

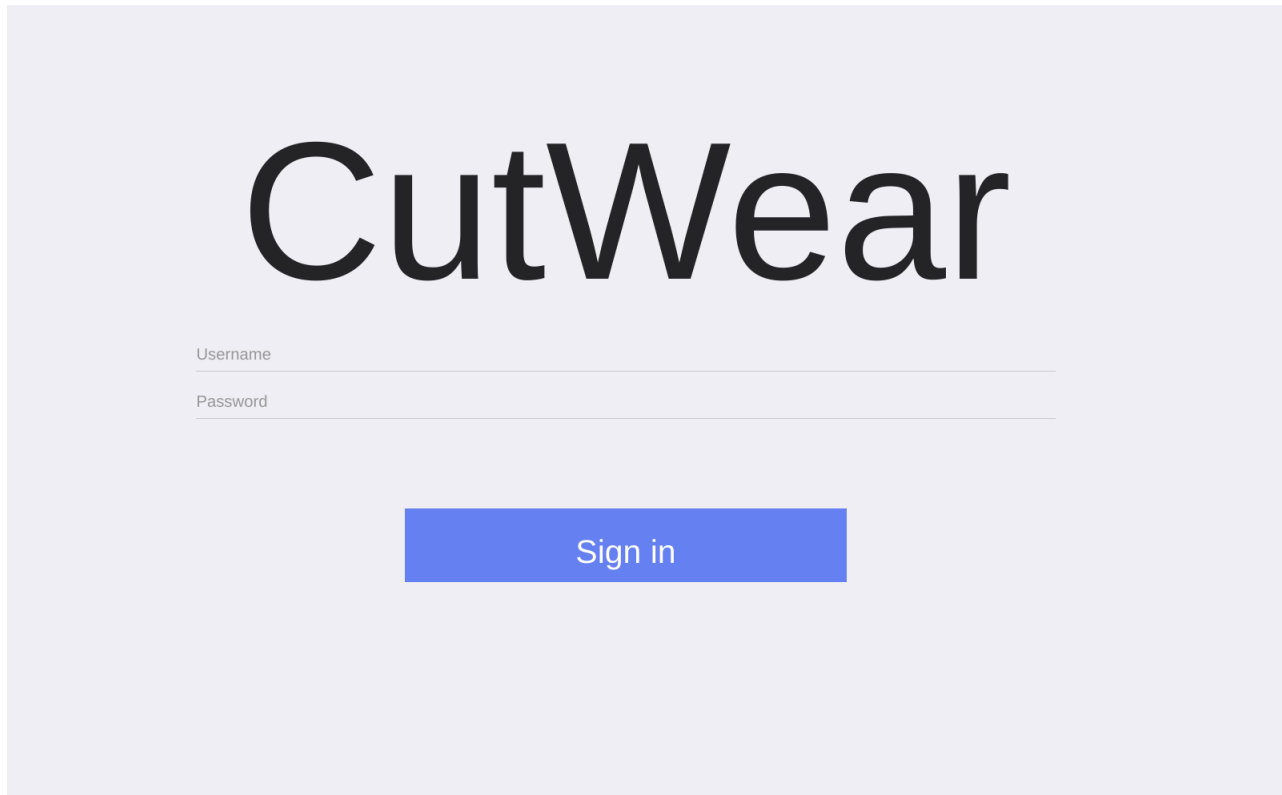
User Manual - CutWear v1.0

Explaining all features within the CutWear application

20th of May 2019

Logging in

When you start CutWear you will enter the log in screen where you will have to enter a valid username and password to get access to the application. The user you sign in with will belong to one of the four user groups, the user group your user belongs to will determine the content of the application. CutWear has four different user groups, these are TBM Inspector, Project Supervisor, Super User and Admin. The following chapters will explain the different features of the application within these user groups.

The image shows the login screen of the CutWear application. It features a light purple background. At the top, the word "CutWear" is displayed in a large, bold, black sans-serif font. Below the title, there are two input fields: the first is labeled "Username" and the second is labeled "Password", both in a small, grey font. Each label is positioned to the left of its respective input field, which is a thin horizontal line. Below these fields is a solid blue rectangular button with the text "Sign in" in white, centered within the button.

Figur 1: Login screen

If you are working on a project and need a user for the application, please contact the following based on what kind of user you need:

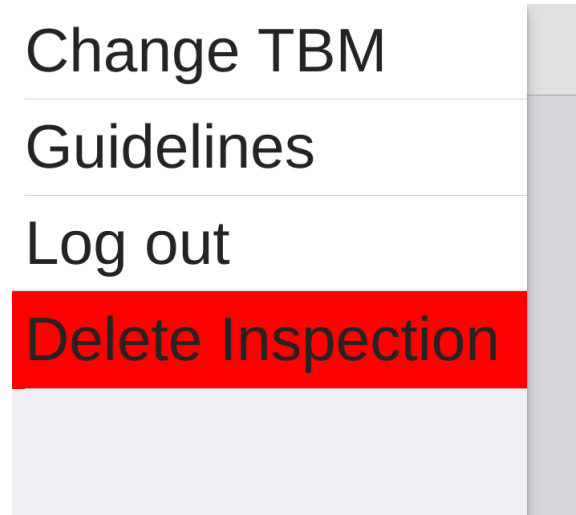
- **TBM Inspector:** Contact a Project Supervisor on your project
- **Project Supervisor:** Contact an Admin

TBM Inspector

The functionality within this user group is focused on registering data from inspections performed on a TBM. This user manual assume that the users logged in as TBM Inspectors has basic knowledge of TBM's and conduct inspections.

The toolbar menu

The toolbar of the application displays the name of the site you are on and the current time, in addition to this it has a menu which can be opened by clicking the blue icon in the top left corner of the screen.



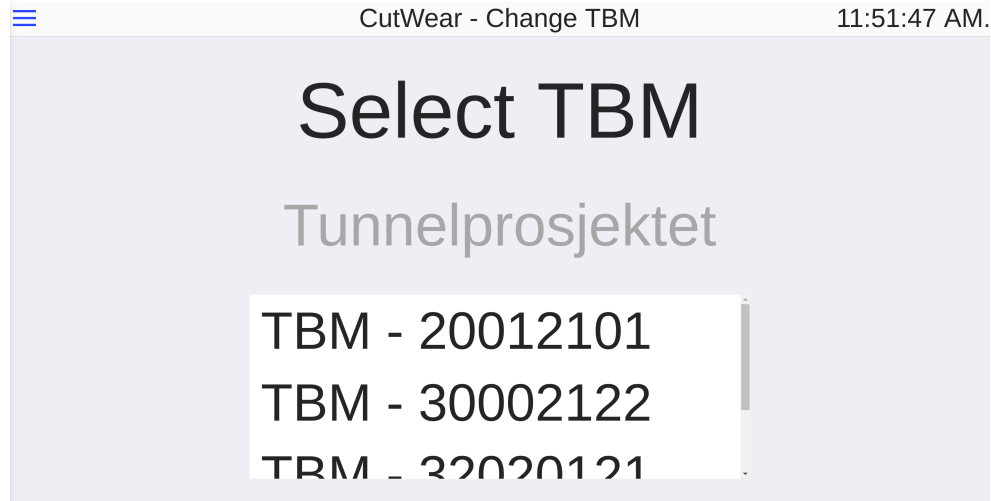
Figur 2: TBM Inspector Toolbar Menu

This menu has four four options, choosing the different options will result in:

- **Change TBM:** If you have started an inspection you will have to pause the inspection before continuing, this will save your progress. When paused, you will be redirected to the page where you can select which TBM to inspect.
- **Guidelines:** You will be redirected to a page in the application containing guidelines on how to use the application.
- **Log out:** If you have started an inspection you will have to pause the inspection before continuing, this will save your progress. When paused, you will be logged out of the application and returned to the login page.
- **Delete Inspection:** This option is used when you wish to exit the current inspection and delete all progress, you will then be redirected to the page where you select which TBM to inspect.

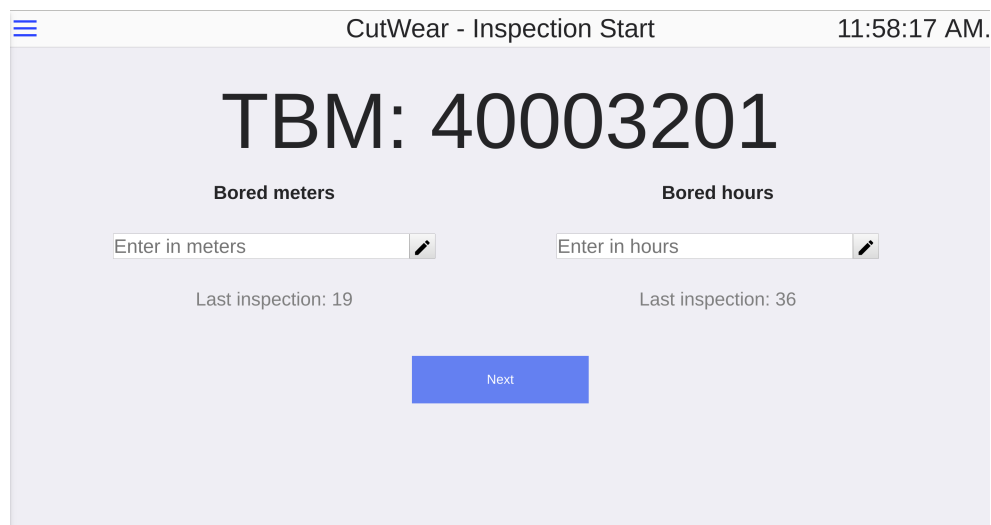
Start an inspection

When you first log in with a TBM Inspector user, you will enter the page where you need to select which TBM to inspect from a list of all the TBM's in your project. On this page the name of the project your user is connected to is displayed with a grey text above the list of TBM's.



Figur 3: The Select TBM page

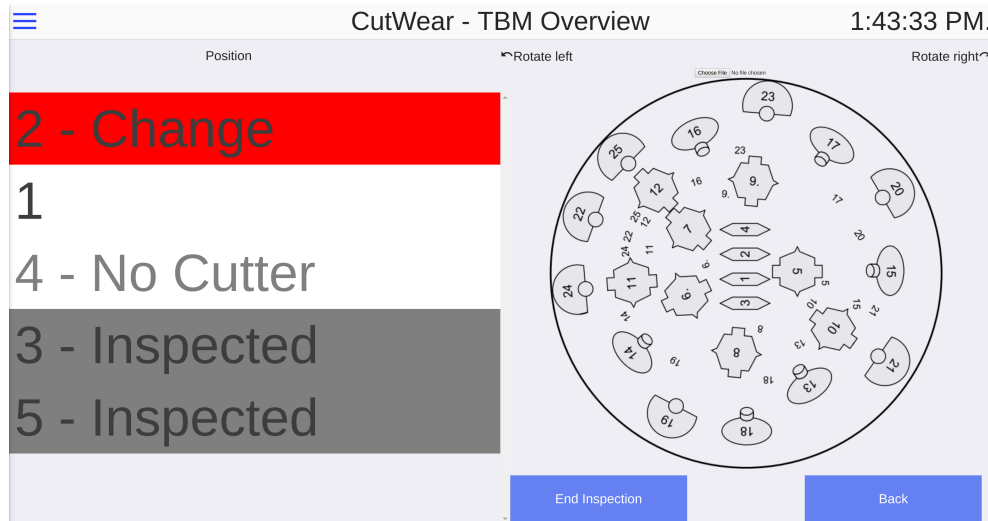
If there is a paused inspection registered on this TBM you will be notified of this before continuing. When you continue from select a TBM, you will be redirected to a page where you can register bored meters and bored hours for this inspection. The name of the selected TBM is displayed on this page, you will also get the values of bored meter and bored hours from the previous inspection.



Figur 4: The Inspection Start page

The TBM Overview page

When you have pressed next from the inspection start page, you will enter the TBM overview page. On the right side of this page you have the option to upload a picture of the different positions in the TBM, this can be used to help the inspector find the positions. Press the Choose File button to upload a photo, when uploaded you can rotate picture using the buttons above it.



Figur 5: The TBM Overview page, with picture uploaded

On the left side of the page there will be a list off all the positions in the selected TBM, the positions can have the following codes:

- **Change (red background):** It is recommended to change the cutter in this position, this is because there is registered wear the exceeds the maximum wear limit or the user has marked the cutter to be changed during the inspection. Positions with this code will be placed at the top of the list.
- **Inspected (grey background):** It is either registered cutter wear within the wear limit or registered a cutter change in this position during the inspection. Positions with this code will be placed at the bottom of the list.
- **No cutter:** There is no cutter registered in this position

To view or register data in one of the positions, select the position by pressing the number in the list. When doing this you will be redirected to the cutter inspection page for the selected position.

Register a cutter in position

If you select a position from the list in the TBM overview page and there is not registered a cutter in a position, you will be redirected to a page where you have to register the cutter located in this position before you can inspect the position/cutter. When you do this the position will no longer be marked with No Cutter in the list and you can enter the position to register inspection data.

Inspecting a cutter/position

When you have selected a position from the position list in the TBM overview page, you will be redirected to the cutter inspection page for this position. The selected position number will be displayed on the top of the page. On the right side of this page there will be information about the position selected as well as the registered cutter wear from the three previous inspections.

The screenshot shows a web interface for 'CutWear - Cutter Inspection'. At the top, there is a header bar with a hamburger menu icon on the left, the title 'CutWear - Cutter Inspection' in the center, and the time '1:28:41 PM.' on the right. Below the header, the main content area is divided into two columns. The left column has a large heading 'Position 1' and two blue buttons: 'Register cutter wear' and 'Register cutter change'. The right column has a heading 'Information' and displays 'Max cutter wear: 21' and 'Current cutter: C123'. Below this, there is a heading 'Previous wear' followed by a list of three wear records: 'Wear: 16 (2019-05-07 11:27:31)', 'Wear: 9 (2019-05-07 11:26:53)', and 'Wear: 5 (2019-05-07 11:26:09)'. At the bottom right of the page, there is a blue 'Back' button.

Figur 6: The Cutter Inspection page, position 1

When inspecting a position you will get two options on the left side of the page., choosing one of these will change the left side of the page and leave the right side unchanged.

Register cutter wear: When you want to register the wear of this cutter you press this button, you will then be redirected to the cutter wear page where you can register wear. In addition to this you can add a comment as well as mark the position for a change, marking the position will give the position the Change code in the list of positions. When finished press Save Cutter Data.

The screenshot shows a web interface for 'CutWear - Cutter Wear'. At the top, there is a header bar with a hamburger menu icon on the left, the title 'CutWear - Cutter Wear' in the center, and the time '2:15:39 PM.' on the right. Below the header, the main content area is divided into two columns. The left column has a large heading 'Position 1' and a heading 'Register wear'. Below this, there is a form with a 'Wear:' label, a text input field containing 'Enter in mm', and a small edit icon. Below the input field is a 'Comment:' label and a text input field containing 'Optional'. Below the comment field is a label 'Needs to be changed:' followed by a checkbox. At the bottom of the left column is a blue 'Save Cutter Data' button. The right column has a heading 'Information' and displays 'Max cutter wear: 21' and 'Current cutter: C123'. Below this, there is a heading 'Previous wear' followed by a list of three wear records: 'Wear: 16 (2019-05-07 11:27:31)', 'Wear: 9 (2019-05-07 11:26:53)', and 'Wear: 5 (2019-05-07 11:26:09)'. At the bottom right of the page, there is a blue 'Back' button.

Figur 7: The Cutter Wear page, position 1

Register a cutter change: When you select "Register cutter change" you will be redirected to the cutter change page. On this page you can register a cutter change, the reason for the change is selected from a dropdown menu containing a list of predetermined categories. You then enter the ID of the new cutter located in the position, if you wish you can also add a comment or register the wear of the cutter that was changed. When finished press Save Cutter Data.

Menu icon

CutWear - Cutter Change

2:16:33 PM.

Position 1

Register change

Information

Reason: **abrasive wear**

New Id:

Comment:

Wear:

[Save Cutter Data](#)

Previous wear

- Wear: 16 (2019-05-07 11:27:31)
- Wear: 9 (2019-05-07 11:26:53)
- Wear: 5 (2019-05-07 11:26:09)

[Back](#)

Figur 8: The Cutter Change page, position 1

Ending an inspection

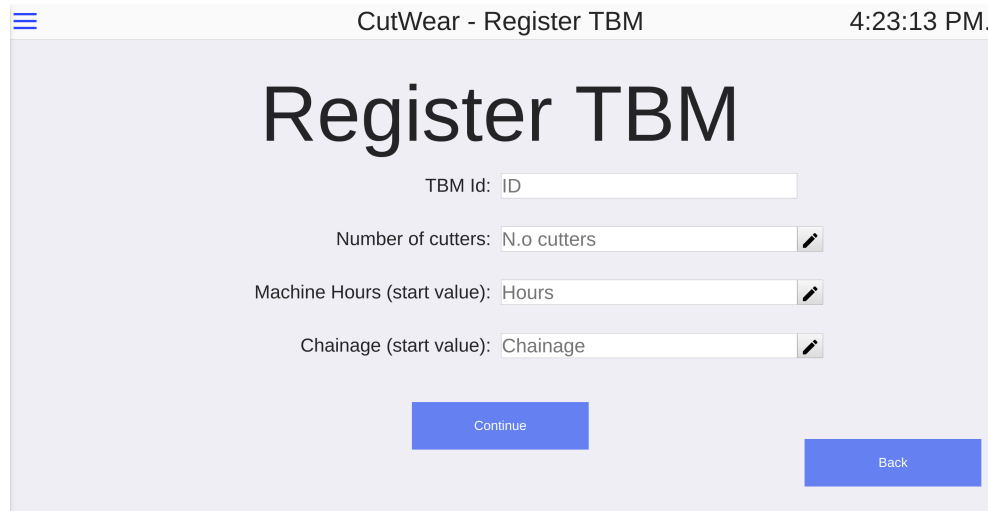
Pressing the End Inspection button in the TBM overview page will end the inspection and try to upload the inspection data to the database. If there is no internet connection the inspection data will be saved locally, as soon as the device is connected to the internet the data is uploaded. After doing this you will not be able to edit the data in this inspection. After ending the inspection the user will be logget out and you will be returned to the login page. If you do not wish to upload the data registered or pause the inspection, please follow the instructions in chapter 2.1 The toolbar menu

Project Supervisor

The functionality available in this user group is connected to managing a project and viewing the data from this project. From the main menu of the Project Supervisor page you will have four options, these will be presented below.

Register a TBM

To start registering a new TBM for the project the user you are logged in with is connected to, fill the input fields on the first page of the Register TBM pages. Then press the Continue button to go to the next page.



The screenshot shows the 'Register TBM' page in the CutWear application. The page has a light purple background. At the top, there is a header bar with a hamburger menu icon on the left, the text 'CutWear - Register TBM' in the center, and the time '4:23:13 PM.' on the right. The main heading 'Register TBM' is centered in a large, bold, black font. Below the heading, there are four input fields, each with a label and a value, and a small edit icon (pencil) to the right of the value. The fields are: 'TBM Id: ID', 'Number of cutters: N.o cutters', 'Machine Hours (start value): Hours', and 'Chainage (start value): Chainage'. At the bottom of the form, there are two blue buttons: 'Continue' on the left and 'Back' on the right.

Figur 9: Register TBM, part 1

When you have finished the first step you will be redirected to the second page where you will have to register max wear and max wear for the neighbouring positions in each position. The list will contain as many positions as you entered in page 1, if you wish to change this press Back. Note that going back will delete your progress on registering max wear. When you have entered all of the data and are ready to finish the registration, press the Finish button.

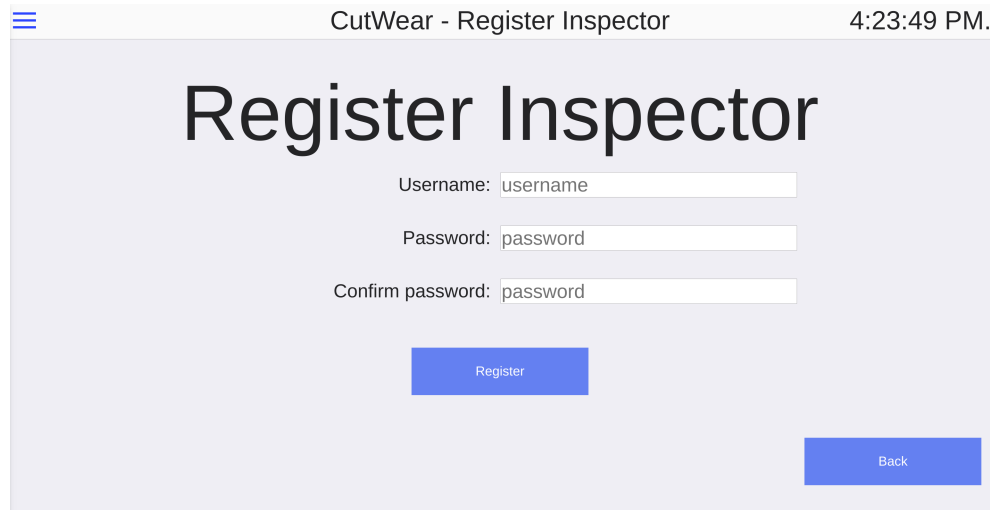


The screenshot shows the 'Register Position Details' page in the CutWear application. The page has a light purple background. At the top, there is a header bar with a hamburger menu icon on the left, the text 'CutWear - Register TBM' in the center, and the time '4:31:14 PM.' on the right. The main heading 'Register Position Details' is centered in a large, bold, black font. Below the heading, there is a table with three columns: 'Position', 'Max wear', and 'Neighbour max'. The table has four rows, each with a position number (1, 2, 3, 4) and input fields for 'Max' and 'Neighbour max'. Each input field has a small edit icon (pencil) to its right. At the bottom of the form, there are two blue buttons: 'Finish' on the left and 'Back' on the right.

Figur 10: Register TBM, part 2

Register a TBM Inspector

When a Project Supervisor need to register a new TBM Inspector user you click the Register Inspector button on the main page, you will then need to enter a valid username that is not in use and a password. Press the Register button to register the user, this user will belong to the same project as the logged in Project Supervisor.

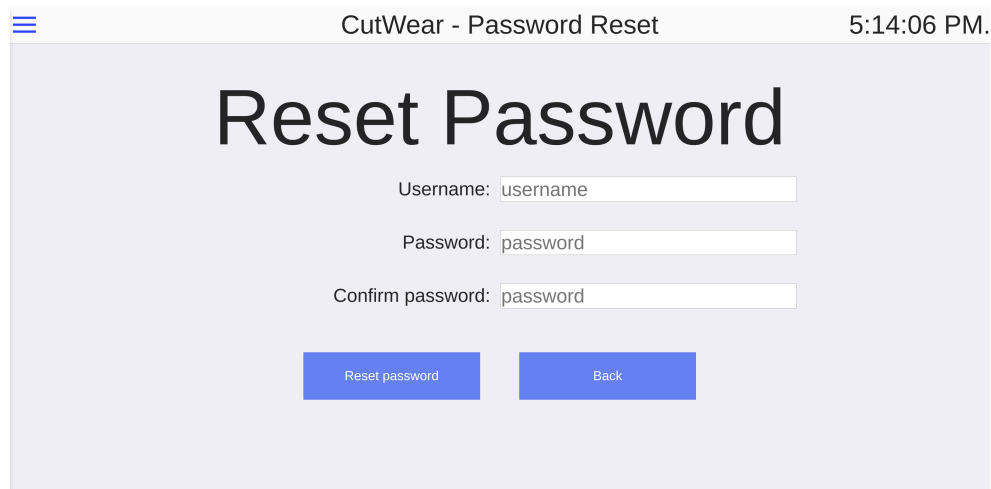


The screenshot shows a web browser window with the title 'CutWear - Register Inspector' and a timestamp of '4:23:49 PM.'. The main heading is 'Register Inspector'. Below it are three input fields: 'Username:' with the placeholder 'username', 'Password:' with the placeholder 'password', and 'Confirm password:' with the placeholder 'password'. There are two blue buttons: 'Register' centered below the input fields, and 'Back' in the bottom right corner.

Figur 11: Register TBM Inspector

Reset Inspector password

If a TBM Inspector has forgotten the password, a Project Supervisor can give him a new password. The supervisor can do this by selecting Reset Inspector Password from the main page, the user will then be redirected to a page where you need to enter the username of the TBM Inspector and the new password.



The screenshot shows a web browser window with the title 'CutWear - Password Reset' and a timestamp of '5:14:06 PM.'. The main heading is 'Reset Password'. Below it are three input fields: 'Username:' with the placeholder 'username', 'Password:' with the placeholder 'password', and 'Confirm password:' with the placeholder 'password'. There are two blue buttons: 'Reset password' centered below the input fields, and 'Back' to its right.

Figur 12: Reset Inspector Password

View TBM

The View TBM feature is used to read inspeksjon data from the TBM's in the project. When you click the View TBM button from the main page you will first be asked to select a TBM from a list of all TBM's in the project, then you will have to choose which inspection connected to the selected TBM you wish to view. When you have selected an inspection you will be redirected to a page that display the data collected from this inspection.

☰

CutWear - View TBM

8:21:25 PM.

Information

Changes

Wear

TBM: 40003201

Inspection finished: Tue May 07 2019 14:59:39

Bored meters: 36

Bored hours: 19

Number of cutter changes: 4

Position 1, reason for change: abrasive wear

Position 4, reason for change: damaged hub

Position 5, reason for change: other

Position 7, reason for change: abrasive wear

Position 1, wear registered: 19 mm

Position 3, wear registered: 12 mm

Position 4, wear registered: 48 mm

Position 5, wear registered: 23 mm

Back

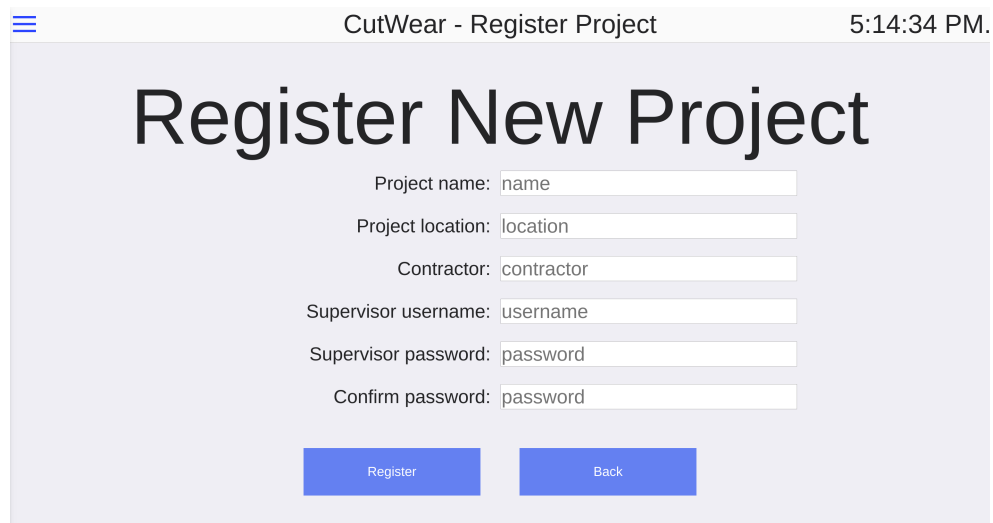
Figur 13: View TBM, Inspection Information

Admin

The Admin user group has two options which will be presented below, Registering Project and Change Supervisor Password.

Register Project

To register a project fill the input fields, this includes registering a Project Supervisor to manage the project. When you are ready to register the project with the data provided, press Register.

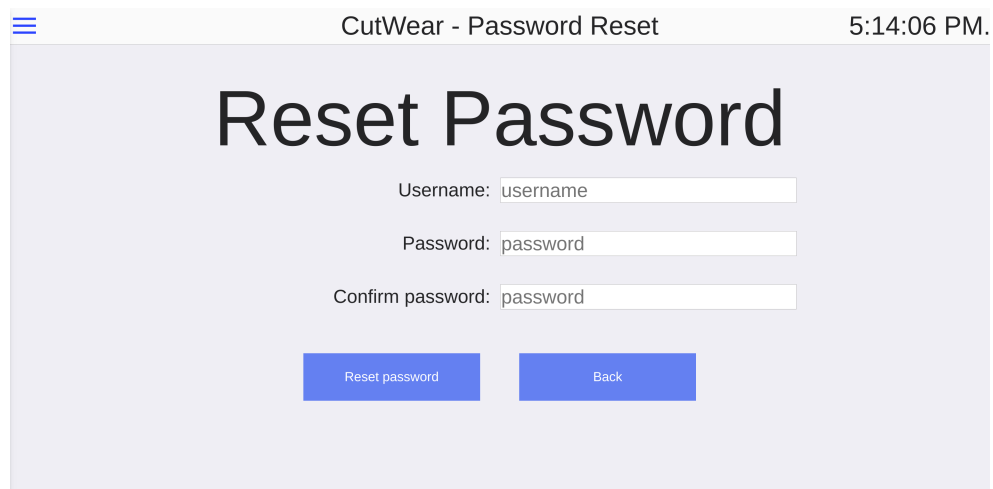


The screenshot shows a web browser window with the title 'CutWear - Register Project' and a timestamp of '5:14:34 PM.' The main heading is 'Register New Project'. Below the heading are six input fields: 'Project name: name', 'Project location: location', 'Contractor: contractor', 'Supervisor username: username', 'Supervisor password: password', and 'Confirm password: password'. At the bottom are two blue buttons: 'Register' and 'Back'.

Figur 14: Register Project

Reset Supervisor password

If a Project Supervisor has forgotten the password, an Admin can give him a new password. The Admin can do this by selecting Reset Supervisor Password from the main page, the user will then be redirected to a page where you need to enter the username of the Project Supervisor and the new password.

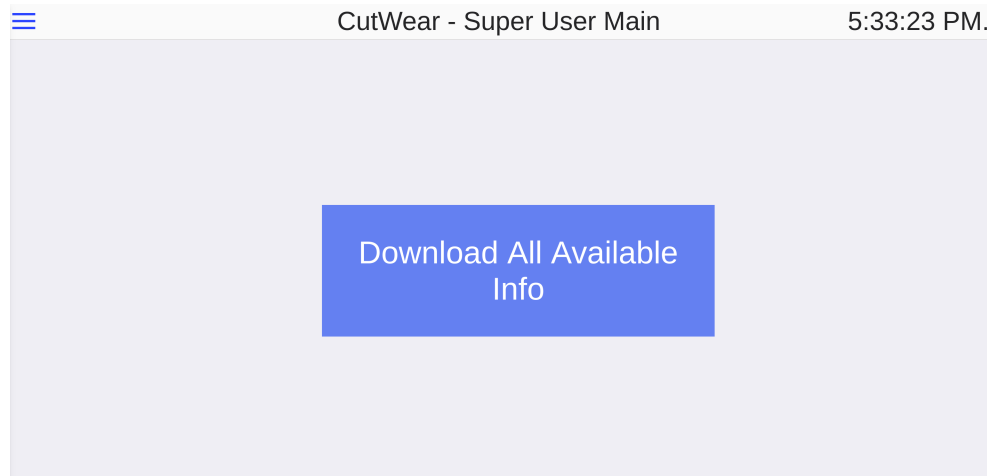


The screenshot shows a web browser window with the title 'CutWear - Password Reset' and a timestamp of '5:14:06 PM.' The main heading is 'Reset Password'. Below the heading are three input fields: 'Username: username', 'Password: password', and 'Confirm password: password'. At the bottom are two blue buttons: 'Reset password' and 'Back'.

Figur 15: Reset Inspector Password

Super User

This user group has only one function and that is to download all the inspection data in all projects from the database, these information will be stored in the info.json file located in the directory where the program is installed. This is a JavaScript Object Notation file and can be opened in programs like Excel.



Figur 16: Super User Page

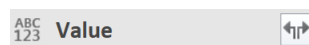
To open the info.json file in Excel, follow this tutorial by Microsoft (Note: this is for Windows only): <https://support.office.com/en-ie/article/connect-to-a-json-file-f65207ab-d957-4bf0-bec3-a08bb53cd4c0>. If you follow this tutorial you will open **Power Query**, then follow these instructions:

1. Press the **Convert to table** button.
2. Then you can extend the table to view the desired data by clicking this icon on the top of the column.



Figur 17: Convert to table button

3. Then you have to press **Extend to more rows**



Figur 18: Extend table button

4. Then click the same icon as in the second step.
5. Then you can choose the values you want to add to the table.
6. Repeat the steps above until you are satisfied with the data in the table. We recommend that you extract changes and wear in two separate tables.
7. At last press the **Close and Load** to import it into Excel. You are now done.



Figur 19: Close and load button