ERGONOMICS in Early phase design in Industry

"ERGO 2018: Human Factors in Complex Systems and Environments” St. Petersburg 3.-7.7.2018

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GUESTIONS TO BE ANSWERED

• What are the necessary conditions that are needed for doing ergonomics?
  • On National level?
  • On Company level?
• What are the differences in understanding of ergonomics between Ergonomists and enterprises in practice?
  • Research?
  • Management and designers at companies?
  • Education?
  • Consultants?
• Current status?
• Target?
• Actions to be done?
ERGONOMICS IN INDUSTRY?

R&D
Product development
project

Designing of new Product (or service)

Analyzing and Designing Productivity and becoming Manufacturing process

DFM DFA FMEA available?

Planning and designing production

Needed changes and development needs (planning, Designing, Implementing)

DFM DFA FMEA available?

PRODUCTION

Running Existing production

Outcomes Functions
Reaching set targets
Control, follow up
Measuring, reporting
Etc.e.tc.

Used outsourcing. Subcontracting

Used outsourcing. Subcontracting

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PROACTIVE OR REACTIVE ERGONOMICS?

NEEDED now and in the future

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Definition of Industrial Engineering

• “Industrial Engineering is concerned with the design, improvement, and installation of integrated systems of men, materials, equipment and energy. It draws upon specialized knowledge and skill in the mathematical, physical and social sciences together with the principles and methods of engineering analysis and design to specify, predict, and evaluate the results to be obtained from such systems”.

IEA Strategy
Ergonomics is a system approach, design driven and it has two outcomes
Performance of the system and wellbeing
Science, theory, principles
HUMAN FACTORS + SYSTEM = ERGONOMICS

Focus on
- Product/service
- Work/action
- Work environment
- Used methods, tools and technologies
- Set targets for the actions

Human Factors
In relation to:
- Action in focus
- Environment
- Used methods, tools and technologies
- Used methods
- Set targets

"Human Technology"
- Physical
- Cognitive
- Organizational

Overall capability of the system
ACTIVITY IN TODAY....

The work in question
- Work environment
- Work tasks
- Work methods
Requirements for the human
- In the work in question
- Set targets for the work in the company
Capability of the company to use ergonomics
- Etc.

Individual character and capabilities
- Suitability in the work in question
- Way of acting in the work in question
- Reaching the targets in the work in question
- Health and safety at the work in question
- Motivation and individual targets
- Wellbeing at work
- Etc.

Studying worklife through individuals

Using ergonomics science, theories and principles

NOT IN FOCUS

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ERGONOMICS IN INDUSTRY IS AN IMPORTANT PART OF PRODUCTIVITY

Productivity

Shigeyasu Sakamoto

Method \times Performance \times Utilization

Work Method
How good?

Performance
How exclusive?

Utilization
How long?

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TIME!!!!!
TIMESTUDIES OR WORK STUDIES?

This it is what is done today

This it is what shall be done !!!!
FROM PRODUCT TO WHOLE PRODUCTION

Production type in relation to product and used technologies and manufacturing methods in relation to set targets. Structures, functions, health, safety, productivity. Including supportive functions like cleaning, filling materials, conveying, repairing etc.

MANUFACTURABILITY (DFM)

Used technologies, automaton, semiautomation, robotics, machines, Equipment, systems (SW) and methods for manufacturing and producing.

TECHNOLOGY DEVELOPMENT (NEEP)

Product specific tools, usability, safety, ergonomics, quality etc.

TOOL DESIGN (PSPHW)

Product, materials, parts, assemblybility, assembly methods, handling of parts quality requirements etc. From human factors and productivity point of view.

PRODUCT DESIGN (DFA)

Different Systems in connection to whole System...

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HUMAN BEHAVIOUR IS GUIDED BY THE STRUCTURES, SYSTEMS AND WAYS OF WORKING IN THE ORGANIZATION

OPERATIVE MANAGEMENT

The DATA and KNOWLEDGE
The management use?
What, for what, how, why?
Decision making
How, based on what,
Where does effect?
WHEN?

OPERATIVE ACTIONS

What kind of operational Planning?
Metrics that used?
How implemented?
How to be used?
What kind of follow up?
What`s measured? WHY?
Where and how reported? WHY?

How operations Are running?
How used?
How controlled and Followed?
What is measured? WHY?
Where reported?
HOW AND WHY?

TRANSPARENCY!!! ("Scientific management, ILO")
SYSTEMATIC APPROACH IN ORGANIZATION IS THE BASE FOR ERGONOMICS IN DESIGN AND CO-OPERATION

Factories use the information of the outputs to design the manufacturing process for ensuring good quality and output (NOTE! By noticing factory specific and product specific factors interfaces)

Capacity calculation, production type, needed machines, conveyors...

Analyzing, defining and designing product construction and assemblyability

New technology development? NEEP

Input from mechanics design to IMP for analyzing and designing the most optimal package for product and production

Input from mechanics design to PSP HW for tool design

Pre Production build feedback about the product construction and PSP HW

Factory specific by factory

Capacity calculation, production type, needed machines, conveyors...

Analyzing, defining and designing product construction and assemblyability

New technology development? NEEP

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Factory specific by factory
PERFORMANCE OF A PROCESS (SYSTEM)

Upper level
Target level
Lower level

Process (manufacturing, assembly, service, man/machine...)

Work phases in the process

ENDRESULT
- Reach set targets
- Safe
- Healthy
- Productive
- Good quality

“Natural wobbling”
NOTE! Different than variation!!!
ARE HUMAN FACTORS INCLUDED IN NATIONAL LEVEL ACTIVITIES?

The machine that enables ergonomics?
SYSTEM THAT PROMOTE AND ACT FOR ERGONOMICS ON NATIONAL LEVEL.

STRONG EFFECT!! example
The real need for ergonomics in practice?

**Company in Question**
- Structure of organization
- Industrial area
- Internal skills, and competences
- Systems in use
- Way of working
- Customer requirements
- Co-operation partners
- Etc.

**Ergonomists need skills and Competences in:**
- Studying customer`s systems
- Defining needs in co-operation with the customer
- Marketing services
- Making Productizing
- Managing projects

Ergonomists need clarity in the role when acting as an ergonomist!!

ERGONOMICS services, products, education, coaching, Consultation etc.
WHAT COULD BE THE FUNDAMENTALS OF ERGONOMICS COMPARED TO INDUSTRIAL ENGINEERING?

Areas of Industrial Engineering (IESE)

- Operations Research
- Innovation Technology
- Environment/Sustainability
- Human Factors Engineering
- Manufacturing & Systems Engineering
- Management Systems

Industrial Engineering Standards in Europe (The IESE Project)
http://www.iestandards.eu/
Funded by the Leonardo EU Program
Life Long Learning
RESULTS OF STUDY!!! Click the icon
HOW ABOUT HAVING AN DESCRIPTION OF LEVELS in CAPABILITY TO DO ERGONOMICS?
FUTURE???

Ergonomics play a remarkable role!!!

IoT and Industry 4.0

WORK IN FUTURE? INDUSTRY IN FUTURE? ERGONOMICS IN FUTURE?

COMPANIES ABILITY TO ANALYZE OWN SITUATION? DEFINE NEEDS, ASK FOR HELP IN DESIGN

HOW WELL OWN STATUS IS KNOWN? How in detail the Organization's processes are studied, described and documented?

Be prepared for this!!!!

Reshape this!!!!!
Let`s help each others to find a road to actions to implement Ergonomics in daily design in industry

THANK YOU!!!!

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