

# **BREAKING THE WALL OF INTENSIVE WORK ABOVE HEAD**

**CHENGHAO XU**

**CHINA**

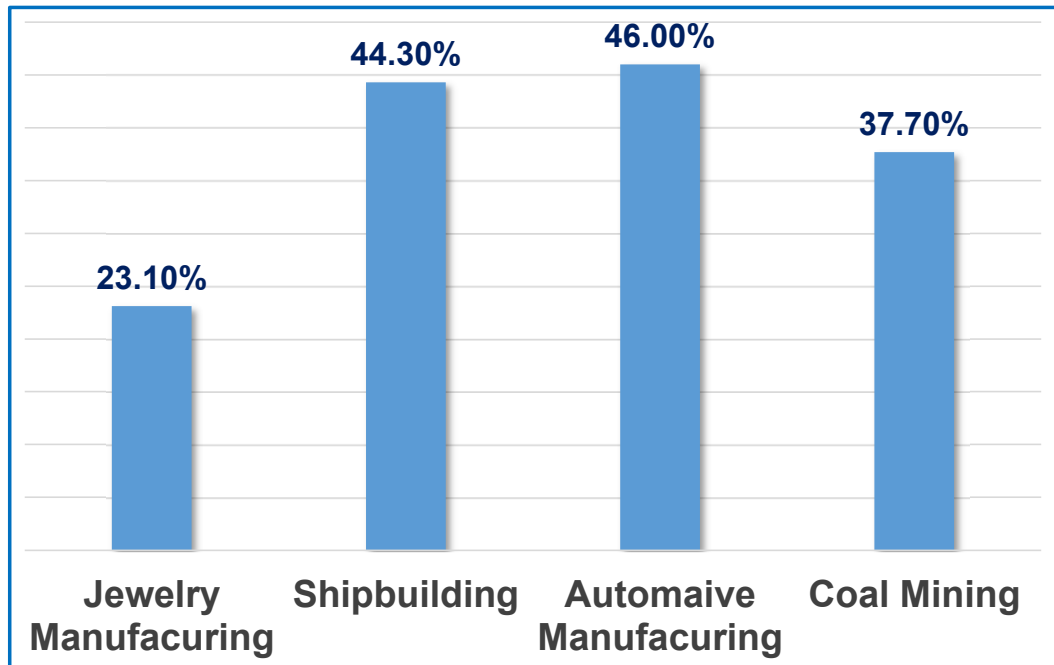
**SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY**

FALLING WALLS LAB **BERLIN 2019**

FALLING WALLS LAB **SHENZHEN WINNER**

## Macro-Trends: Work-related Musculoskeletal Diseases

Incidence of WRMDs about Different Industries in China



### CHINA

Prevalence of All Workers in 2016: **38.2%**  
Annual Incidence Rate of Automakers: **52.0%**

### United States

Medical&Compensation: More than **\$15 billion/year**  
Prevalence of US Occupational Population: **28%**

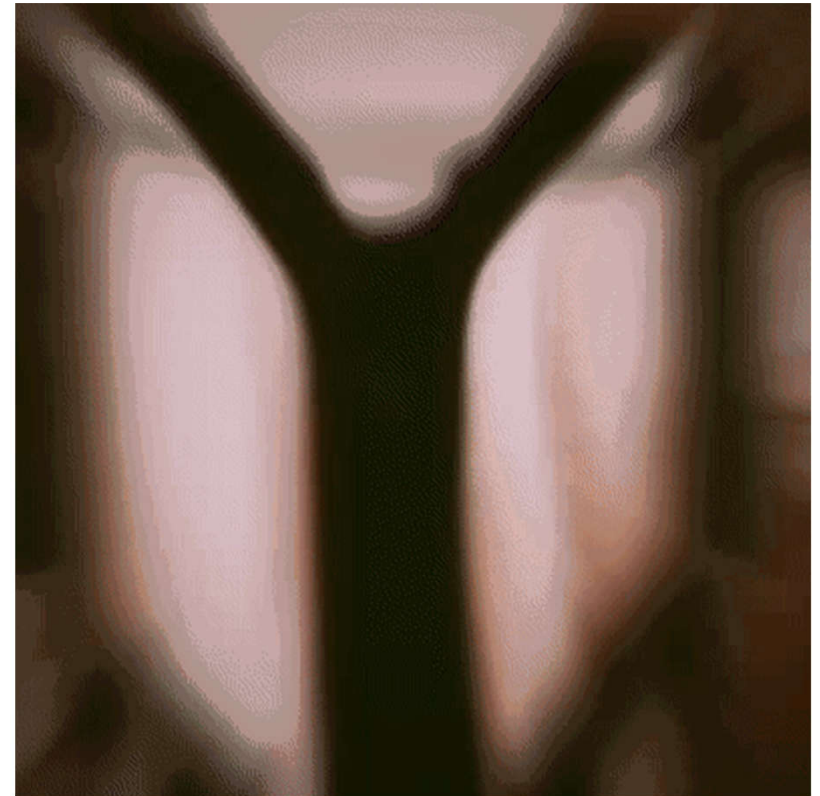
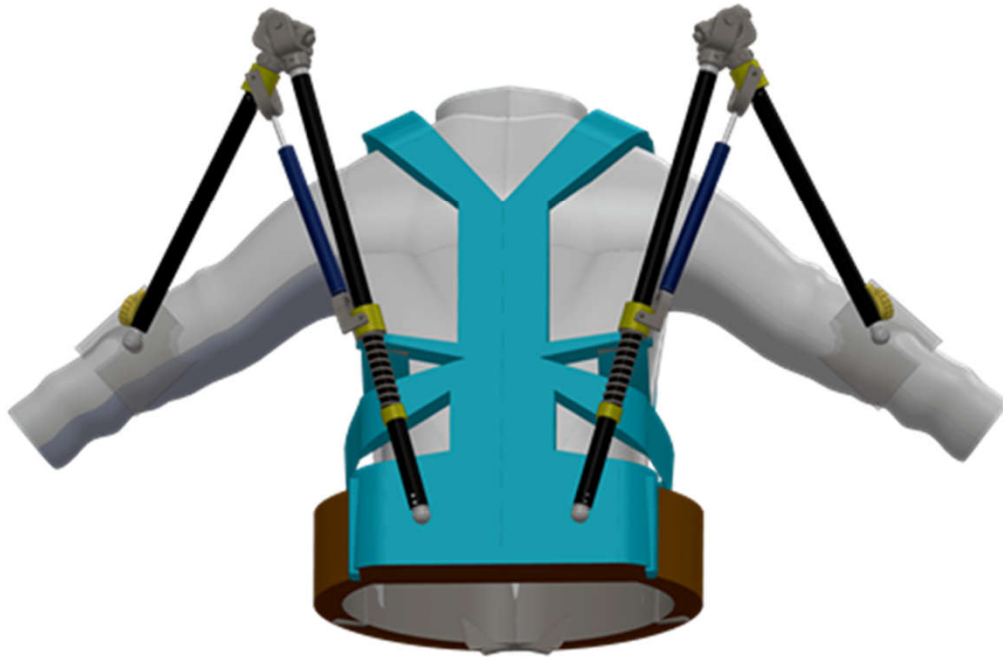
### Worldwide

Industrial Illness Absenteeism: Accounts for **15-20%**

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## Adaptive Upper Arm Assisted Exoskeleton



# Adaptive Upper Arm Assisted Exoskeleton

## Functional Test



Metabolic Consumption: 50% Reduce

Muscle Fatigue Strength: 57% Reduce

## Advantages

POWER	PRICE	SUPPORTING RANGE	WEIGHT
Battery	5500 EUR	Adaptive	4.3kg
Torque Generator	3800 EUR	Unadjustable	3.0kg
Spring	130 EUR	Adaptive	1.7kg