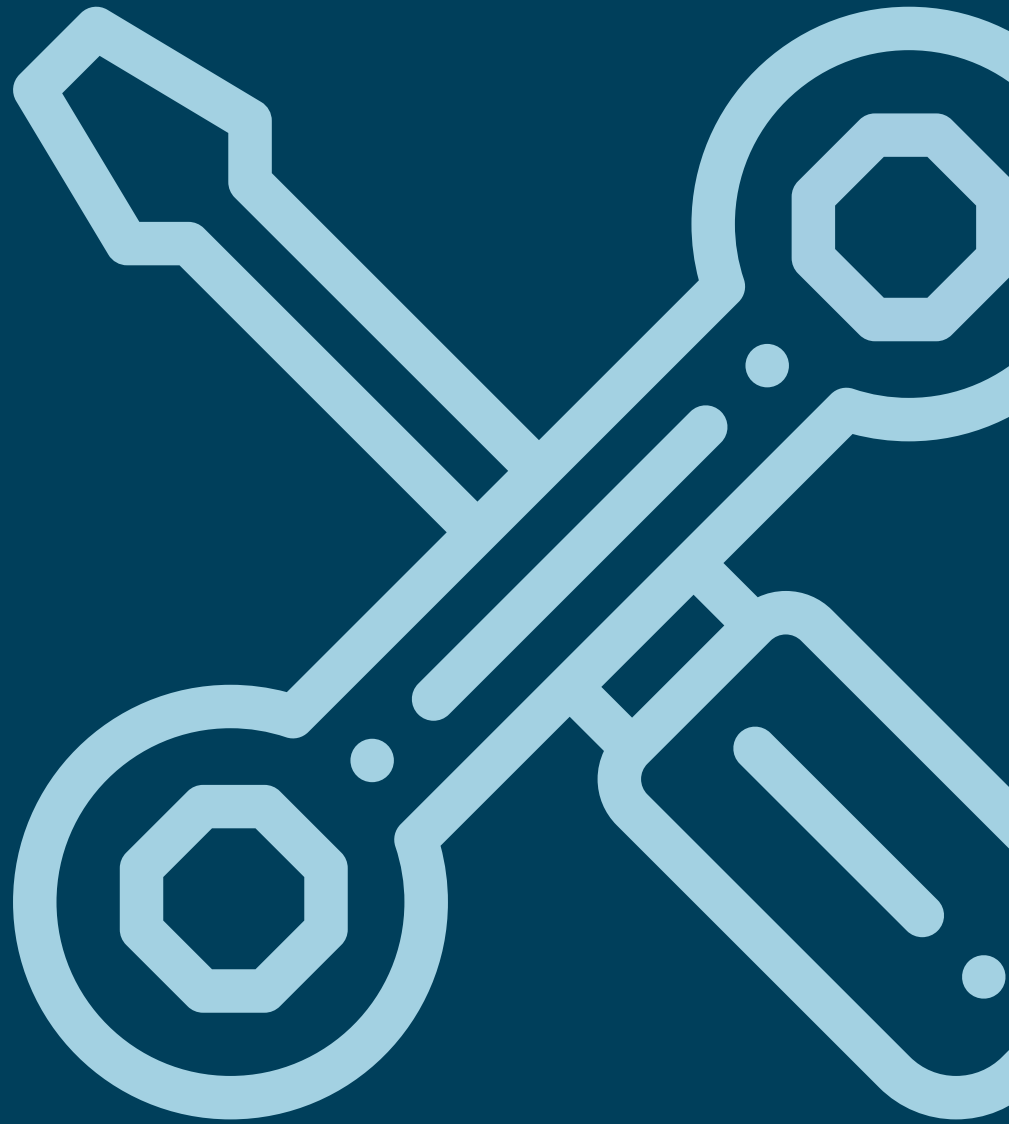


BOLT
✓-CHECK



Operation Manual

Bolt-Check BoltTrack

R&D Test Systems A/S

Rev. date. 12-12-2024

Name: Bolt-Check BoltTrack Manual			
Date: 12-12-2024	Rev.: 01	Document no: 0001-415-MAN	

Contents

1	Document Revision Table	3
2	Introduction.....	3
2.1	Purpose	3
2.2	Customer support	3
2.3	Disclaimer	4
2.4	Scope.....	4
3	Getting Started	5
3.1	New User.....	5
3.2	Navigation.....	5
3.2.1	Dashboard	5
3.2.2	Your Sites.....	6
3.3	Viewing Data.....	6
4	Data Editing.....	7
5	Admin Features.....	8
5.1	Users.....	8
5.1.1	Edit Users.....	8
5.1.2	Edit Roles	9
5.2	Sites	10
5.3	Maintenance.....	11
6	References	12

Name: Bolt-Check BoltTrack Manual			
Date: 12-12-2024	Rev.: 01	Document no: 0001-415-MAN	

1 Document Revision Table

Rev. no.:	Rev. Date:	Change:	Responsible
01	12-12-2024	First edition	JAS

2 Introduction

2.1 Purpose

The purpose of this manual is to describe the usability of the Bolt-Check BoltTrack and secure safe and correct use of the platform.

BoltTrack is a web interface serving as a management platform to evaluate data, change targets, spring constants, and manage roles or sites.

2.2 Customer support

R&D maintains a customer support, capable of assistance regarding questions not covered in this operation manual. Customer support can be reached via the following contact information.

Customer support
<p>R&D Test Systems A/S Sigma 3 8382 Hinnerup Denmark Mail: service@rdas.dk Phone: +45 28 51 89 50</p>

Name: Bolt-Check BoltTrack Manual			
Date: 12-12-2024	Rev.: 01	Document no: 0001-415-MAN	

2.3 Disclaimer

This manual should be read and understood prior to use. Lack of understanding can lead to wrong creation or editing of data, resulting in false analysis of elongation data.

This manual only covers the Bolt-Check BoltTrack.

To download additional manuals in relation to Bolt-Check components, browse to:

<https://rdtestsystems.com/bolt-check/manuals/>

2.4 Scope

The Bolt-Check BoltTrack is, amongst other things, designed to:

- Present elongation measurements performed with a Bolt-Check devices
- Provide access to the measurements
- Define or change joint specific acceptance criteria and material constants
- Administrate users
- Provide a backup of the data

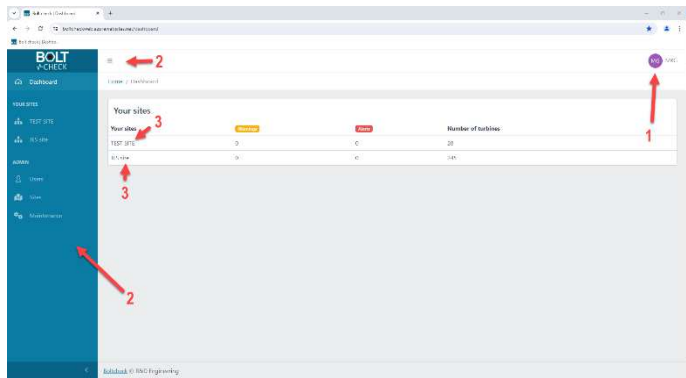
3 Getting Started

3.1 New User

To create a new user, contact your company administrator. User credentials consist of an e-mail and a password. Passwords can be temporary and later reset to a personal password by the new user.

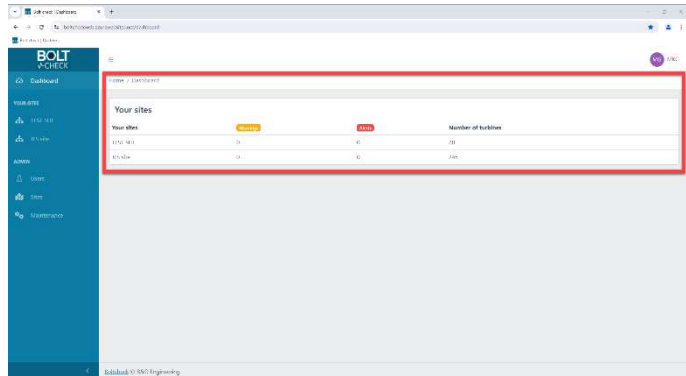
3.2 Navigation

- Top right corner the user logged in is shown. (1)
- Top left corner besides Bolt-Check logo contains access to: (2)
 - Dashboard
 - Your Sites
 - Admin
- "Your sites" can be navigated from "Dashboard". (3)



3.2.1 Dashboard

- From "Dashboard" there is an overview of all "Your Sites", if any warnings or alerts are present, these will be displayed here. Contains number of total turbines on every site.

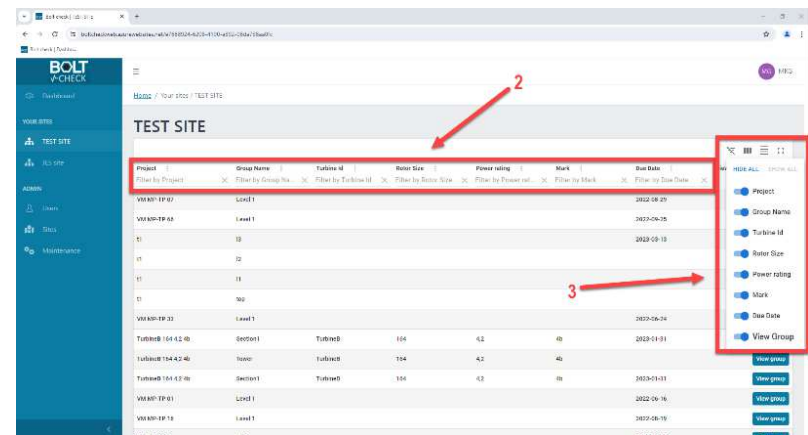
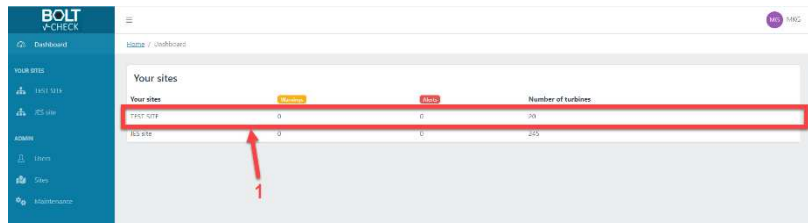


Your sites	Warnings	Alerts	Number of turbines
TEST SITE	0	0	20
JES site	0	0	245

3.2.2 Your Sites

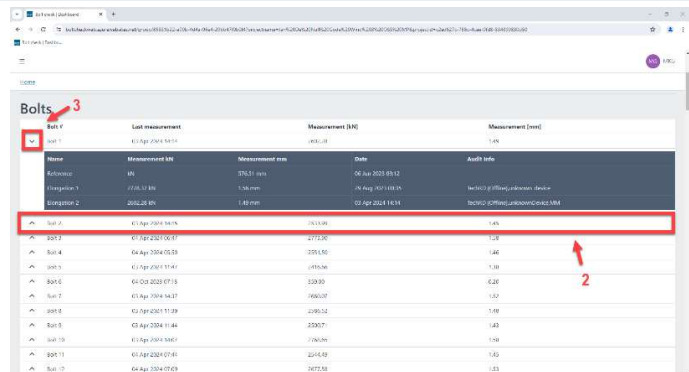
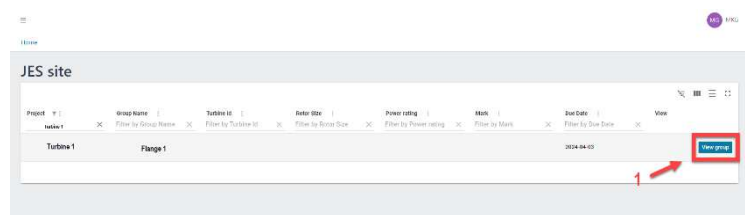
To access a site:

- Press on the desired "Site". (1)
- Filters make for easy search on the desired specifications: (2)
 - Project
 - Group Name
 - Turbine ID
 - Rotor Size
 - Power Rating
 - Mark
 - Due Date
- On the right-hand side of the filters, there are different options to sort how to view such as: (3)
 - Show/Hide filters
 - Show/Hide columns
 - Under "Show/Hide columns" there is an option to select which column to hide.
 - Toggle density
 - Toggle full screen



3.3 Viewing Data

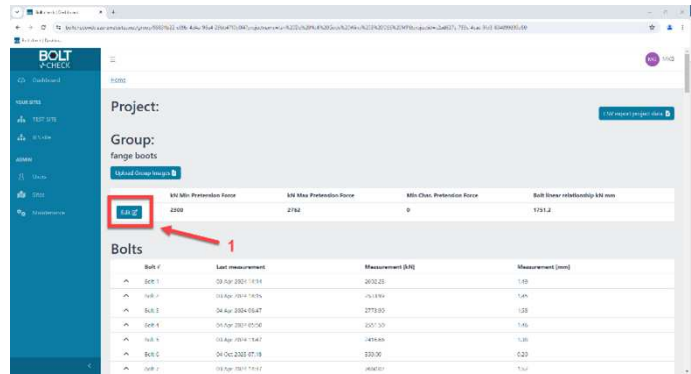
- Find the desired project and press on "View Group". (1)
- From here there's an overview over all bolts in project.
- The overview shows: (2)
 - Last measurement (Day/Month/Year)
 - Measurement [kN] (Current)
 - Measurement [mm] (Current)
- Press the arrow (3) to get more details on performed measurements.



4 Data Editing

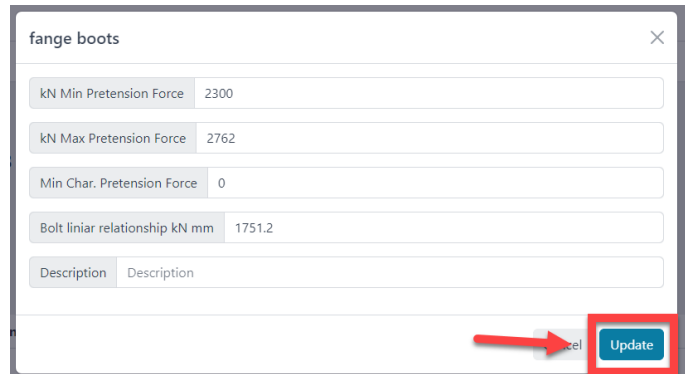
For making the first data or editing:

- Go to the desired project and press "Edit" (1)
- From there a window opens with options to set:
 - kN Min Pre-tension Force
 - kN Max Pre-tension Force
 - Min Char. Pre-tension Force
 - Bolt linear relationship [kN/mm]
 - Description
- When everything is set to the desired specifications press "Update"
- In top right corner there is an option to export projects data as a CSV file for excel.



	kN Min Pretension Force	kN Max Pretension Force	Min Char. Pretension Force	Bolt linear relationship kN mm
Edit	2300	2762	0	1751.2

Bolt #	Last measurement	Measurement [kN]	Measurement [mm]
Bolt 1	28-Sep-2020 12:31	2632.02	1.62
Bolt 2	18-Aug-2016 14:56	1518.91	1.48
Bolt 3	24-Aug-2024 05:47	2779.93	1.58
Bolt 4	24-Sep-2021 05:58	2007.33	1.46
Bolt 5	18-Apr-2014 15:47	1424.68	1.36
Bolt 6	24-Dec-2022 07:18	133.36	0.23
Bolt 7	18-Sep-2017 14:12	4562.91	1.67



fange boots ✕

kN Min Pretension Force

kN Max Pretension Force

Min Char. Pretension Force

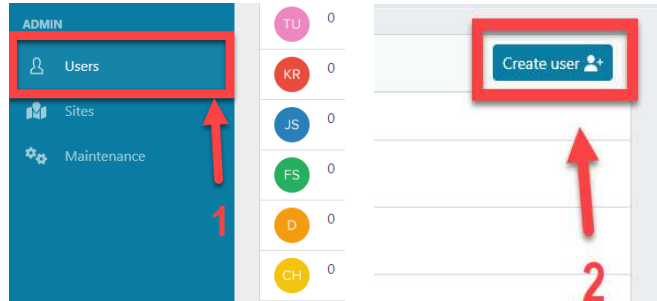
Bolt linear relationship kN mm

Description

5 Admin Features

5.1 Users

- Pressing on “Users” gives an overview over all users. (1)
- From here the option to “Create user” is located. (2)
- After pressing “Create user” a window will appear with boxes to fill out: (3)
 - Name
 - Username
 - Email
 - Password
 (Can be reset later)
 - Select Roles
 (Can be changed later)
- Press “Create” to finish new user creation



Create User [X]

Name

User Name

Email

Password

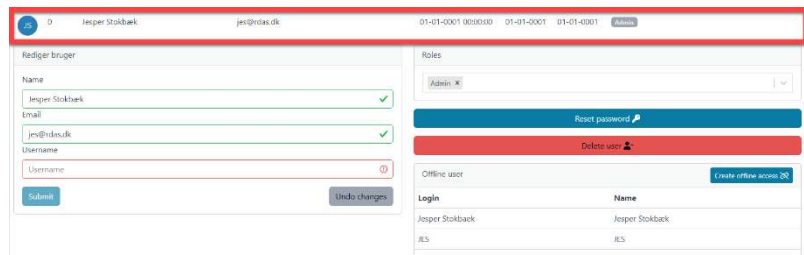
Password

Select Roles

Create [Reset form] [Close Create]

5.1.1 Edit Users

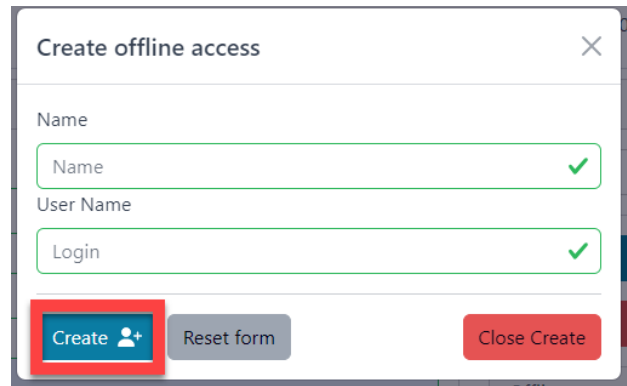
- By pressing on the user needing to be edited, a menu will appear. Details to change:
 - Name
 - Email
 - Username
 - Roles
 Go to “5.1.2 Edit Roles” for more.
 - Reset password
 - Delete user
 - Create offline access
- Press “Reset password” and follow the instruction, type (reset) press “Reset”.
- After an email with reset password link, will be sent to the person’s email.



Reset password [X]

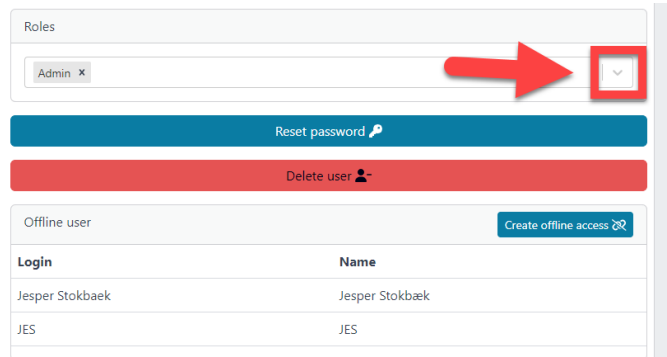
Confirm Reset - Type (reset)

- To create offline access press on "Create offline access" type name and username and press "Create".
- To delete user the same method as "Reset password" is used. Press "Delete user" and type (delete) press "Delete".



5.1.2 Edit Roles

- Press the highlighted arrow to get a menu with the roles. Now select the specific role to assign them, this step needs to be repeated if more than one role is required.
- **Admin**
 - Admin rights to all existing sites, and/or created by themselves
 - Can give access to other admins to their sites (and assign to role below in hierarchy)
- **Back-office engineer (product manager etc.)**
 - Must be given site access by higher role in hierarchy
 - Can not assign site access to anyone
- **Measurement Manager**
 - Must be given site access by higher role in hierarchy
 - Can assign site access to techs (lower in hierarchy)
- **Tech**
 - Must be given site access by higher role in hierarchy



Login	Name
Jesper Stokbaek	Jesper Stokbaek
JES	JES

Role	BC Standard		BC Cloud		
	Use BC Standard	View sites	Assign user to a site	Create new site	Create new users
Admin	X	X	X	X	X
Measurement Manager	X	X	X		
Back Office Engineer	X	X			
Tech	X				

5.2 Sites

From here there is an overview over all sites assigned to the user. The list includes:

- Name of the sites
- Users on the sites

- To create a new site, press "Create site". (1)

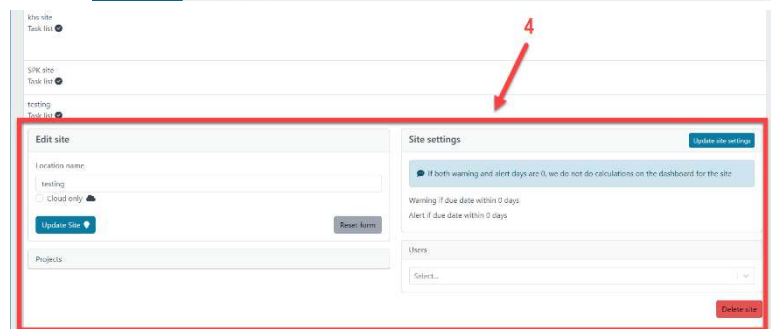
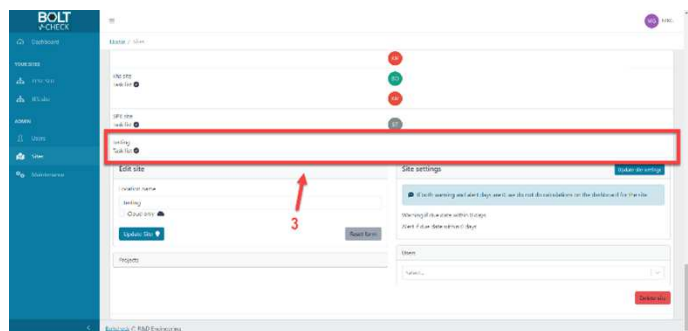
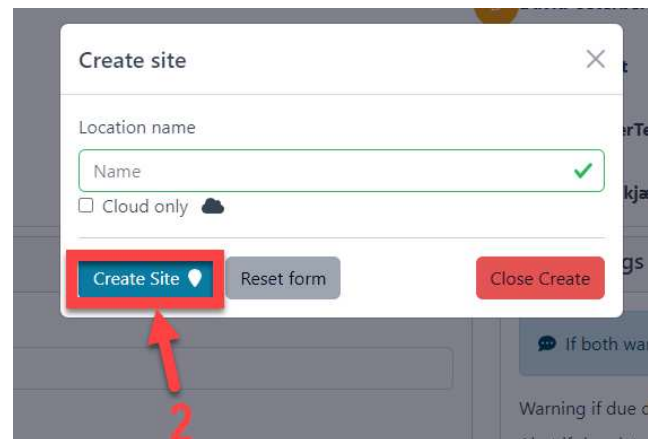
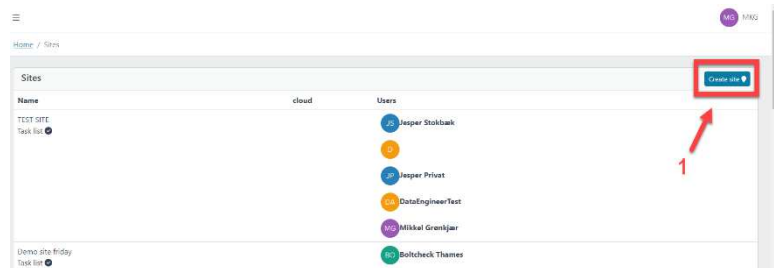
- Type the site name and press "Create site". If the box "Cloud only" is pressed, the site cannot be synced down onto Bolt-check standard. (2)

"Cloud only" can be put on or taken off later.

- The new site will appear in the bottom of the list of sites.
- Press on the site as shown in the picture. (3)
- A menu will appear, from here "Cloud only" can be put on or off. Site settings can be put on to give warnings and alerts.

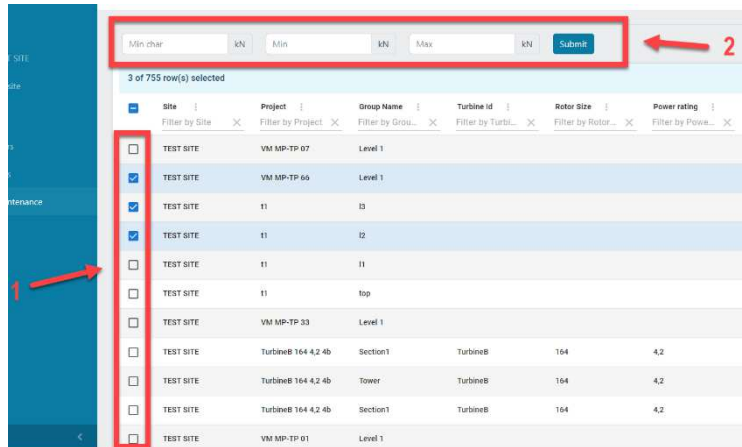
Users can also be assigned to the site from here. (4)

- If site needs to be deleted, press "Delete site" a window will appear. type "delete" and press on delete.



5.3 Maintenance

- Type in sites, projects, etc. to sort the list of flanges available for selection
- Press and select desired site/project/group (1)
- Set: (2)
 - Min char [kN]
 - Min [kN]
 - Max [kN]
 This is used for easy mass setting
- "Min Pre-tension Force" can be set after the specific task. Minimum Pre-tension Force is set to know when to retighten.
- "Max Pre-tension Force" can also be set after the specific task. Maximum Pre-tension Force is set to know when somethings wrong.
- "Min Char. Pre-tension Force".
 - $\mu - Kn \cdot \sigma$
 - μ : Mean of sample
 - Kn : Coefficient from table
 - σ : Sample standard deviation



Characteristic Pretension

$$\mu - k_n \cdot \sigma$$

where:

- μ : mean of sample
- k_n : coefficient from Table 13-1
- σ : sample standard deviation
- n : number of measurements in sample

n	3	4	5	6	8	10	20	30	∞
k_n	3.37	2.63	2.33	2.18	2.00	1.92	1.76	1.73	1.64

Table 13-1: Value for the k_n for the 5% characteristic value, based on EN 1990:2002+A1:2005 (E).

For values of n not available in Table 13-1, the following approach can be used for obtaining k_n , depending on n value of interest:

- for $3 < n < 30$:

$$k_n = \frac{(n_2 - n)}{(n_2 - n_1)} \cdot k_{n1} + \frac{(n - n_1)}{(n_2 - n_1)} \cdot k_{n2}$$

Corresponding to a linear interpolation using the following values from Table 13-1:

- n_2 : n value closest to and immediately higher than n
- n_1 : n value closest to and immediately lower than n
- k_{n2} : k_n value correspondent to n_2
- k_{n1} : k_n value correspondent to n_1

- for $n > 30$: $k_n = k_{30}$.

Name: Bolt-Check BoltTrack Manual			
Date: 12-12-2024	Rev.: 01	Document no: 0001-415-MAN	

6 References

Ref [1] 0001-407-MAN-Bolt-Check 3 Operation Manual rev. 01