



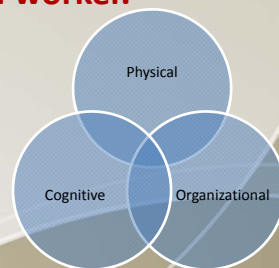
Northern Illinois

Ergonomic Simulation and Modelling software: Jack 7.1

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NEIL Chapter NIU Student Day

Ergonomics

- **Ergonomics: Study of work; study of fitting jobs to people who do them**
- **Human factors in design**
- **User-centered approach to research and design.**
- **Ergonomic workplace can make the work more comfortable to an individual worker.**
 - Domains of ergonomics
- **History of ergonomics**



Benefits of an ergonomic workplace

- **Decrease musculoskeletal disorders**
- **Promote efficiency and productivity**
- **Ensure the capacity of human is not exceeded**
- **Balance needs of people with real life limitation**
- **Promote health and well-being of the employees**
- **Reduce operator fatigue and discomfort**
- **Reduce sick leaves, absenteeism and turnovers**
- **Decrease rework costs**
- **Increase profits**



Musculo skeletal disorders (MSDs)

- **MSDs : Major ergonomic issue in workplaces**
- **387,820 MSDs cases (33% of all worker injury and illness in 2011, BLS)**
- **\$13 to \$54 billion annually, NIOSH(2001)**
- **Industries with highest rate of MSDs**
 - Healthcare
 - Transportation
 - Warehousing
 - Retail & wholesale
 - Construction



Ergonomic software

- **Jack software : Human modelling & simulation tool**
- **5 elements of analyzing work worker & outside & economic influences**



Jack features

- **Scalable human figures that are anthropometrically and biomechanically accurate**
- **Country-specific anthropometric data**
- **Posture algorithms that help analyze how a body reacts to exerted force**
- **Ability to customize the work place**
- **Ability to manipulate the scene and the objects**
- **Ability to save all work and do the performance evaluation**
- **Ergonomic analysis tools available**



Analysis Tool Kit

- **Ergonomic analysis tool kit**
 - Fatigue analysis
 - Lower back analysis
 - NIOSH lifting equation
 - Rapid Upper Limb Analysis
 - Metabolic Energy Expenditure
 - Static Strength Protection
 - Predetermined time standards
 - Ovako Working poster analysis
 - Manual handling Limits



Jack benefits

- **Improve compliance with ergonomic goals during product design and manufacturing**
- **Avoid rework costs by uncovering human performance and feasibility issues earlier**
- **Visually capture and store best practices for future programs**
- **Enhance workplace safety and efficiency**



Video



Strength & Weakness of Jack

Strength

- Easy and simple to use
- Enable us to design an ergonomically safe workspace suitable for 95% of the workers.
- Helps us to customize workspace and figures

Weakness

- Need technical expertise and support to operate
- Proper knowledge about the task, elements involved and the work environment
- Dimensions of the work station & physical characteristics of the worker need to be known
- Operating system compatibility & few bug issues



Questions?

THANK YOU



References

- <http://www.cbs.state.or.us/osh/pdf/ergo/ergoadvantages.pdf>
- http://www.plm.automation.siemens.com/en_us/products/tecnomatix/assembly_planning/jack/
- <http://www.ohlearning.com/Files/Student/JF02%20v1-0%2010Apr10%20W506%20Student%20Manual1.pdf>

