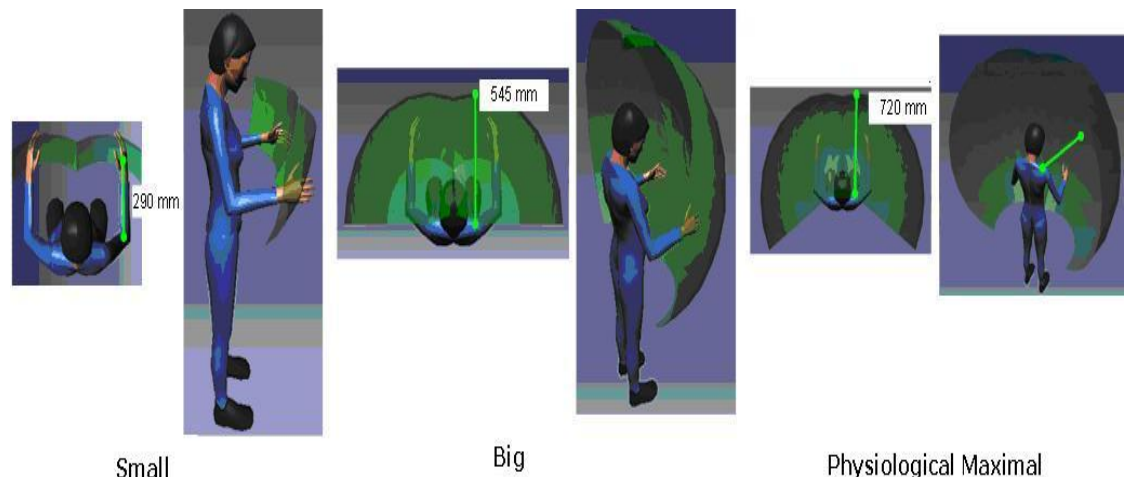
#### To Enable New Reach Ranges

- 1) Go to **Tools < Settings < Maintenance Tool < Global**.
- 2) Make new Setting, workplace/reachrangetype 2  
It activates the new set. If setting is not found or value is 1, the old settings are used. If value is neither 1 or 2 an is shown, and the old set is used.



**Figure 12: New Setting for Reach Range**

The global setting can be overruled by a value set in the **Current User** tab, since it is possible to switch between old and new norm.



**Figure 13: New Reach Ranges**

### Set Horizontal View Angle

Set a horizontal rotation of the head. The rotation is specified in degrees.

### Set Vertical View Angle

Set the view angle. The entries here are also made in degrees. You are advised to select a view angle of 40° for a sitting human being model and an angle of 30° for a standing model.



**Figure 14: Vertical, Horizontal View Angle, and View**

### Showing Vision Field

Use the vision field button to open another graphic in which you can view the work position through the eyes of the worker. Compare the work position design below on the right with the vision field of the worker on the left.

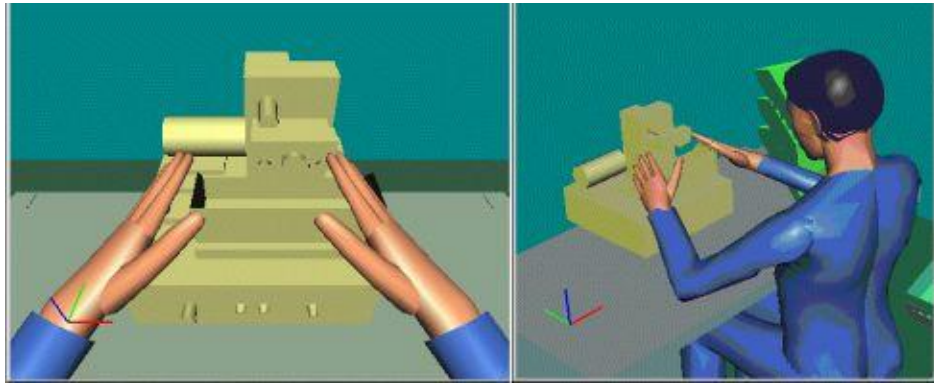


Figure 15: Displaying Vision Field

## 2.2.6 Specifying Work Position Properties

### Selecting a Type

Select between a standing and a sitting human being model that you want to integrate in the scene. *Please refer to the [Figure 5](#).*

### Specifying Position

Specify the center of the front edge of the table (*Please refer to the [Position X/Y/Z](#)*) to place a sitting human being model in the working surroundings. The standard distance between the reference point and the shoulder joints (in the top view) is 150mm and therefore corresponds to the **Middle** position. The distance is 100mm in the **Front** position and 200mm in the **Back** position.



Figure 16: Position Template

### Specifying Requirements

The **work requirements** design parameter specifies the distance between the work position (For example, height of desk top and appliance) and the position of the shoulders or eyes in a **sitting** position. In the **standing** position, this parameter does not affect the position of the shoulders or eyes because these are defined by the floor space. Actions assigned to the corresponding work requirements can best be displayed in the form of a table. Standard requirements are average requirements as far as visual control and precise motor-skills are concerned (For example, doing wiring or assembling small parts with little effort). The height of the shoulders and eye position is increased by 100mm when great demands are made on visual control and precise motor-skills (For example, adjustment work, visual control, or the assembly of extremely small parts).

This height is decreased by 100mm (men) and by 50mm (women) compared with the standard settings when low demands are made on visual control and high demands are made on freedom of movement of the arms (For example, sorting, packing, or assembling heavy work pieces with great effort).

### X Position/Y Position/Z Position

You can specify the position where you want to place the human being model in your work position. To do this, specify the absolute human being model coordinates of the scene. Use the graphic tools to change the model position

and hence the reach ranges as well as the vision field. These changes are transferred to the edit work position template.

### **X Rotation Angle/Y Rotation Angle/Z Rotation Angle**

You can turn the human being model on its own axis using the rotation angle. To turn it simply on the floor, enter a rotation angle on the Z-axis. Entries are made in degrees. You can also turn the human being model by using the graphic tools as described in the case of the X/Y/Z position.

Position x	0,000 mm
Position y	0,000 mm
Position z	-1000,000 mm
Rotation angle x	0,000 °
Rotation angle y	0,000 °
Rotation angle z	0,000 °

**Figure 17: Specifying the Position of the Axes and the Rotation Angle**

### **Setting the Working Height**

The working height specifies the vertical distance between the desk top and the actual work position (For example, laying-in height of appliance) when sitting. The working height can be disregarded because the floor level is the decisive parameter for the worker position.

Working height	100,000 mm
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**Figure 18: Working Height**



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