

ISE 311 – Ergonomics & Work Measurement

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Key Concepts

- Name (from the Greek)
 - *erg*
 - *nomos*
- Terminology
 - ***Ergonomics*** : *the study and optimization of the interaction between people and their physical environment by considering their physical, physiological, and psychological characteristics.*
 - ***Occupational ergonomics*** *concerns the application of ergonomics principles specifically to the workplace and related tasks.*
 - *ergonomics vs human factors*

Your Turn ...

- Why is it important that engineers concern themselves with ergonomics? Consider in your response:
 - productivity
 - effectiveness
 - safety
 - ethics
 - others?

History

- Wojciech Jastrzebowski (1857)
- Frederick Taylor (1911)
- Frank & Lillian Gilbreth (1911)
- Ralph Barnes (1933)



Productivity

- Definition:
 - 1 : the quality or state of being productive [yielding results, benefits, or profits]; 2 : rate of production (Merriam-Webster Online, <http://www.m-w.com/>)
 - general : ratio of output to input
- Examples: Personal productivity

- Examples: manufacturing/service productivity

Benefits of Productivity

- Personal Benefits (pp. 8-9 of your textbook)

- Organizational Benefits
 - increased volume
 - decreased cost
 - improved services

Components of Productivity

Component	Improve productivity by:
land	better seed, fertilizer, insecticides, agricultural methods
materials	better materials, insulation, design
machines	scheduling, logistics, design
labor	work methods, selection, training, incentives
technology	tools, equipment, knowledge

ISE 311 - 1

7

Working Smart vs Working Hard

■ Working smart



Figure 1: Square wheels
(© Performance Management Company)

working hard vs



smarter vs



vs ... ?

ISE 311 - 1

8

Working Smart and Working Hard

Smart	Hard
Reduce work content	More product
Improve product design	Attention to quality
Standardize	Additional products/markets
Appropriate quality standards	Continuous improvement
Reduce waste	
Energy efficiency	
Improve work methods	
Improve tools and equipment	
Proper management	

ISE 311 - 1

9

Role of Ergonomics & Work Measurement

- Ergonomics & work design
 - improve safety, health, and wellbeing
 - increase efficiency and productivity
 - reduce cost
- Work measurement (time study)
 - measure effectiveness
 - control cost
 - manufacturing plants with no time standards average 60% performance
 - manufacturing plants with time standards average 85% performance
 - manufacturing plants with incentive systems average 120% performance

ISE 311 - 1

10