

FSMMD Ultra Smart

Ergonomic. Efficient. Reliable.





Intelligent, carefully considered solutions for people and industry.

For more than 100 years, Spohn + Burkhardt has been developing and producing joysticks, control stations and resistors in the Swabian town of Blaubeuren, for use at ports, in construction machinery, cranes, on the railways and in industry.

Now operating from five locations within Germany, and with its own subsidiaries in China, India and the Netherlands, Spohn + Burkhardt is currently the only company in the world to offer a complete system including the cab, control station and joystick as a plug-and-play solution. Simplicity, efficiency and cost savings for your business.

Our extensive range of products promises maximum comfort and the perfect prerequisites for a healthy, ergonomic workstation. We rely on maximum quality throughout our product range, with the guarantee: 'Made and Engineered in Germany'.

'Innovative technology needs to support people – not the other way round!'

Thomas Hahn, CTO, Spohn + Burkhardt

The new standard for multi-shift operation: the FSMMD Ultra Smart from Spohn + Burkhardt.

The FSMMD Ultra Smart is the innovative control station solution for the most challenging applications in production, logistics and heavy industry. With its carefully considered ergonomics and extensive personalised setting options, the FSMMD Ultra Smart is the perfect control station for the everyday challenges in industry.

Memory function:

Personalise the seat settings for **numerous operators** without storage limit.

- 01 Rotatable control station
- 02 Seat horizontal adjustment
- 03 Height and tilt adjustments of upper seat with side consoles
- 04 Backrest adjustment
- 05 Seat pad length adjustment
- 06 Side console horizontal adjustment
- 07 Side console to seat height adjustment
- 08 Side console tilt adjustment
- 09 Side console pivotable
- 10 Adjustable footrest tilt and height
- 11 Pivoting bull horns
- 12 Adjustable armrests
- 13 Headset height and inclinable

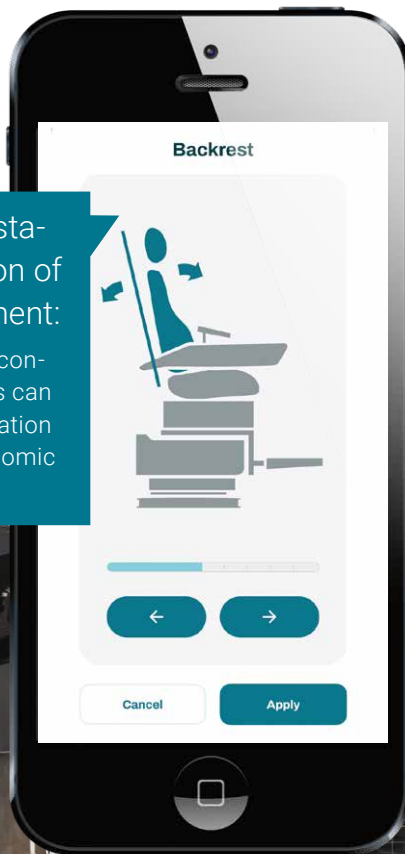


Countless smart details for a common goal – ergonomically healthy working.

Control stations are where the demanding work of a crane is done – sometimes while seated, sometimes standing, and often by more than one person at the same workstation. The FSMMD Ultra Smart from Spohn + Burkhardt supports its users with intelligent solutions for personalised adjustment functions, for efficient working.

A healthy workstation is a question of perfect adjustment:

with intelligent app control, crane operators can restore their workstation to the perfect ergonomic adjustment.



Individual adjustment and memory options with memory function

The individual adjustment and memory functions of the FSMMD Ultra Smart create the best prerequisites for:

- **Efficiency and time saving**, thanks to **high-speed loading of personalised profile settings** (memory function)
- **Ergonomic safety**, by retrieving the correct, stored settings for each user



Smart app control for simple and efficient work

A healthy working environment at the press of a button: the app allows personalised adjustment data to be fully restored.

- Quick and easy operation
- Precise adjustment options
- User-defined memory function



All-round support with our remote service

Rapid troubleshooting and direct service for seamless operational workflows.

- Online fault analysis
- Online program adjustments and settings

Work better efficiently – ten years of reliability and tried-and-tested quality

As an intelligently and carefully considered control station, and the first model of its kind on the market, over a period of ten years the FSMMD Ultra Smart has become the ultimate capable solution for the complex challenges of work in industry.

With its numerous adjustment options and ergonomic details, the FSMMD Ultra Smart represents a considerable competitive advantage over the other control stations available on the market.



Flexible adjustment to individual tasks and needs

- Wide range of adjustment options
- Healthy working while standing
- Easy position changing
- Memory function for numerous operators without storage limit.
- Ideal for eight-hour / three-shift operation thanks to the memory function



Apple



Google Play

Download the app today and start enjoying all the benefits of the FSMMD Ultra Smart.

'I am so happy.'

SUEZ crane operator | Paris

Ergonomics, efficiency and reliability were the determinative criteria for SUEZ in Paris when deciding which crane control station to choose.

With its numerous electrical adjustment options to allow individual operators to work both while seated and standing, the innovative FSMMD Ultra Smart control station from Spohn + Burkhardt impressed employees at the waste incineration facility in Argenteuil.

We are delighted that SUEZ Paris chose us as a partner for the ergonomic and healthy configuration of workstations for its employees.

That way you can meet the highest requirements of a **healthy workstation**.

A healthy, comfortable, correct posture while working is essential for the health of employees and for ensuring consistently positive performance and reduced downtime.

Nowhere is this more true than at demanding workstations such as control stations. An ergonomically comfortable position while working is crucial to ensuring maximum concentration and fatigue-free performance while at work.

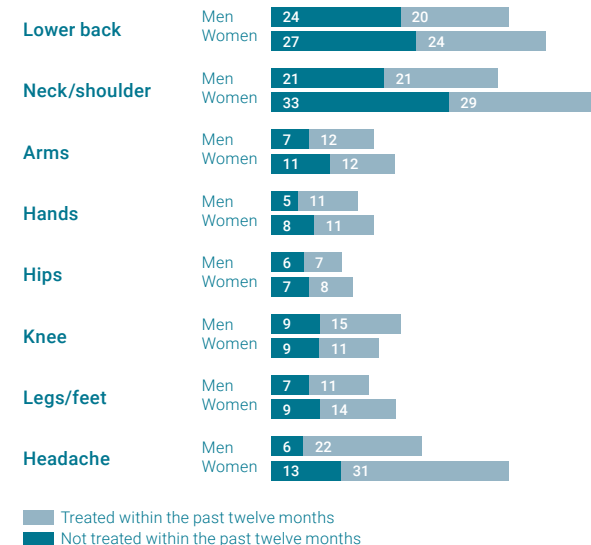
Poor posture, excess strain on certain muscular and skeletal areas and lack of changes of position are often the cause for physical complaints and an impaired ability to work.

This can lead to repeated illness and painful strain in the workplace. If sustained, this can have significant consequences for the health of employees, and for the company as a whole.

Facts, figures and statistics on occupational health

- ▶ **2000 hrs**
spent working in a seated position every year¹
- ▶ **\$22.30 billion**
in production downtime costs every year due to musculoskeletal system complaints²
- ▶ **27.3 days**
of incapacity for work every year taken by crane operators³
- ▶ **1.5 million days lost/year**
that, according to a study by KKH, can be attributed to diagnosed musculoskeletal complaints⁴

Frequency of physical pain when working predominantly in a seated position:⁵



¹ Based on the following calculation of annual working time for work carried out primarily in a seated position: 50 wks/year x 40 hrs /wk = 2,000 hrs/year

² BAuA Bundesanstalt für Arbeitsschutz und Arbeitsmedizin – Volkswirtschaftliche Kosten durch Arbeitsunfähigkeit 2021; www.baua.de

³ de.statista.com/statistik/daten/studie/492294/umfrage/au-tage-von-aok-mitgliedern-nach-berufsgruppen-mit-hohen-fehlzeiten

⁴ www.kkh.de/presse/pressemitteilungen/ruecken

⁵ BAuA (Federal Institute for Occupational Safety and Health) – The Changing World of Work 2021



Ergonomically healthy work in any position.

Avoiding one-sided strain, especially when working in a primarily seated position, helps to prevent muscular fatigue and tension. The FSMMD Ultra Smart provides the opportunity for easy position changes and offers a range of smart adjustment options to support a healthy posture while working at a control station.



Seated, upright, clear view

Seated, leaning forwards, looking downwards

Visibility (monitor), seated, upright



Reachability, seated, upright: Touchscreen, buttons

Seated, leaning backwards, looking upwards

Standing, clear view



Good reachability and intuitive operation: the ergonomic arrangement and design of the joystick and side console minimise strain in the wrist joint.

Optimal visibility in any working position: adjustable sideconsole ensure optimal visibility of all screen content while at the same time reducing strain on the head/eye motor function.

Workplace analysis by TU Dresden

At Spohn + Burkhardt, we work hard to constantly evolve our products and their technology, so that they are even more user-friendly, efficient and comfortable for our customers.

To ensure thorough testing of the FSMMD Ultra Smart control station and the highly complex ergonomic requirements, we joined forces with TU Dresden to evaluate the situation in the workplace.

The work carried out by employees was monitored and recorded over several hours for a subsequent extensive study to allow us to draw conclusions about a typical shift using the FSMMD Ultra Smart.

► Result of the observations:

- Activities with the FSMMD Ultra Smart are frequently (approx. 40 % of working time) carried out while seated upright.
 - Visual targets (such as the crane's waste grabber) are frequently a long way below (30-40%) or above (20-30%) the operator.
 - In those cases, the operator must lean a long way forwards or backwards in the FSMMD Ultra Smart.
- The FSMMD Ultra Smart offers a range of adjustment options for the complex working conditions of a control station, to ensure ergonomically correct working in almost any position.

Competent research for healthy working: ergonomics studies by TU Dresden

Product optimisation and continued development are a key focus at Spohn + Burkhardt. In cooperation with TU Dresden we initiated an extensive study to test and analyse the ergonomic requirements of the FSMMD Ultra Smart in everyday working conditions.

This included a comprehensive study of ergonomics, biomechanics and usability. The results were combined and documented with additional findings from strain tests and

concrete user surveys. By using the outcoming results from the observations and user surveys, typical scenarios in everyday work could be simulated in digital models.

The objective is to be able to identify and deduce poor working posture early on so that resulting physical strain can be prevented with the aid of the adjustment options on the FSMMD Ultra Smart.



Extensive ergonomic tests and analysis in three areas:

1. Activity analysis



- Experience reports, interviews, meetings
- Video analyses of typical activities, visual requirements, body posture and working time

2. Digital analysis



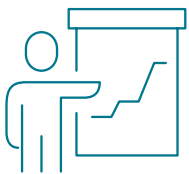
- Studies carried out on CAD using the 'CharAT Ergonomics' digital human model with integrated ergo-typing tools to check suitability for different user groups

3. Biomechanics and usability tests



- Biomechanics analysis with volunteer studies to measure the strain on muscles using a motion capture system with XSens and real-time evaluation in typical body postures

Result of the study and recommendation



- ▶ The review with the DHM (Digital Human Model) has shown that the control station is sized and designed for a global group of users.
- ▶ The results of the study confirm the numerous ergonomic benefits of the FSMMD Ultra Smart.
- ▶ The FSMMD Ultra Smart can be used both while seated and standing. Changing to a standing position is recommended.
- ▶ Regular changes of movement help to reduce the risk of musculoskeletal complaints.
- ▶ Spohn + Burkhardt offers a guide to sitting ergonomically to accompany the FSMMD Ultra Smart.



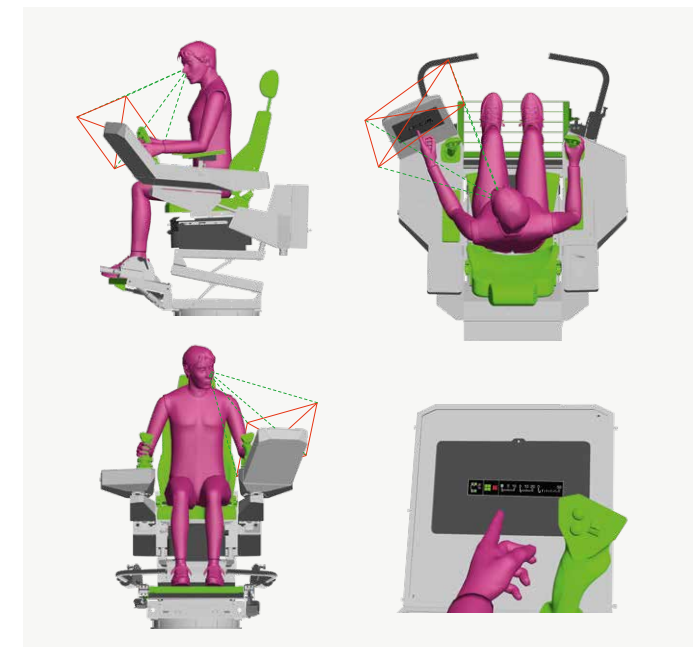
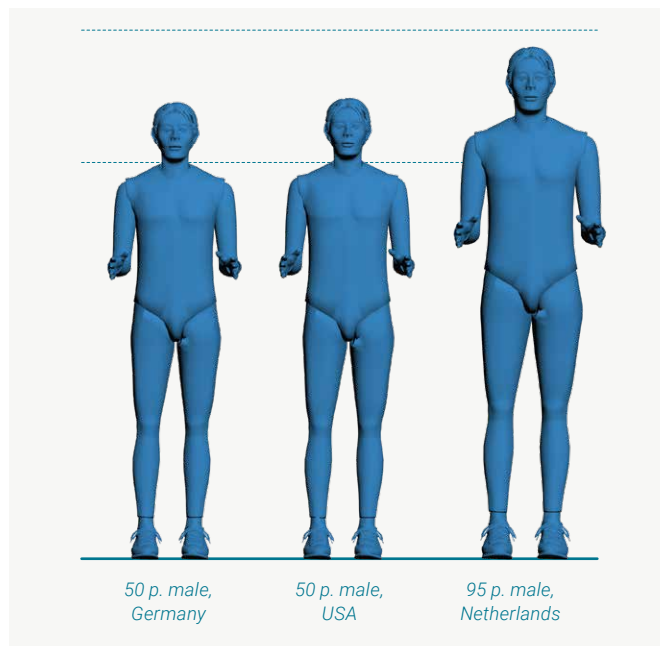
Under the microscope: **Highest demands on different groups of users**

The individual demands on different users with varying body sizes while working are extremely high. A state-of-the-art, intelligently considered control station must satisfy a wide range of ergonomic preconditions for every individual to be able to ensure consistently healthy working.

Maintaining the correct distance to important controls and the right ergonomics when it comes to seat, arm and back-rest surfaces are essential to ergonomically healthy working in a control station.

Thorough analyses of the ergonomics and usability of the FSMMD Ultra Smart were carried out with consideration of the high demands on different groups.

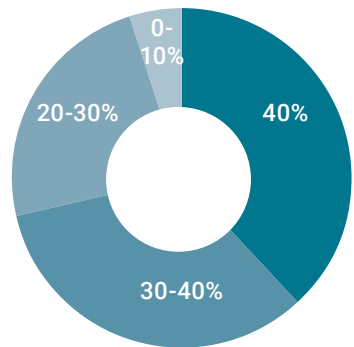
Region, gender	Percentile	Age	Size	Data source
Germany, male	50	18-65 y	1750 mm	DIN 33402-2 Germany
USA, male	50	18-65 y	1766 mm	ISO 7250-2 USA
Netherlands, male	95	18-65 y	1961 mm	ISO 7250-2 Netherlands



The detailed studies, results and evaluations can be downloaded here as a PDF.

Clear findings from activity analyses for work carried out while seated and standing.

The new FSMMD Ultra Smart from Spohn + Burkhardt meets the requirements of a state-of-the-art, ergonomically optimised control station. Carefully considered equipment features and state-of-the-art technologies that allow the operator to perform ergonomically healthy work while seated and standing impress a wide variety of different users in everyday work.



Average working positions used:

- Seated, upright
- Seated, leaning forwards
- Seated, leaning backwards
- Standing

► Result of the observations:

The evaluation showed that only 10% of the work performed is in a standing position.



Very frequently ~ 40%



Frequently 30- 40%



Rarely 20- 30%



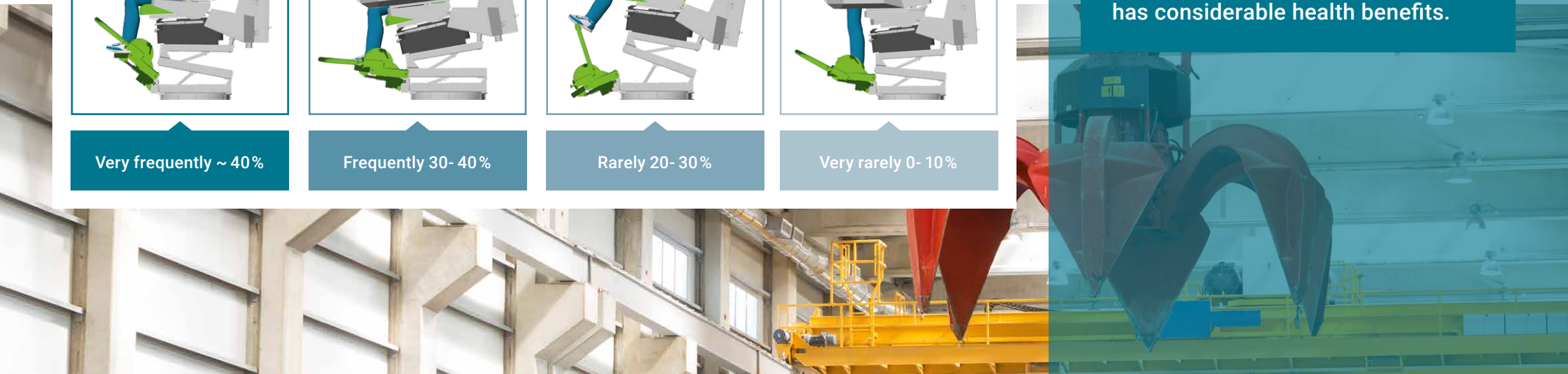
Very rarely 0- 10%

Conclusion and evaluation:

The wide range of adjustment options offered by the control station is not yet being fully utilised. The operators are not aware of the possibility of working standing up.

The FSMMD Ultra Smart has been specifically designed to provide optimal support to its users when changing between different working positions.

Varying the position from seated to standing can help to take the strain away from muscles and joints and has considerable health benefits.



Ergonomics validation and simulation on the digital human model (DHM).

An anthropometric investigation by testing different groups of users and an accompanying simulation using the digital human model (CharAT Ergonomics®) looked at the FSMMD Ultra for its suitability and usability in everyday work.

Testing of operability and posture criteria:

- Overall body posture
- Left and right hand-arm system
- Reachability of touchscreen and controls
- Visual conditions on the touchscreen monitor with user-orientated settings

The following aspects were analysed and evaluated on the basis of occupational science findings relating to physiologically optimal, acceptable ranges of movement for individual parts of the body:

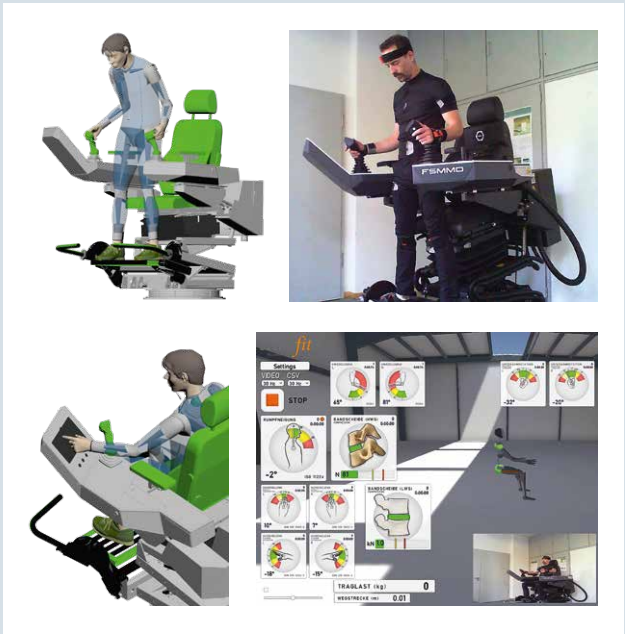
In four posture classes:

- ‘Seated, upright’
- ‘Seated, leaning forwards’
- ‘Seated, leaning backwards’
- ‘Standing’

Evaluation	Evaluated scenario	Overall evaluation (amongst all groups of users)
Body posture (normative data)	Seated, upright	0 1
	Seated, leaning forwards	1 3
	Seated, leaning backwards	0 1
	Standing	0 2
Reachability (screen and buttons)	Seated, upright	0 1
Visibility (monitor)	Seated, upright	2

- All body posture criteria within optimal value ranges
- 1 or 2 body posture criteria outside of optimal value ranges, but still within the acceptable range
- More than 2 body posture criteria outside of optimal value ranges, but still within the acceptable range
- At least one body posture criterion outside of acceptable value ranges – action required!
- All body posture criteria outside of acceptable value ranges – significant action required!

The evaluation was based on occupational science findings relating to physiologically optimal and acceptable ranges of movement for individual parts of the body. The evaluation was performed for limit percentiles (F5/M95) using the RULA method (Rapid Upper Limb Assessment) for hand-arm position during operation.



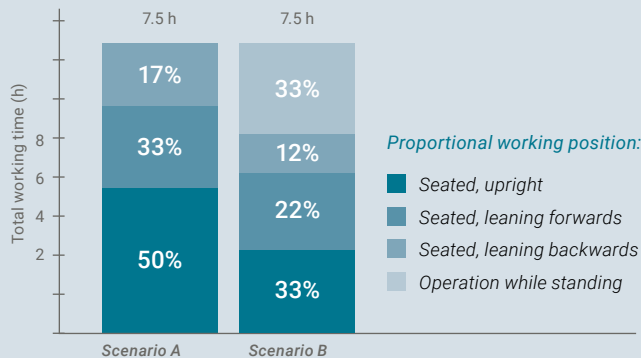
Conclusion and evaluation

The results of the analyses performed using the digital human model confirm that the FSMMD Ultra Smart control station offers a good **all-round ergonomic design**.
The extensive adjustment options and the rapid retrieval of all personalised data at the press of a button help to support ergonomically healthy working.

Conclusive investigation results on working posture and ergonomics.

Biomechanics study

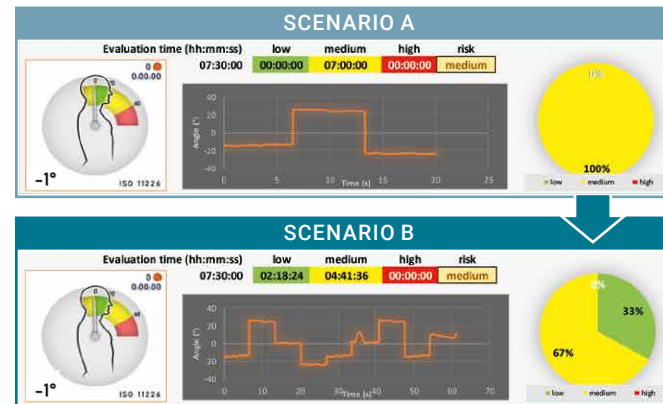
Biomechanics analysis performed as part of the ergonomics study confirm the benefits of changing between a standing and seated working posture at regular intervals.



Scenario A Simulation of everyday work, seated only
Scenario B Simulation of everyday work, with regular changes between seated and standing working postures

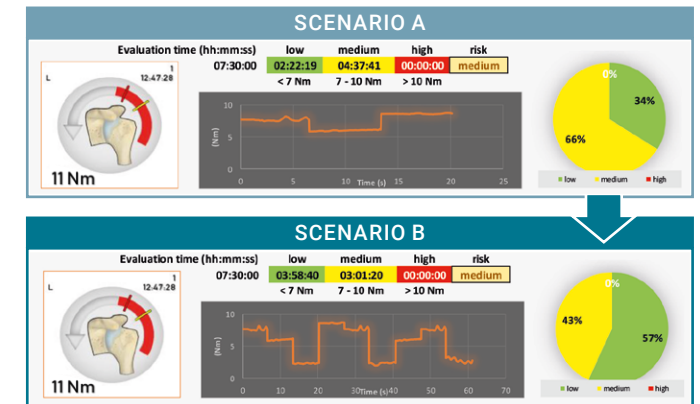
Operation of the FSMMD Ultra Smart in a seated position only was compared with operation in alternating seated and standing positions in two different scenarios. The data were extrapolated to a shift duration of 7.5 hrs of pure operation time (without taking break times into consideration) in order to simulate a full working day.

Investigation of upper body flexion



► **Improvement in scenario B:** during operation when standing, the upper body remains more upright – in the optimal deflection range of 0-10° (reduced strain).

Investigation at shoulder joint moment



► **Improvement in scenario B:** one-sided strain phases are significantly reduced. Due to the proportion of operation when standing, shoulder joint deflection in the optimal range is visibly more frequent.

Conclusion and evaluation:

When there are regular changes between standing and seated positions, the values for upper body, knee and head flexion, shoulder moment and for the hand-arm system are **significantly improved** when compared to a solely seated position. Overall, the joints experience less one-sided strain and that strain is relieved by the changes in position.

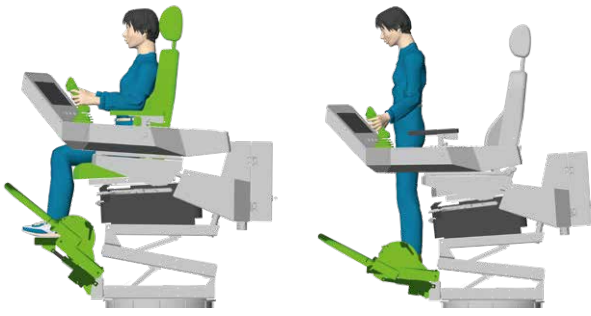


Scan the QR code here and request the complete ergonomics study as a download

Work more efficiently with the FSMMD Ultra Smart:

Recommendations for an ergonomically healthy working posture

The new FSMMD Ultra Smart from Spohn + Burkhardt enables quick and flexible changes to working position for **healthy working**. With simple and quick adjustment functions, it allows activities to be carried out with greater efficiency and improved ergonomics in both a seated and standing position. To be able to make best use of the workstation, the FSMMD Ultra Smart can be easily adjusted to your individual requirements thanks to smart technology.



► Change working posture more frequently

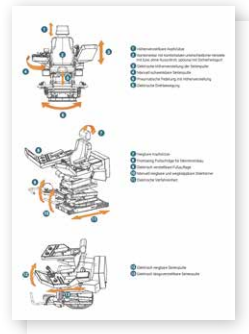
Movement and regular changes between a standing and seated position help to relieve strain on the muscles and protect the joints.

We recommend that users stand at least 25% of the time to ensure ergonomically healthy working. Take advantage of the flexibility that the FSMMD Ultra Smart offers for maximum ergonomic support when changing activity.

► Personalise your adjustments

Benefit from the option to adjust your seat entirely to your personal requirements.

Create your own unique user profile for the FSMMD Ultra Smart and simply recall your adjustments using the app when you start work. Your adjustments can be stored and recalled at the push of a button thanks to the intelligent memory functions.



► Tailored advice

Visit us on site for tailored advice and benefit from a detailed demonstration of all of the adjustment mechanisms on the FSMMD Ultra Smart.

Additional detailed information on all adjustment options that the FSMMD Ultra Smart has to offer are available to download on our website.



Scan the QR code now to receive the adjustments guide as a PDF

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Your partner in your country:

Extensive research pays off:

We always develop our products according to people and their requirements, with every design and implementation based entirely on ergonomic aspects.

Studies performed in conjunction with TU Dresden support us in creating products that enable healthy, comfortable working conditions.

Technische Universität Dresden

Professor in Occupational Science | D-01062 Dresden

In cooperation with (project management):

GWT-TUD GmbH

Freiberger Str. 33 | 01067 Dresden

Our showcar can come to you: learn more about the benefits of the FSMMD Ultra Smart on site.

Take advantage of our no-obligation services and order our showcar to pay you a visit. Try out the benefits of the FSMMD Ultra Smart on site and learn more about its features and equipment options. We will demonstrate the individual adjustment options and the benefits that the FSMMD Ultra Smart control station can bring to your business using a real-life model.



Our showcar can come to you.



*We can visit any country in Europe.**



Book a consultation with the Spohn + Burkhardt showcar and try out the FSMMD Ultra Smart live on site. There is no obligation.

** Please note that we can only offer a showcar visit in certain European countries. Please contact us by telephone or e-mail for more information.*