



IDEAS - Interactive Design and Simulation

# Dalle noie della postura alle gioie del movimento

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Director of Fraunhofer JL IDEAS@DII Naples

# The Founding Institutions



- **1224 AD:**  
oldest **public**  
academic  
institutions in  
the world



- **1811 AD:**  
Politechnic  
School, **Murat**

**2012 AD:** The  
DII was  
established  
joining 5  
existing depts.



 **Fraunhofer**  
IWU

- founded on  
July 1st, 1991
- approx 510  
employees
- 29 million euro  
budget

# Agenda

Dalle noie della postura...

- la *class action* in ambito automobilistico;
- le misure di discomfort:
  - scarpe, poltrone, sedie, stazioni di lavoro;
- comfort, discomfort e danno;

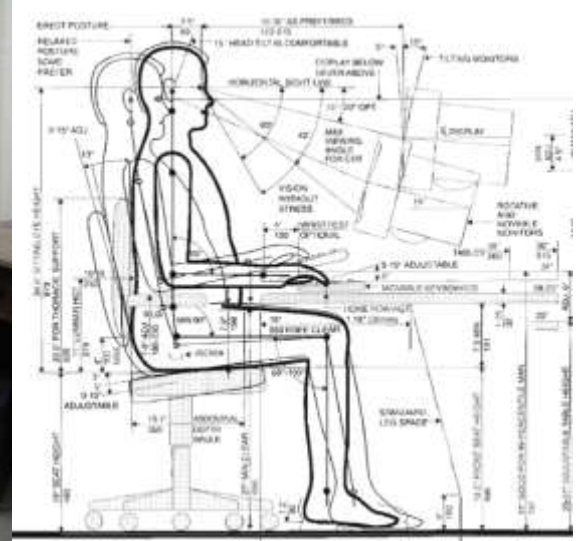
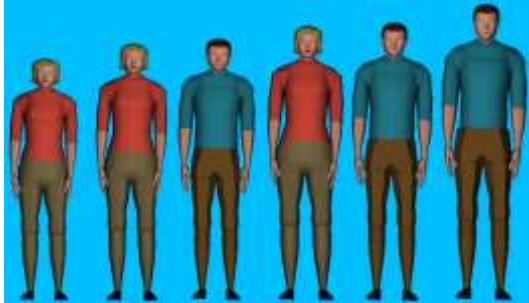
allo stile di vita attivo;

- Iniziare dai bambini: *Joy of moving*

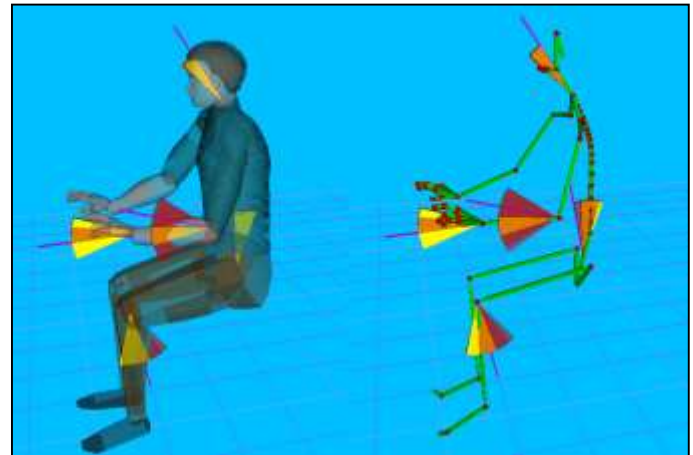
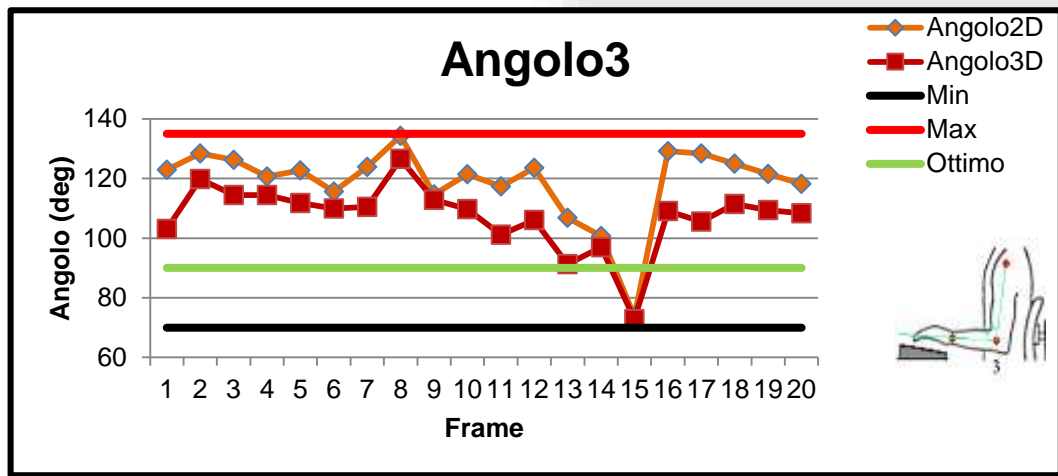




# MONITORAGGIO ANGOLI



Dreyfuss H.



## MAPPE DI COMFORT



# Comfort Assessment and Pressure

Comparative comfort assessment to improve design of office chairs and sofas.



Armonia

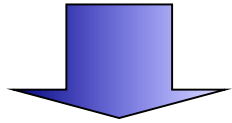


Massimo

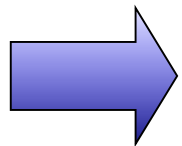
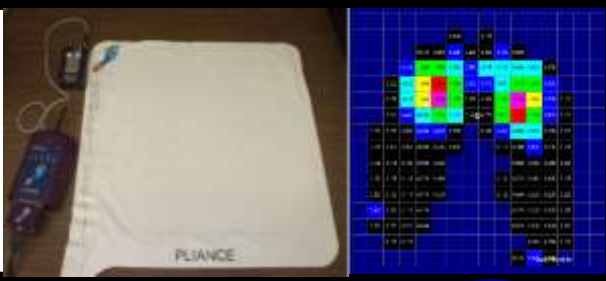


# Seat comfort improvement

*Control Factors*  
*Chair design*  
*Material characteristics*

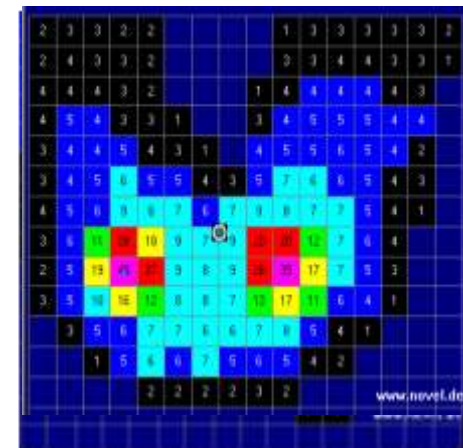
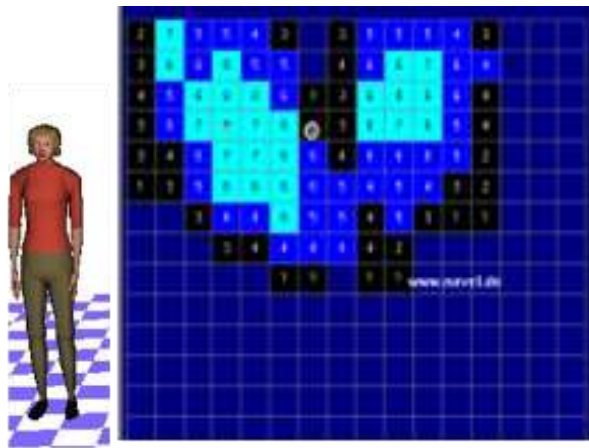


***Experiments***

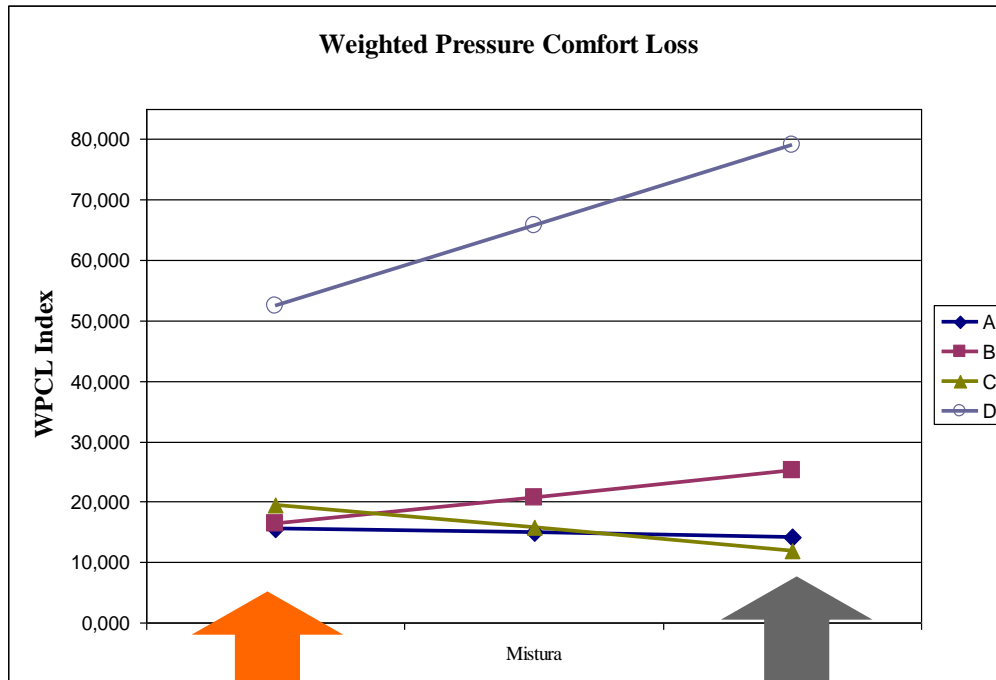


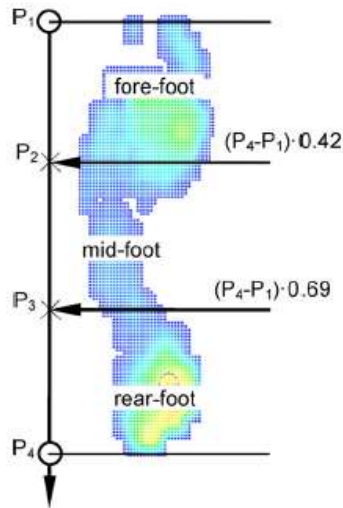
*Response*  
*Comfort index*





Weighted Pressure Comfort Loss





P. Franciosa et al. / Medical Engineering & Physics 35 (2013) 36–46

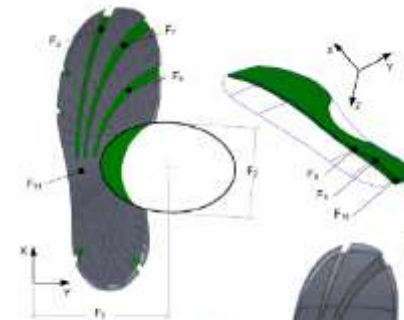
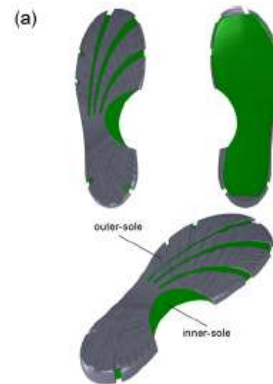


Fig. 4. Geometrical design

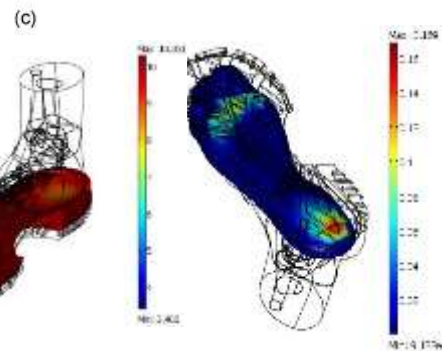
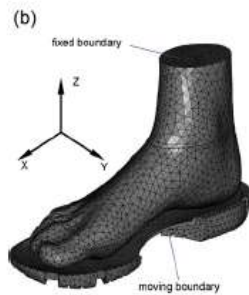


Table 5b  
Shoe design according to the adopted L30 factorial array.



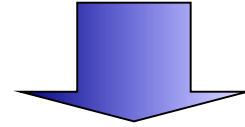
Factor	Value	Factor	Value
F <sub>1</sub>	169 mm	F <sub>7</sub>	129 mm
F <sub>2</sub>	55 mm	F <sub>8</sub>	93 mm
F <sub>3</sub>	3 mm	F <sub>9</sub>	2.0 mm
F <sub>4</sub>	soft	F <sub>10</sub>	medium
F <sub>5</sub>	soft	F <sub>11</sub>	medium
F <sub>6</sub>	OFF	F <sub>12</sub>	ON
F <sub>7</sub>	ON	F <sub>13</sub>	ON
F <sub>8</sub>	ON	F <sub>14</sub>	ON
F <sub>9</sub>	2.0 mm	F <sub>15</sub>	1.0 mm
F <sub>10</sub>	1.0 mm	F <sub>16</sub>	1.0 mm
F <sub>11</sub>	OFF	F <sub>17</sub>	ON

Comfort degree	<b>7.80</b>	Comfort degree	<b>3.39</b>
optimal shoe design		initial shoe design	

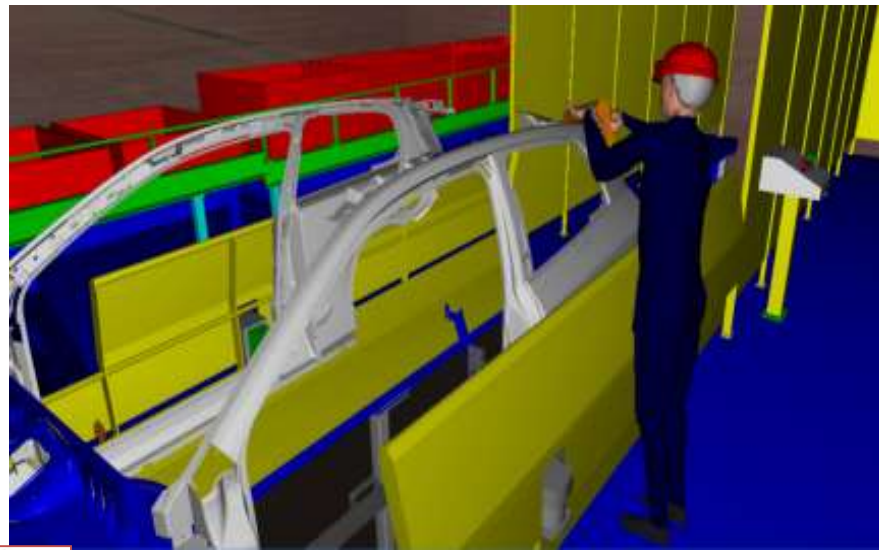


# Manual workcell simulation

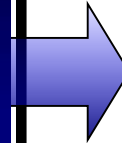
Geometric features of a workplace



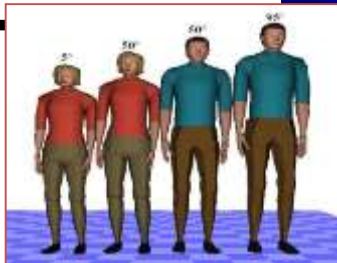
Virtual simulation  
of manual tasks  
by using digital  
human models



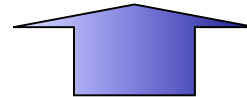
Ergonomic  
indices



*PEI, WEI*

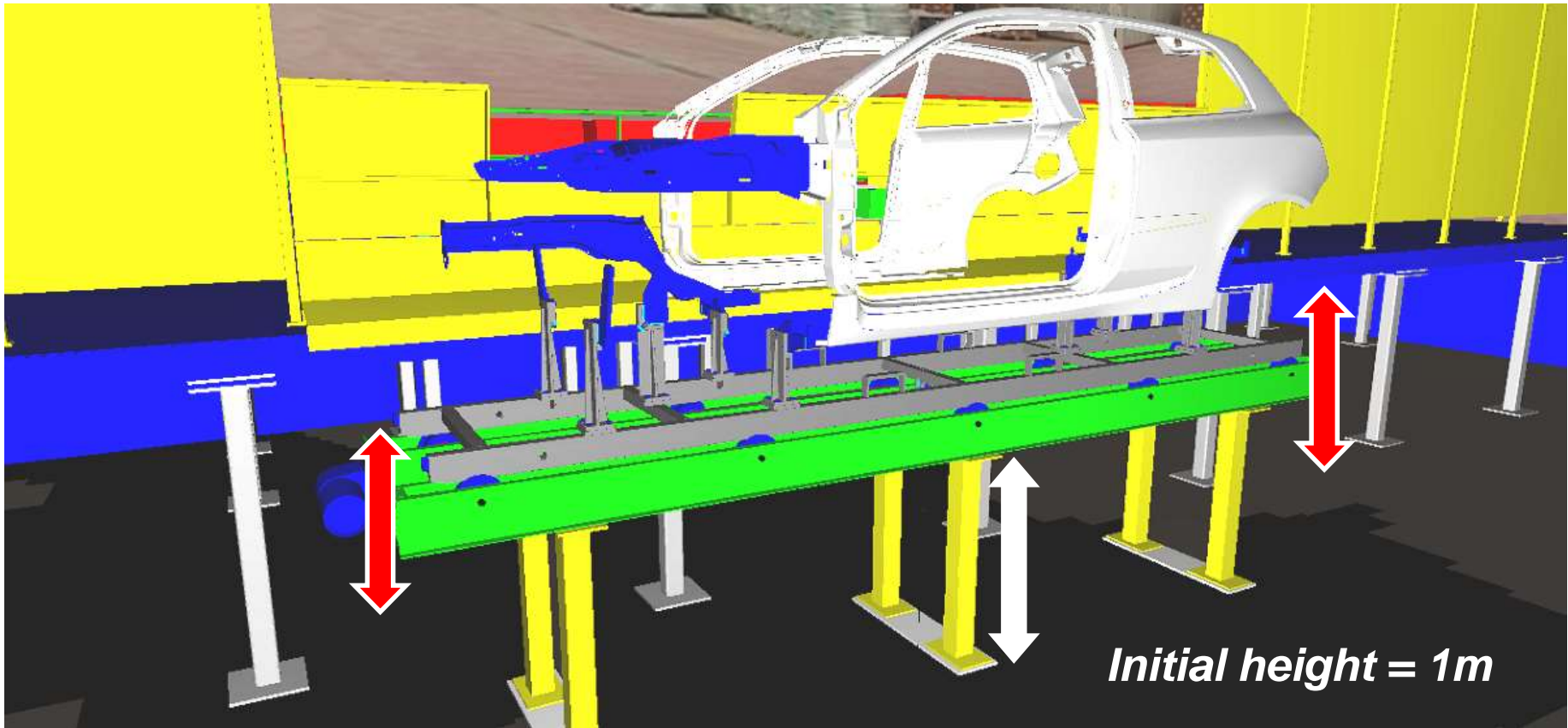


5-th, 50-th, 95-th percentile  
of human manikins



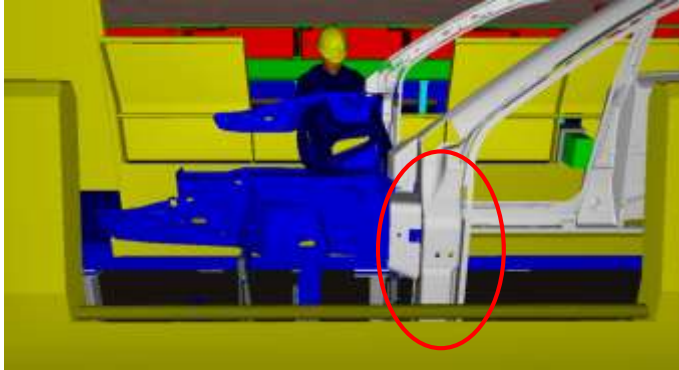
# I) Manual workcell simulation

## *DEFINITION OF THE BEST HEIGHT FOR THE ROLLER BED*



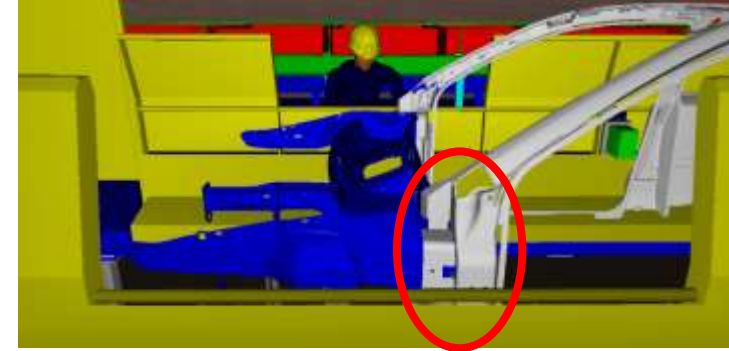
# I) Manual workcell simulation

## WELDING VISUAL CONTROL



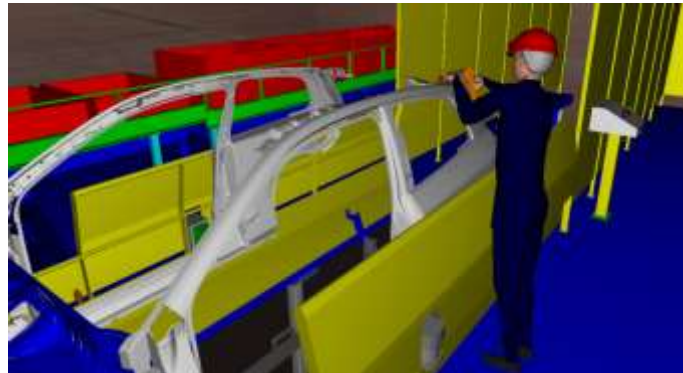
SPOT WELDING VISIBLE

Lower limit  
95cm  
(-5cm)



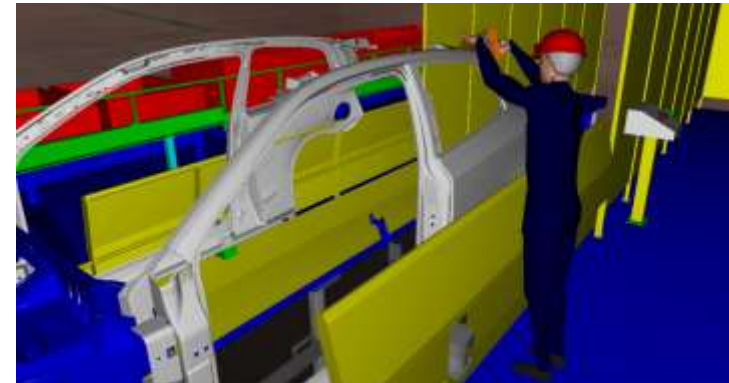
SPOT WELDING NOT COMPLETELY VISIBLE

## SMEARING SEALER WITH GUN



OPERATION MADE BY THE 5th perc.

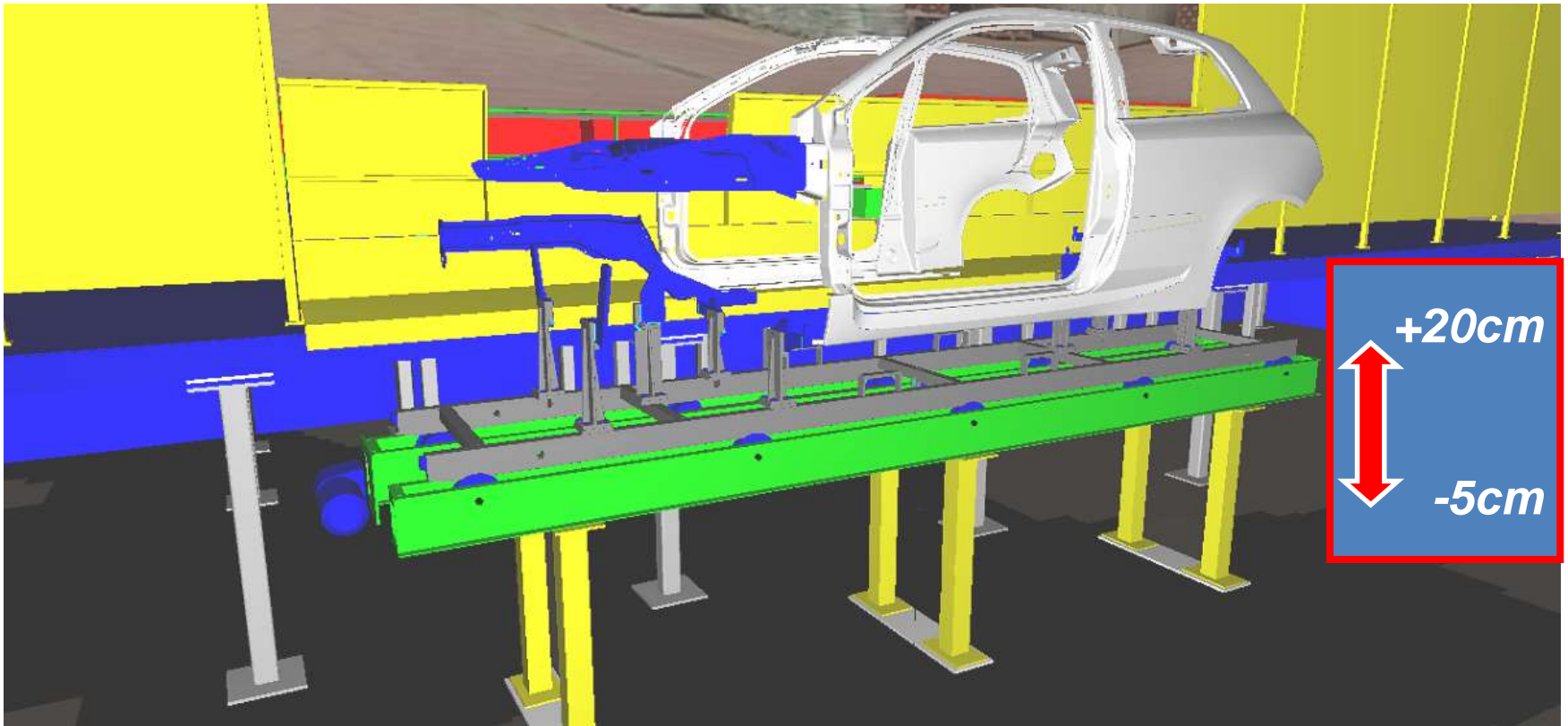
Upper limit  
120cm  
(+20cm)



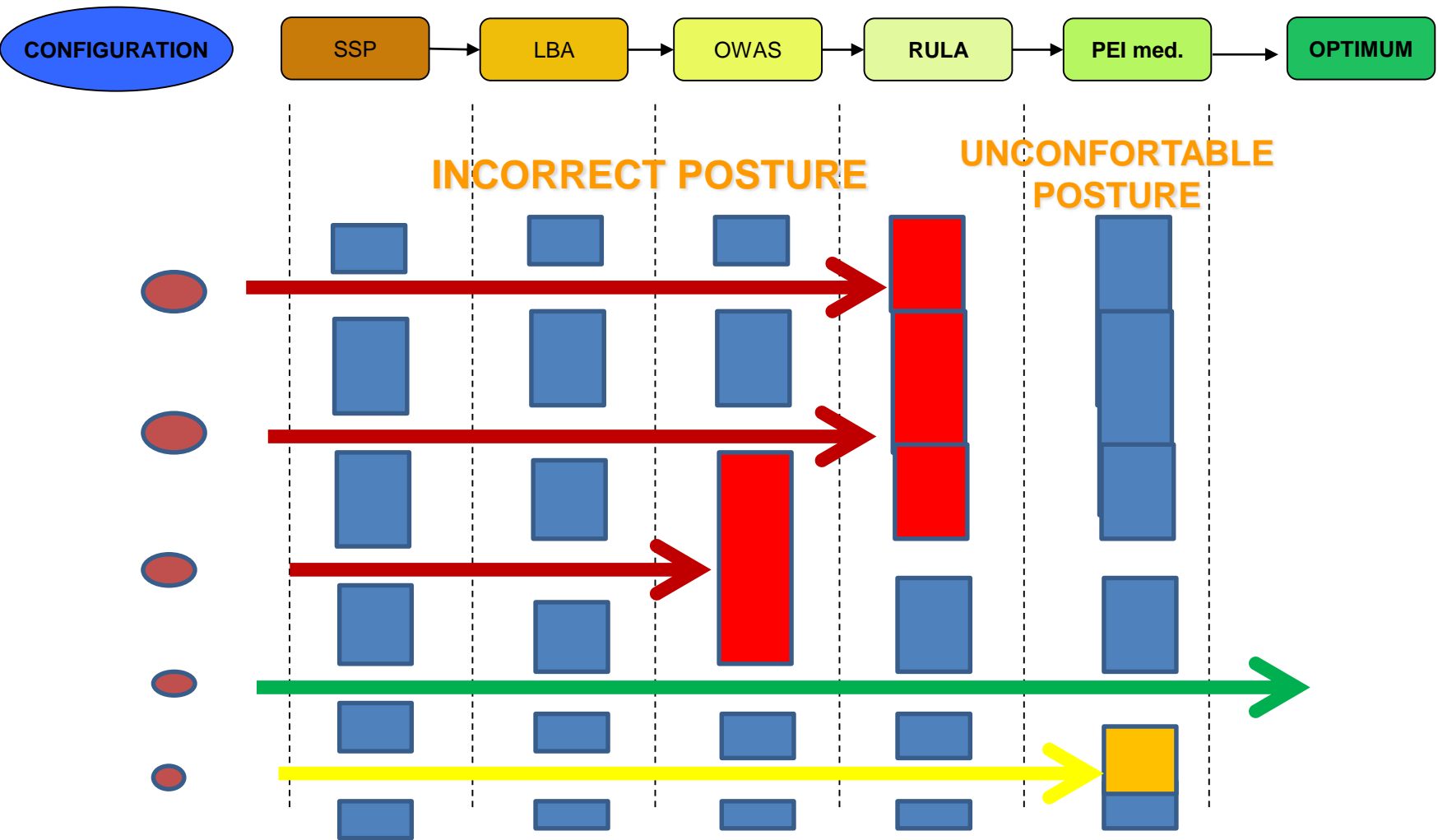
OPERATION HAZARDOUS FOR THE 5th perc.

# I) Manual workcell simulation

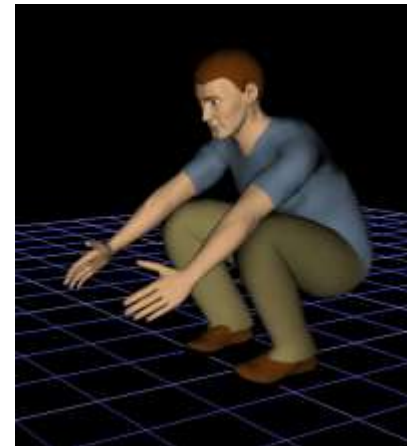
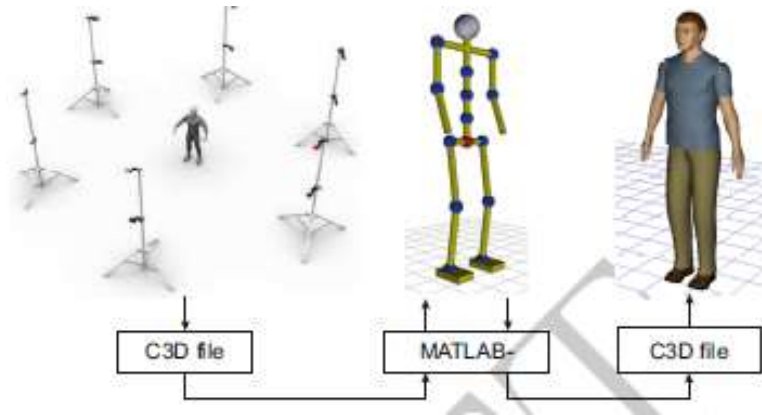
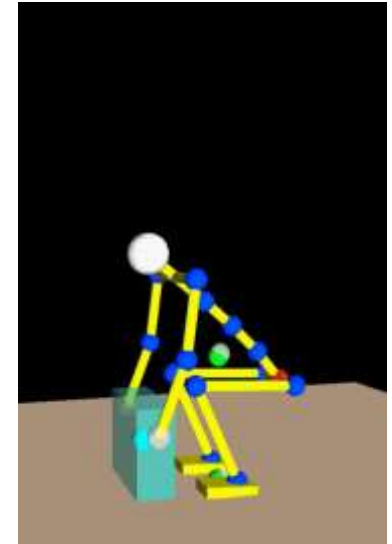
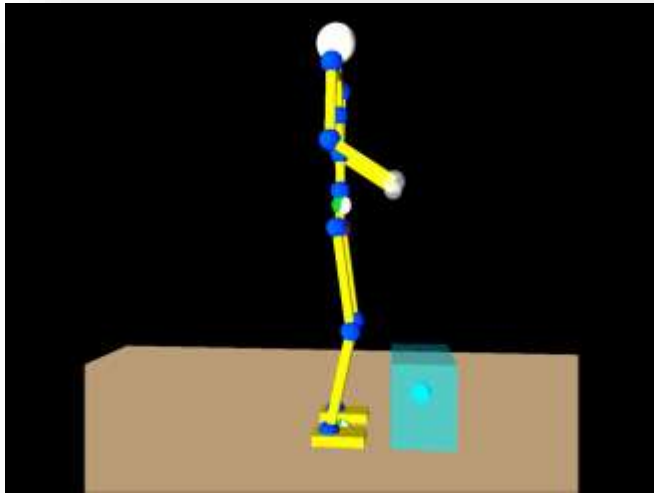
## *MAX ALLOWABLE HEIGHT VARIATION*



# PEI method as a "FILTER"

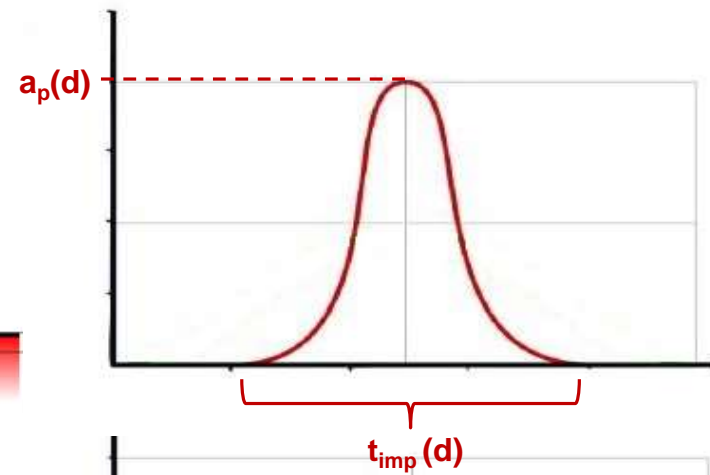
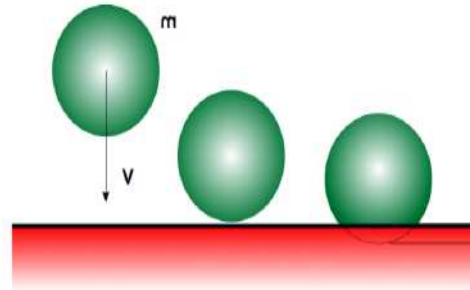
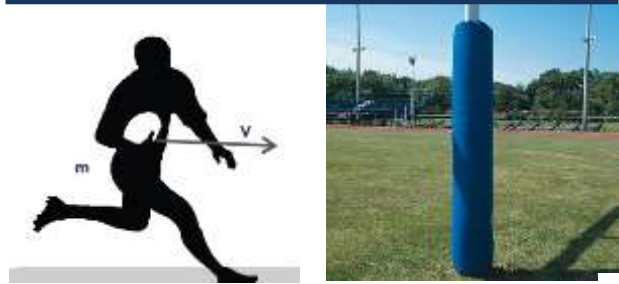


# VIRTUAL ERGONOMICS

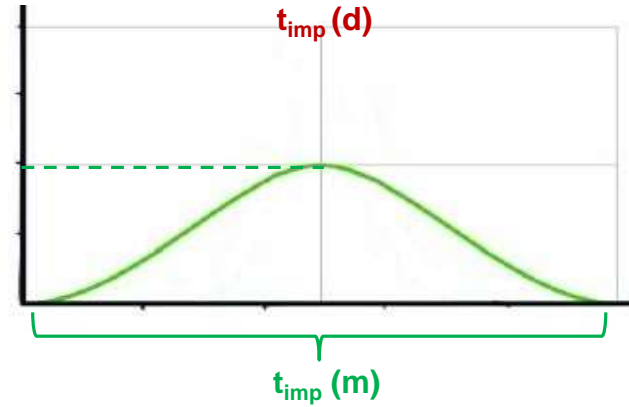
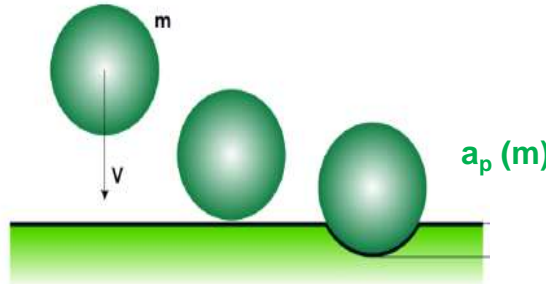


# RISCHI DI IMPATTO IN IMPIANTI SPORTIVI

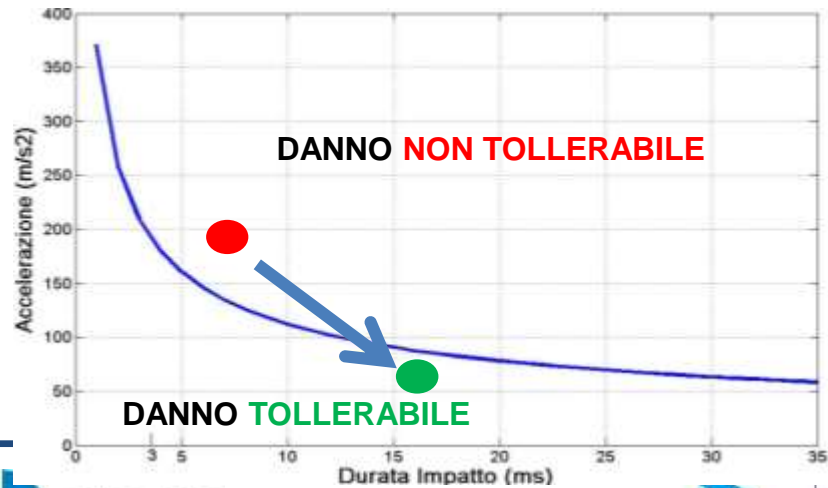
## RUGBY



## BASKET



## CALCIO



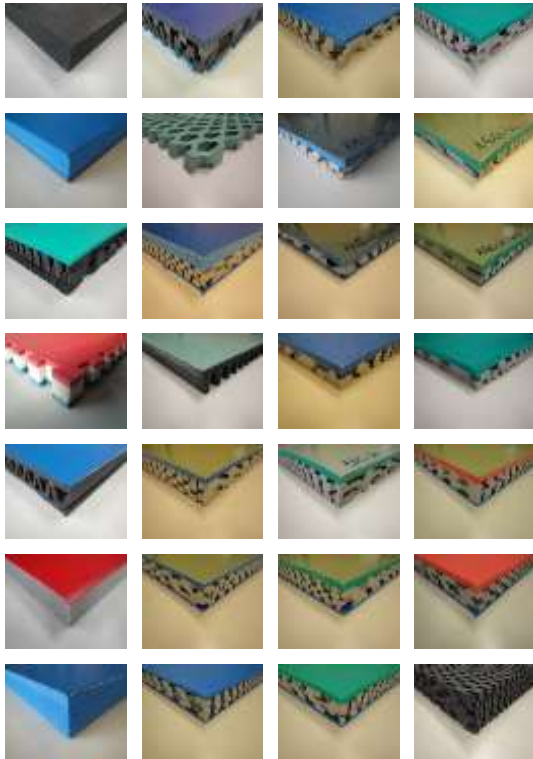
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## TEST DI IMPATTO: CAMPAGNA SPERIMENTALE

**50**

### TIPOLOGIE DI ARCHITETTURE

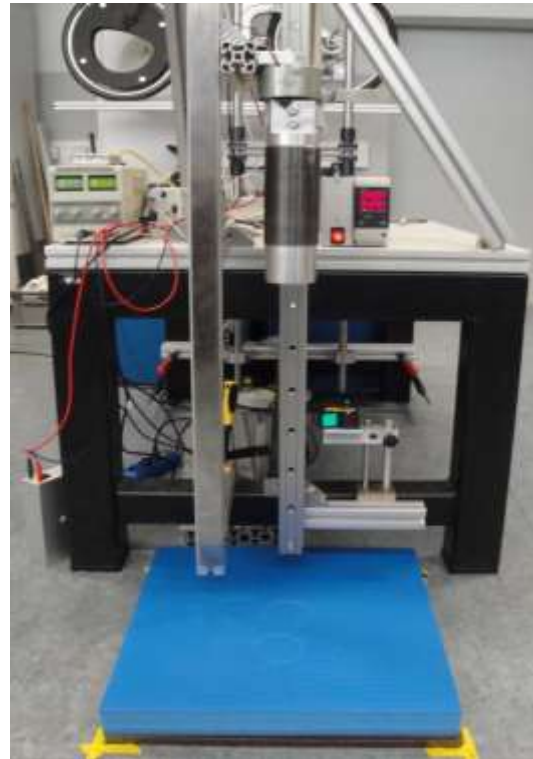
testate in Polietilene Espanso  
Reticolato a Cellula Chiusa



**1**

### APPARECCHIATURA

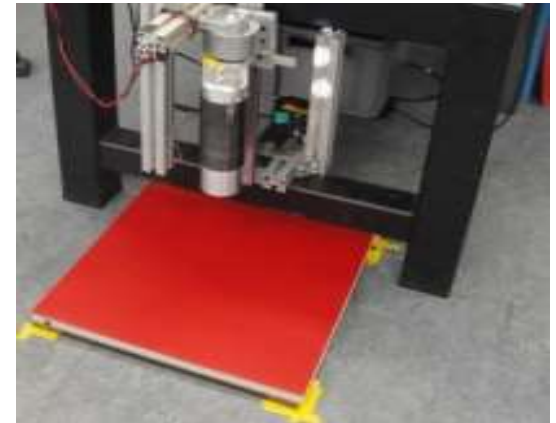
innovativa per test d'impatto,  
progettata e costruita.



**12**

### MESI DI TEST

e oltre 1500 impatti



# Kinder



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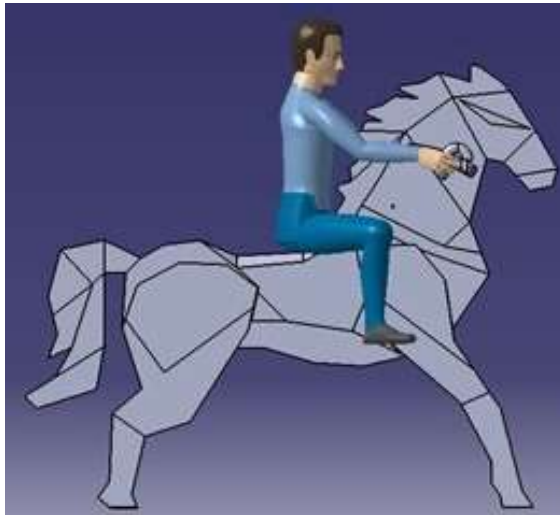


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