

SUITX by Ottobock

*David Duwe
VP SUITX by Ottobock Europe*

Futuring Human
Performance

Die **Gesundheit** der Belegschaft im Fokus –
Lessons Learned aus globalen Exoskelett
Implementierungen
&
Einsicht in erste Langzeitstudien

Ottobock – A Global Market Leader Since 1919

SUITX
by ottobock.

World leader in numerous areas

100 years of biomechanical expertise



Prosthetics



Orthotics



Neuro Mobility



Exoskeletons



Since 2012



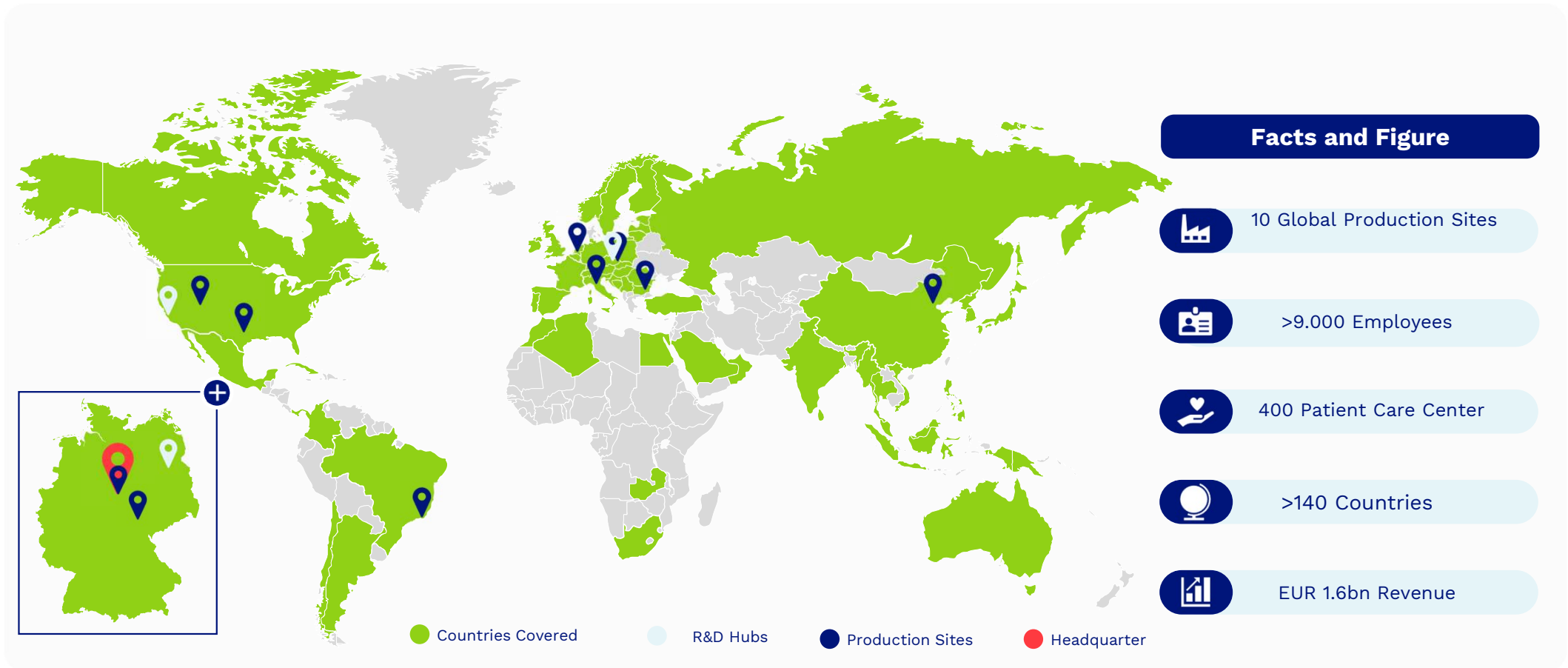
Ottobock solidifies
exoskeleton expertise
with SuitX acquisition



2021

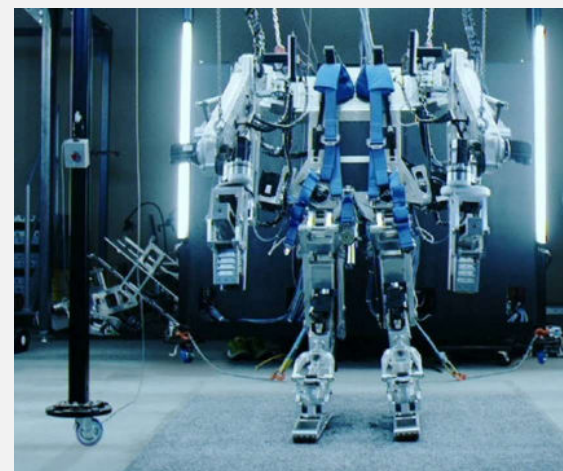


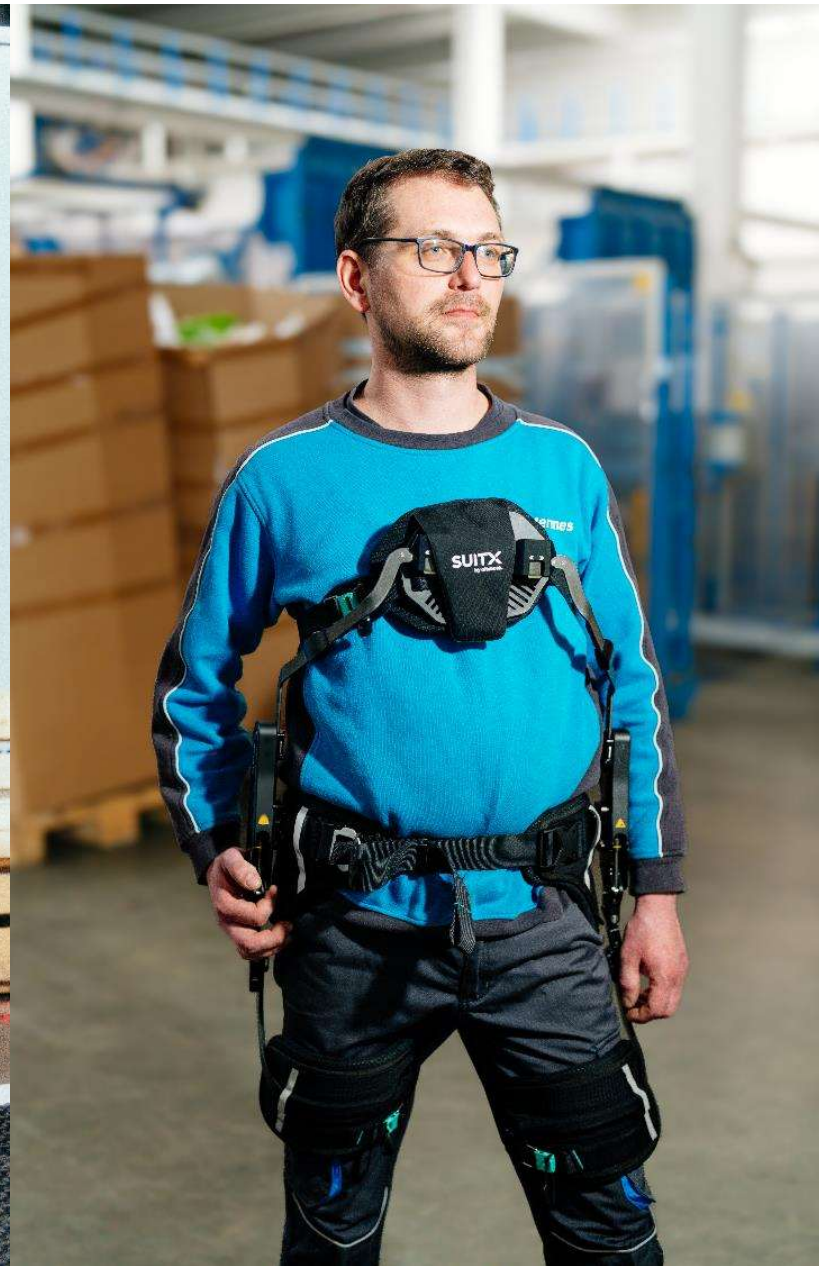
Ottobock - A Global Biomechanics Powerhouse **ottobock.**





Exoskeletons





Our Compact Exoskeletons (CX) Small Exoskeletons, Big Effect

Relief of the upper cervical spine during overhead work



**CX
EASY NECK**

Lower fatigue and less performance decline during overhead work in a warm environment



**CX
COOL SLEEVES**

The exoskeleton relieves the thumb end joints and the saddle joints



**CX
POWER THUMB**

**CX
SOFT WRIST**



Effective support for the wrist when handling loads

**CX
SOFT BACK**

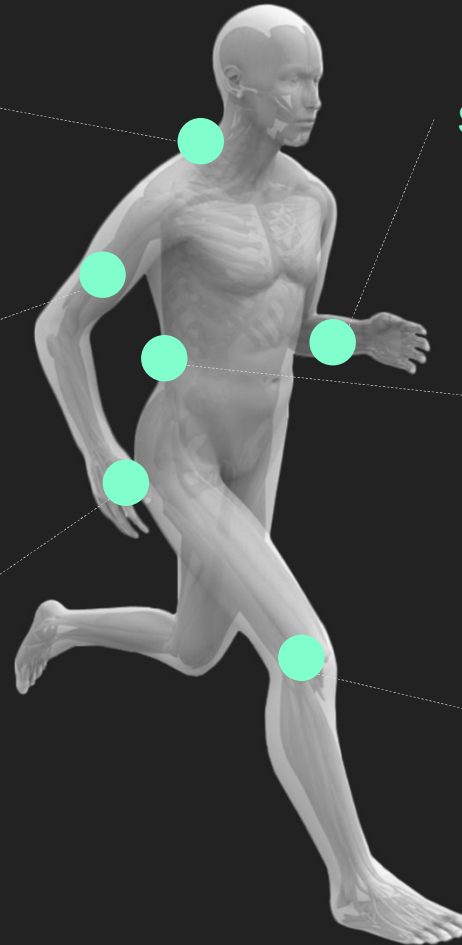


Lower spine support while standing and handling loads

**CX
SOFT KNEE**



Ergonomic knee protector with maximum comfort for insertion into work pants



Empower Your Workforce – Join the Elite Group



“For years we were challenged with the overhead work and what to do with that in terms of providing support for team members - until these exoskeletons came along. This really offered a new avenue.”

–Marisol Barero, Toyota

“Our goal is to make exoskeletons part of our employees’ personal protective equipment for certain applications, just like high-visibility jackets and safety shoes.”

–Gerald Müller, DB Schenker

“I suit up for hockey. I wear my helmet. I wear all my pads so that I don’t get injured - and I do the same thing when I come to Boeing. By the end of the workday, I noticed that it reduced the amount of fatigue for sure.”

–Jason Hill, Boeing

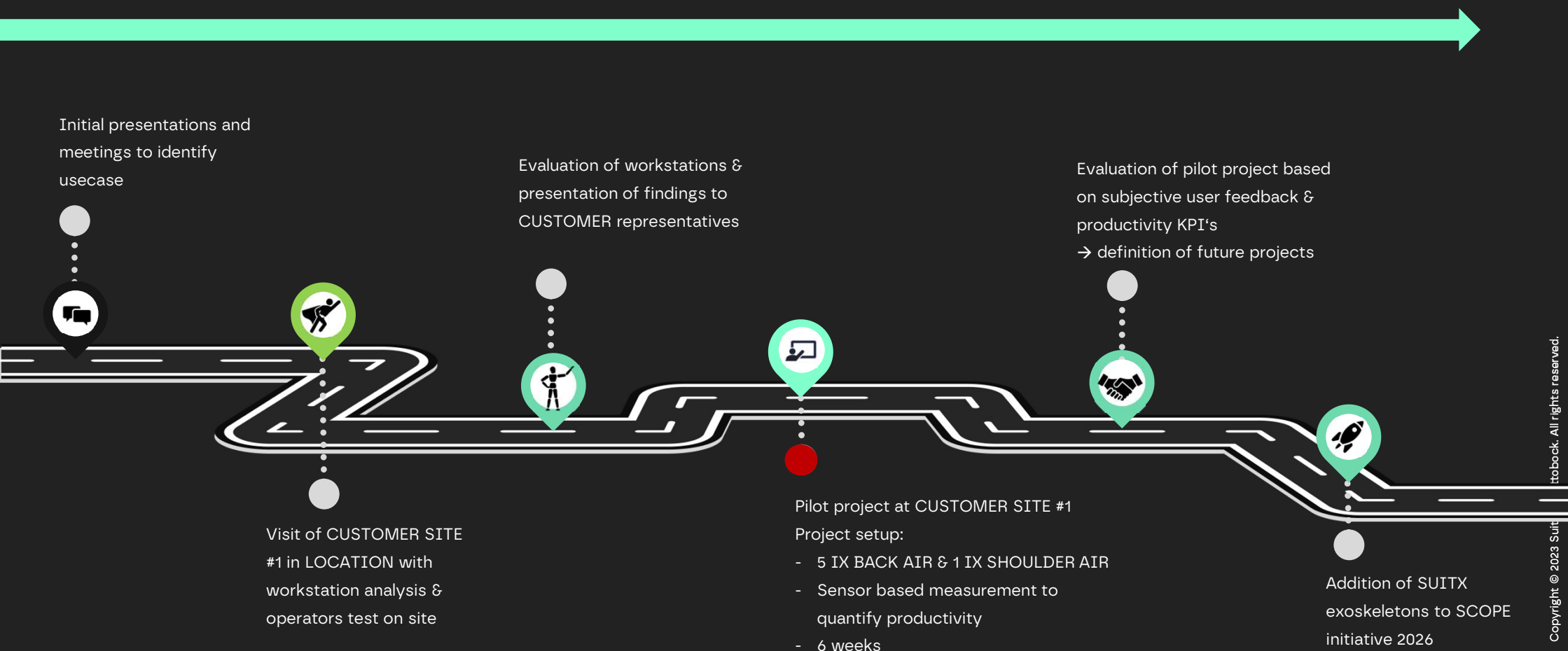
Lesson 1

Erfahrungen aus 4.000+ Projekten

Create a clear plan –
together with project partner

Roadmap SUITX by Ottobock @CUSTOMER NAME

Example



Deployment Process

SUITX
by ottobock.

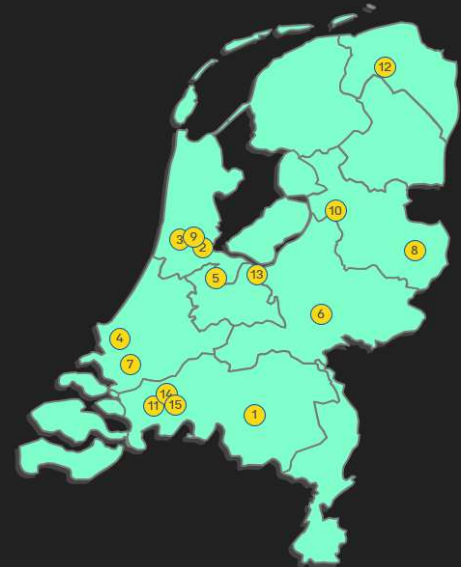
Example Retail

-  **1** Define **Country/Market Coordinator** and involve relevant stakeholders
-  **2** Book **Kick-Off Meeting** with Ottobock Team and align on **country implementation process**
-  **3** Put recommended exoskeleton type and amount into **budget** and use **supporting material** to prepare the implementation
-  **4** Book **Coordination Call** with all units and optionally **Experience Day**
-  **5** Place **exoskeleton order** based on global framework agreement
-  **6** Book **product trainings** with Ottobock Team for your **exoskeleton users**
-  **7** **Start exoskeleton usage** gradually and monitor first usage weeks with Ottobock Team through **support options**
-  **8** **Share experiences** with new markets, book regular **update calls** and continue ongoing **deployment**

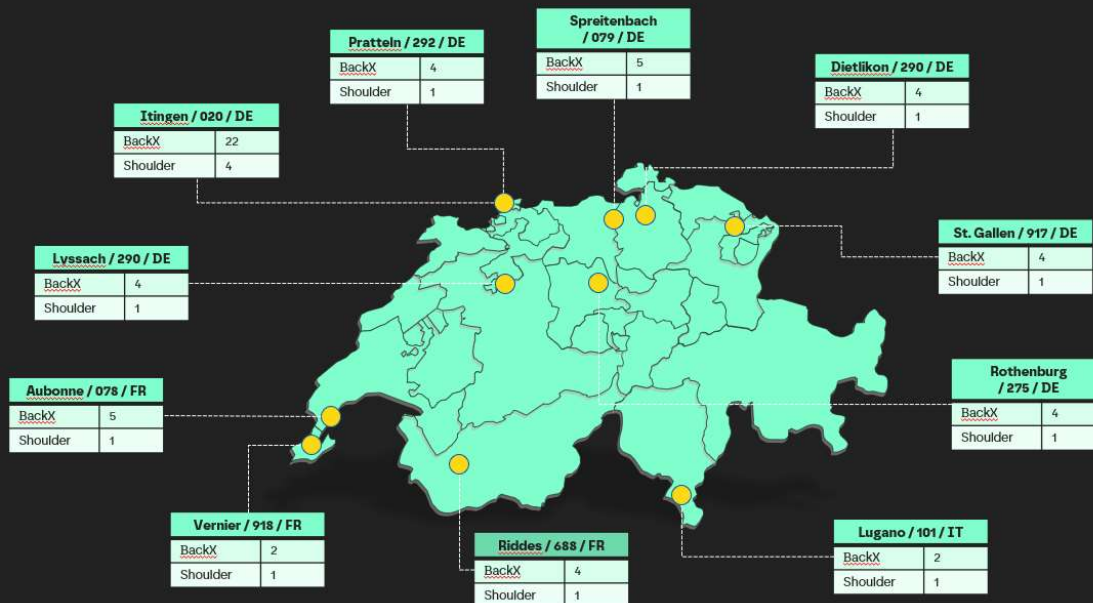
Rollout Examples: Netherlands & Switzerland

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Example Retail



	Location	Back Air	Rollout
1	IKEA Eindhoven	14	Feb 2025
2	IKEA Amsterdam	6	Feb 2025
3	IKEA Heerlen	6	Jan 2025
4	IKEA Delft	...	...
5	IKEA Utrecht	8	Feb 2025
6	IKEA BV Duiven	8	Feb 2025
7	IKEA Rotterdam	8	Jan 2025
8	IKEA Hengelo	5	Jan 2025
9	IKEA Harleem	10	Feb 2025
10	IKEA Zwolle	5	Jan 2025
11	IKEA Breda	8	Jan 2025
12	IKEA Groningen	14	Jan 2025
13	IKEA Amersfoort	9	Feb 2025



Provide support
- proactively

Provide Deployment Supporting Material

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Example Retail

Q&A
Questions & Answers

Topic Support:
Meyenik Finger
Business Support Deployment Leader
meyenik.finger@ikea.de

Ugar Celik:
Fulfillment Unit Support Leader
ugar.celik@ikea.de

Diana Semirashenko:
Safety Specialist
O&A Safety & Security
diana.semirashenko@ikea.de

Exoskeletons: Ergonomic support in business operation

BACKGROUND
A wide range of operational processes in Ingka are not yet supported by any ergonomic solutions. Most of these processes and activities demand manual handling and load lifting, and with the increasing number of customer orders and growing co-workers' involvement in manual handling, in our units, ergonomics is continuing to be a key focus area in Ingka today.

Exoskeleton technology aims to minimize the negative impact of heavy lifting on co-workers' physical health. Ultimately with the goal to create a healthier workplace and reduce the costs caused by sick leave due to musculoskeletal disorders.

Accumulated data reported via Incident reporting system (IRS) in FY23 shows that in IKEA:
 + muscle strain and back injury make up for 40% of the reported lost time injury types
 + Taking an unsafe position or posture and unsafe lifting make up 37% of the lost time injuries

History: exoskeleton tests in IKEA
During the test apart from subjective data (daily (short) co-workers survey, extended co-workers survey, managers' survey and management executive summary), **ScaleX** measurements of relief created by exoskeletons were engineered to collect the objective data. The data collection showed that exoskeletons by Ottobock meet the goals set for the test and steering group came to the decision to make the portfolio available for the Ingka countries and start the deployment supported by the CTF Business Support & Deployment Team.

QUESTIONS & ANSWERS

Q: How do exoskeletons work?
A: The Ottobock Back and **BackX** support in the area of the lower back and produce a measurable positive relief effect when lifting heavy loads. When bending, energy is stored in the system with the help of spring elements and returned to the user as soon as the person straightens up again ("Energy Harvesting System, EHS"). There is no

Q&A Exoskeletons

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Usage of reach trucks and forklifts with SUITX by Ottobock exoskeletons at IKEA
Status: 03.05.2024

Usable vehicles*
*Please note that the use of the vehicles may also depend on how the employee is built.
Example: For a person who is wide in the pelvis, use may also be restricted if the system protrudes from the side of the forklift truck.

Illustration 1:


Illustration 2:


Illustration 3:


Vehicle Overview

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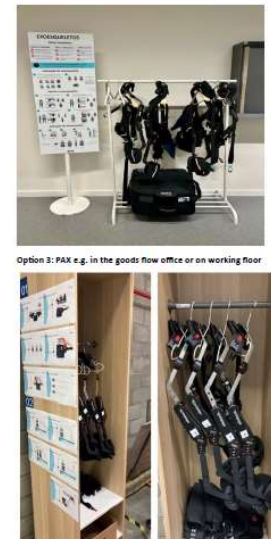
Storage options for SUITX by Ottobock exoskeletons at IKEA
Status: August 2024

In General: The closer the storage is to the workplace, the better the acceptance and the easier it is for employees to use at work.

Option 1: Hooks on pallet cages


Option 2: Hanging on clothes rail


Storage Options



Facilitate Regular Inter-Company Exchanges

Project Team Call IKEA & Ottobock

Chat

Shared

Recap

Q&A

Meeting Whiteboard

Some people in this chat are outside your org. It's possible they have message-related policies that will apply to the chat. [Learn more](#)

Ludwig, Laurenz

Ottobock Exoskeleton rollout plan v.3.xlsx

UC

Ugur Cellek (External) 8/21 11:31 AM

Hello, we just got a shipment to our office, can it be to the malmo store?



LU

Ludwig, Laurenz 8/21 12:33 PM

Hej Ugur, I guess so. Let me check with operations and include you in the mail in case of sorry in case it was sent wrong!



LU

Ludwig, Laurenz 8/21 12:39 PM

Elena I sent you all the different materials for my learning and hope you can open the file can discuss it tomorrow



UC

Ugur Cellek (External) 8/21 1:08 PM

Ludwig, Laurenz 8/21/2025 12:33 PM

Hej Ugur, I guess so. Let me check with operations and include you in the mail in case of questions. Thanks for the info and sorry in case it...

another note :it came on behalf of Amela Sofic who had ordered Exoskeletons 2 years ago anymore



Exoskeleton rollout NL

Chat

External

Some people in this chat are outside your org. It's possible they have message-related policies that will apply to the chat. [Learn more](#)

GL

Germaine Loupatty (External) 2/13 1:46 PM

Hej Rick, is it also possible for me to assign co-workers for the my learning training?

KH

Karin Huizing (External) 2/13 1:48 PM [Translate](#)

Wat een intressante bijeenkomst... wat een mooi staaltje techniek... was zeer onder de indruk. 🙌



RS

Rick Semmekrot (External) 2/13 1:55 PM

Germaine Loupatty 2/13/2025 1:46 PM

Hej Rick, is it also possible for me to assign co-workers for the my learning training?

you can set this up with the safety specialist / P&C department

LB

Lars Banning (External) 2/13 3:41 PM





Get buy in from users
– create images
where people
„find themselves“



The Challenge

The warehouse in Odense is one of the central hubs in Lemvigh-Müller's supply chain—a vast site where housands of products are moved every day to ensure customers receive their orders on time.

This speed and reliability are only possible thanks to the performance of the logistics teams. But the work is physically demanding: long hours of standing, walking, lifting, and moving heavy goods are part of everyday life.



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The Solution

Ergonomics in Daily Warehouse Operations

Lemvigh-Müller has been a sales partner for SUITX products since the end of 2024. Lemvigh-Müller decided on ergonomic innovations in order to safeguard the health and satisfaction of its employees. They also use the exoskeletons for

Nicki Hoegsberg and Stig T. are responsible for the equipment (PPE) – support customers in Denmark with

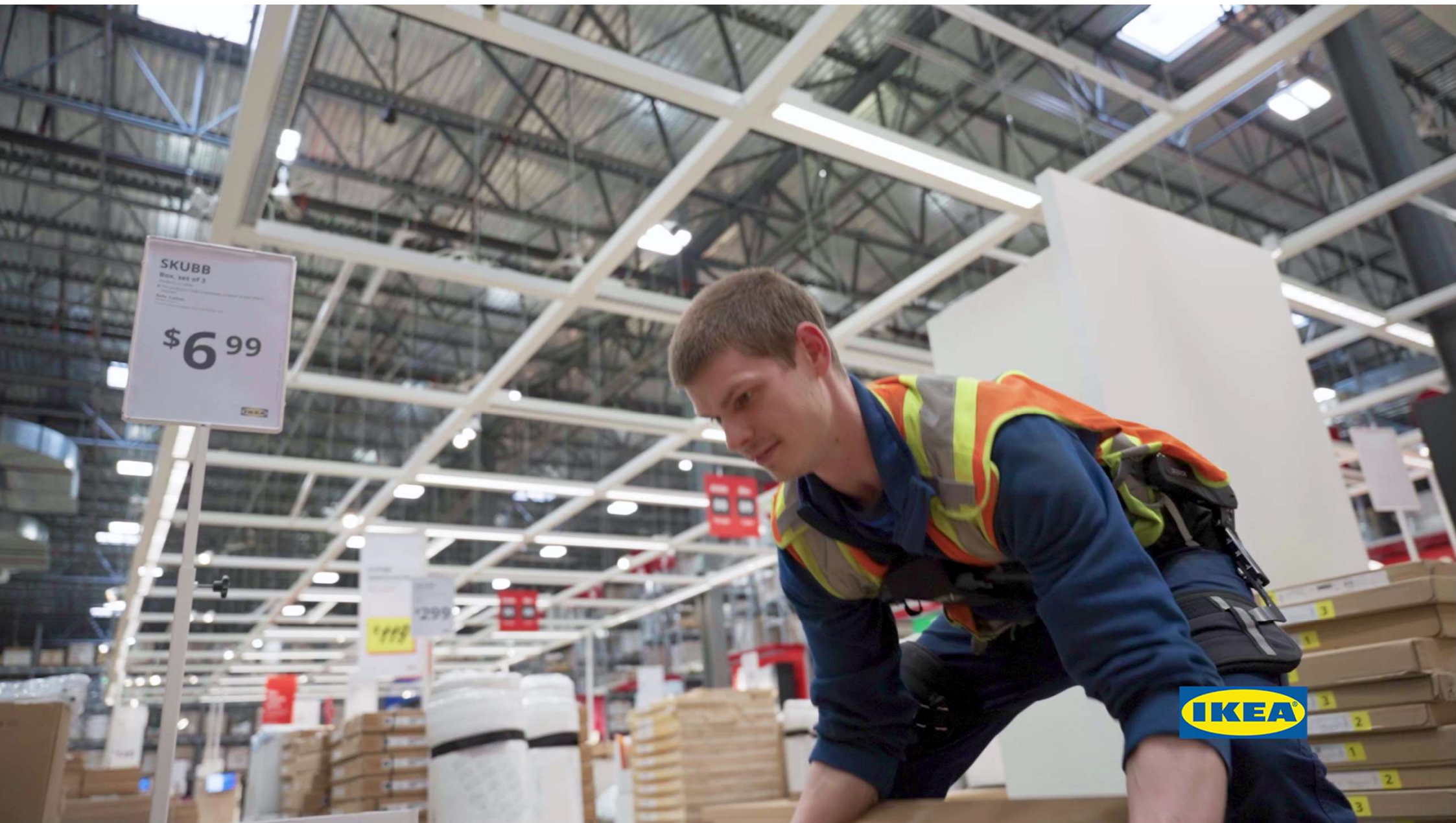
The result

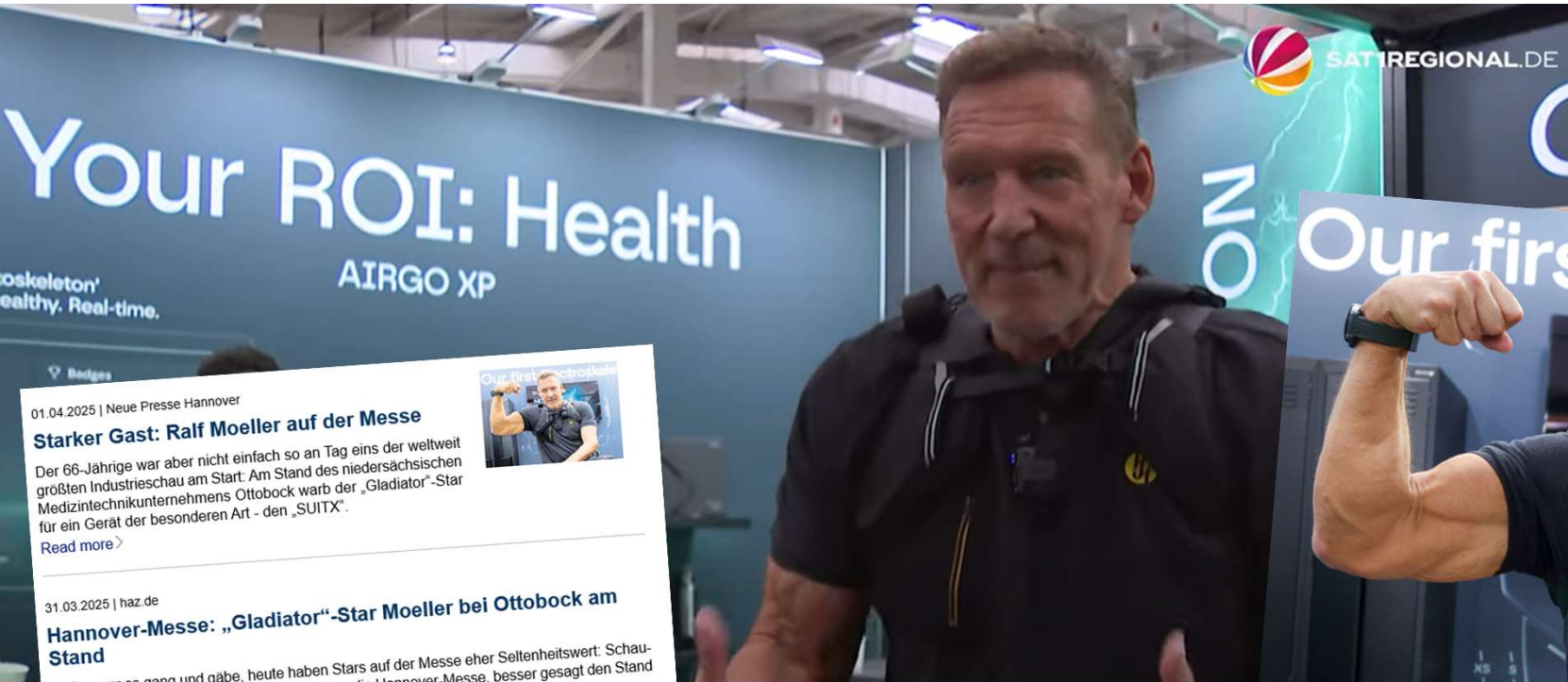
By introducing exoskeletons, Lemvigh-Müller demonstrates how a company can put not only its customers but also its employees first. With the use of IX BACK AIR and CX SOFT BACK, the vision becomes reality: a strong logistics team that remains healthy and capable - continuing to deliver on the quality promise "Order today, delivered within hours."



"The SUITX by Ottobock exoskeletons are solutions that help you do your job – keeping you healthy and enjoying your life even when you get older."

Rune Banke, Warehouse Coordinator, Lemvigh-Müller Odense





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01.04.2025 | Neue Presse Hannover

Starker Gast: Ralf Moeller auf der Messe

Der 66-Jährige war aber nicht einfach so an Tag eins der weltweit größten Industrieschau am Start: Am Stand des niedersächsischen Medizintechnikunternehmens Ottobock warb der „Gladiator“-Star für ein Gerät der besonderen Art - den „SUITX“.

[Read more >](#)

31.03.2025 | haz.de

Hannover-Messe: „Gladiator“-Star Moeller bei Ottobock am Stand

Früher war es gang und gäbe, heute haben Stars auf der Messe eher Seltenheitswert: Schauspieler Ralf Moeller (66) besuchte am 31. März die Hannover-Messe, besser gesagt den Stand des Medizintechnikunternehmens Ottobock.

[Read more >](#)

31.03.2025 | RTL Television

Ralf Möller demonstriert Exoskelett auf Hannover Messe

[Read more >](#)

31.03.2025 | N-TV

Exoskelett auf Hannover Messe vorgestellt

[Read more >](#)



Get buy in from
management

Get buy in – from all levels!

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Transfer to official
institutions to
support movement

Anforderungen und Hinweise für Arbeitsschutzprämien

Rücken- und schulterunterstützende Exoskelette – Einweisung mit zweiwöchigem Praxistest am Arbeitsplatz

01.07.2025

Wie stark ein Exoskelett bei der Arbeit unterstützt, hängt von den individuellen Anforderungen ab und kann sehr unterschiedlich sein. Die Arbeitsschutzprämie richtet sich deshalb an Unternehmen, die herausfinden möchten, ob ein Exoskelett zu den Tätigkeiten in Ihrem Betrieb passt – und ob sie Ihre Mitarbeitenden körperlich entlasten können.

Empfohlene Vorgehensweise

Zunächst treffen Sie eine Auswahl potenziell geeigneter Exoskelette. Dabei hilft eine systematische Analyse der Anforderungen. Unsere Entscheidungsmatrix www.bgbau.de/matrix-exoskelette unterstützt Sie dabei, verschiedene Modelle objektiv zu bewerten.

Im nächsten Schritt erhalten die späteren Nutzer eine Einführung in die Handhabung der ausgewählten Exoskelette. Die Exoskelette werden individuell an die Körpermaße angepasst und der Einsatz am Arbeitsplatz wird fachlich begleitet.

Anbieterwahl:

Sie können den Anbieter der Maßnahme frei wählen – zum Beispiel den Hersteller, den Inverkehrbringer oder einen Händler des jeweiligen Exosketts.

Der Praxistest findet im Arbeitsalltag statt. Dabei wird geprüft, ob das Exoskelett folgende Kriterien erfüllt:

- Es bietet ausreichende körperliche Unterstützung.
- Es lässt sich einfach bedienen und individuell einstellen.
- Es schränkt die Bewegungsfreiheit nicht ein (z. B. beim Gehen, Treppensteigen, Bücken).

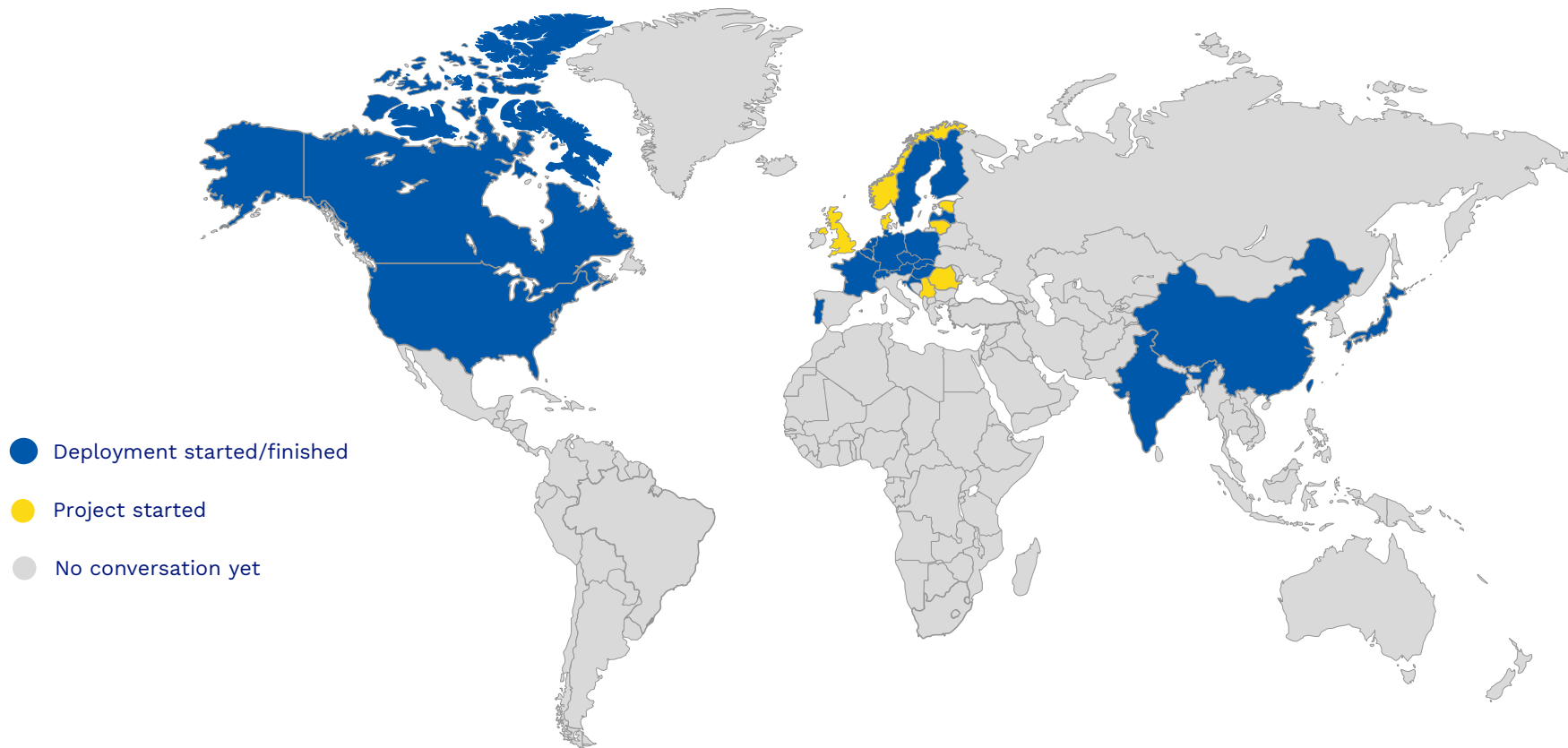
— Können die Kosten des Exosketts (IX SHOULDER AIR bzw. IX BACK AIR) als Mittel zur beruflichen Wiedereingliederung oder als LTA (Leistungen zur Teilhabe am Arbeitsleben) von der Rentenversicherung übernommen werden?

Die Kosten werden nach § 49 Absatz 3 Nummer 1 des neunten Sozialgesetzbuches (SGB IX) als Hilfen zur Erhaltung oder Erlangung eines Arbeitsplatzes einschließlich Leistungen zur Aktivierung und beruflichen Eingliederung bewilligt. Für die Beantragung benötigt man:

- Das [Formular G0100](#) – Antrag auf Leistungen zur Teilhabe für Versicherte – Rehabilitationsantrag
- Das [Formular G0133](#) – Anlage zum Antrag auf Leistungen zur Teilhabe am Arbeitsleben – Kostenübernahme für Hilfsmittel und technische Arbeitshilfen, die behinderungsbedingt zur Berufsausübung erforderlich sind
- Ihren Kostenvoranschlag inkl. der ausführlichen Funktionsbeschreibung und
- ein fachärztliches Attest mit konkreter Diagnose und möglichst einer Empfehlung für das System.

Rollout Status (August 2025)

Example Retail



**21 Experience Days conducted
(+1 planned)**

**21 Deployment Countries
started/finished (+3 planned)**

**600+ Exoskeletons implemented
in 120+ Units**

Lesson 2 Ergebnisse Langzeitstudien

Status Quo 2018-2022

Empirical research underscores the positive impact of exoskeletons

100+ studies

show the positive impact of occupational exoskeletons

Considered Factors (examples)

-  Oxygen Consumption
-  Heart Rate
-  EMG Muscle Activity
-  Muscle Fatigue Index
-  Compression Forces
-  Productivity Increase
-  Perceived Rate of Exertion



“Using exoskeletons significantly reduced peak activity of the trunk extensor muscles and energy expenditure in all conditions tested.”

Harvard Medical School

“We found reductions of up to 50% for the muscle activity, up to 61% for the net metabolic rate, and up to 99% for fatigue.”

TU München

Status Quo 2022/2023

Proven impact on productivity*

5.6% Average Productivity
Increase

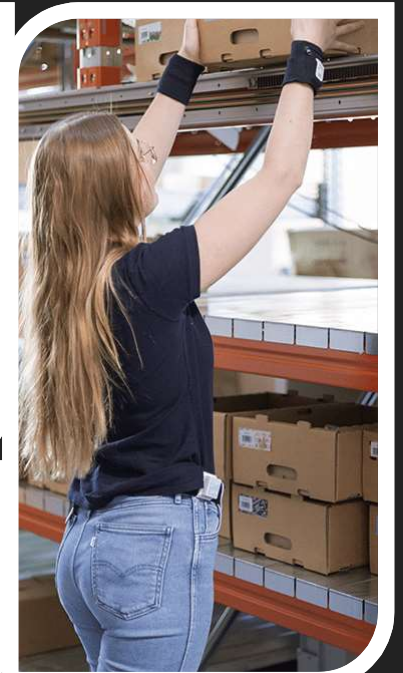
12% Maximum
Productivity
Increase

74% Of Users
Are More
Productive



*Test Group: 19 users, direct comparison with/without exoskeleton
Test Length: 3.5 years, since 2021

New in 2025



CFG

STOP

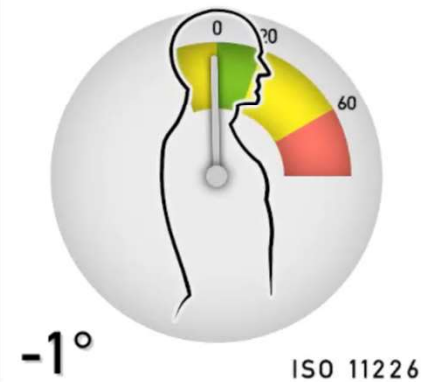


TRAGLAST (kg) 0

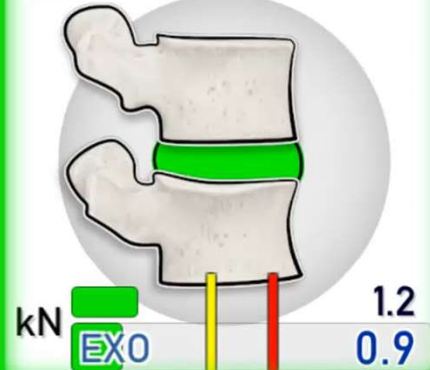
Mode:
Instant

22%
SUPPORT

RUMPFNEIGUNG



BANDSCHEIBE (LWS)
KOMPRESSION



Bionic Analytics Sheds Light on Ergonomic and Productivity KPIs

1

Ergonomics

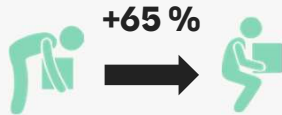
Weight Relief



**23
tons**

Weekly exoskeleton use leads to a **weight reduction** equal to a fully loaded truck

Posture Enhancement



+65 %

Significant improvement in working **posture** while lifting via use of exoskeleton

Ergonomic Rating

W/o Exo



With Exo



Ergonomic rating improvement of the workstation through weight reduction and improved posture

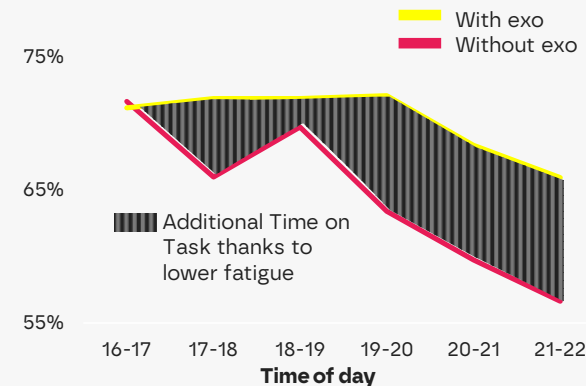
2

Productivity



**+19 %
throughput**

Time on Task increases by 9% towards end of shift





Summary of the results of the long-term exoskeleton study

DEFENCE AND SPACE

Vanessa Berg and Christian Boehm, THTG6
18.10.2024

AIRBUS

Management Summary

Management Summary

1

Process view very stressful activities

Cumulative duration of handling over 90° per shift is 42% - 53% of time on site on days with exo use.

Up to 82% of over-shoulder activities require dwelling for more than five seconds (isometric contraction)

LMM risk HIGH



2

Very positive user feedback

4.4 from 5

for "well-being"

Very good values also for

"Comfort"

"Relief"

3

Workplace comparison

Compared to Structure, much more time is spent working over the shoulder level in Equipment.

The area above 135° stands out in particular: 25.4% of the activity has a dwell time of more than five seconds

4

Proof of significant relief

Reduction of the risk of physical overexertion and the effective load on the shoulder by wearing the exoskeleton.

This leads to a relief of 6 to 9 Nm.

In relative terms, this corresponds to a relief of 22% to 34% in Structure over the course of the shift and 29% to 43% in Equipment.

5

Long-term effects through exoskeleton use

Positive long-term effect due to 14% increase in holding time for over-shoulder activities.

As well as an indicator for quality improvement in the reduction of the attachment/detachment by 12-15%.



Lift/lower arms per hour of overhead work

3. Workplace comparison between Structure and Equipment

Activities at the construction site / posture



A comparison between Equipment and Structure shows that even **more time (53%)** is spent working over the shoulder in Equipment. The area above 135° stands out in particular with a dwell time of over five seconds.

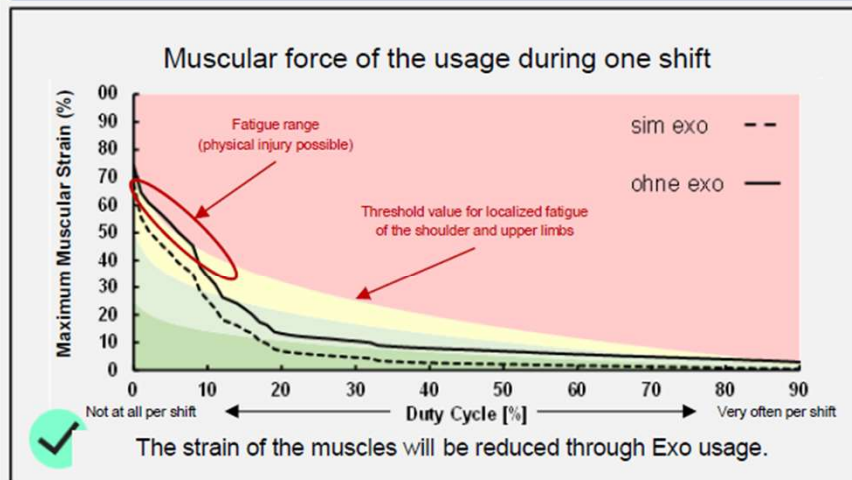
On the other hand, at approx. **1080x per shift**, there is less frequent lifting/lowering arms than in Structure.

In Structure and Equipment, **71 to 82% of the required overhead activities** are with a dwell time of more than 5 seconds (isometric contraction).

4. Reduction of the required muscle strength in structure and equipment

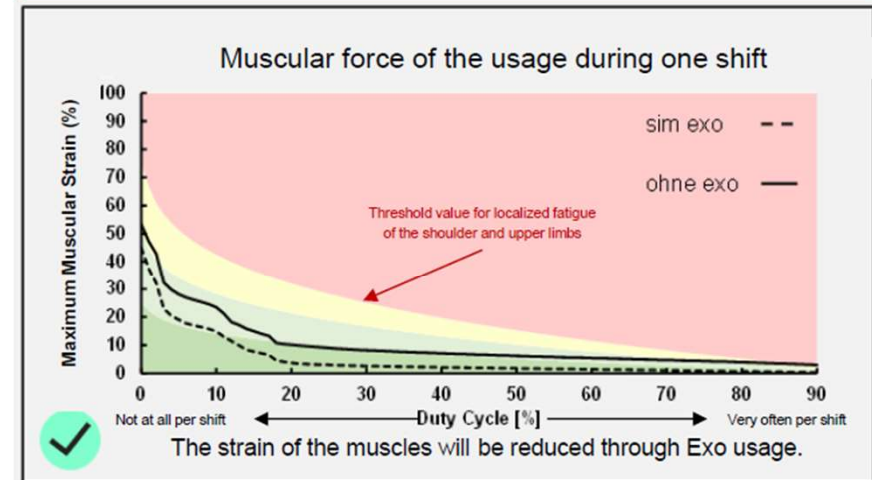
Cumulative assessment of muscle strength over a shift

Relief in Structure



The results indicate that the muscular stresses occurring in the "structure" are so high that, due to the high proportion of time without an exoskeleton, **sufficient recovery of the muscles (by the following day)** is not guaranteed. With an exoskeleton, however, adequate relief could still be possible.

Relief in Equipment



The results indicate that the muscular load occurring in the "equipment" is just low enough to ensure sufficient muscle recovery due to the time component. **With an exoskeleton, the strain could possibly be reduced in such a way that the recovery effect is enhanced.**

Example Aviation: Sensor Analysis

IX SHOULDER AIR Shows Major Relief

600+ hours
of measurement with
operators in their day-
to-day workplace

14%
productivity increase
thanks to less lowering
& re-lifting of arms

52%
of time on task is
spent with arms
raised overhead



43%
relief of the shoulders
when using the IX
SHOULDER AIR



Patented motion capturing
technology: operators wear
sensors



A long-term study with a global aviation company, partnering with
the leading German accident insurance institution (DGUV)

Wie geht es
weiter?



Here you are looking at our next innovation

With Your **Safety** in Focus:
Creating a **New Standard**



Our first Electroske

THANK YOU



Let's Future Human Performance



David Duwe

Vice President SUITX by Ottobock Europe

✉ David.Duwe@ottobock.com

☎ +49 170 234 2406