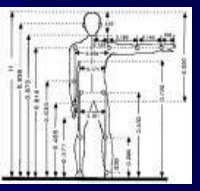
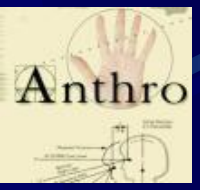
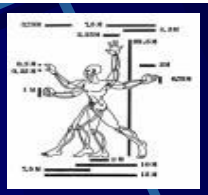


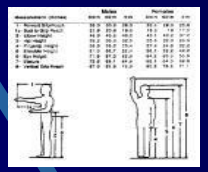




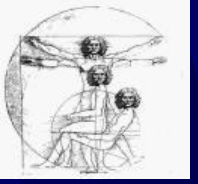







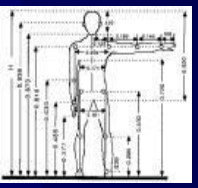


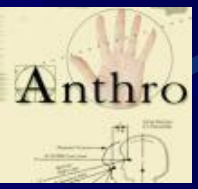
PENGANTAR TEKNIK INDUSTRI







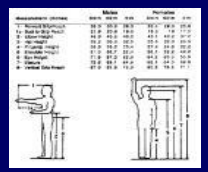












LECTURER CONTENT:

- ❑ Tujuan Instruksional Mata Kuliah: MPK & PSK
- ❑ Materi Pokok Ajaran
- ❑ Reference
- ❑ Arti, Definisi, & Fokus Pendekatan
- ❑ Ergonomics : Objectives , Justification Program, Research, Industrial
- ❑ Some Importance of Ergonomic & Problematics
- ❑ Penutup & Diskusi

Tujuan Instruksional…[1]

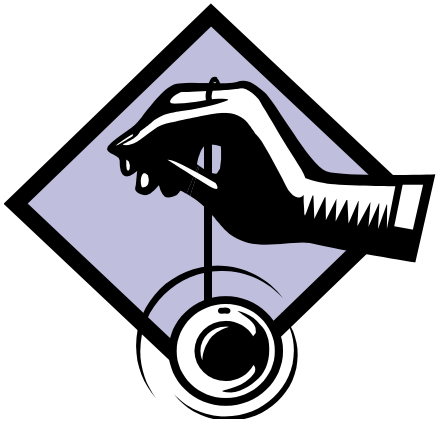
- APK adalah mata kuliah yang dirancang terutama untuk memberikan wacana, studi kasus pengukuran kerja, dan pemahaman tentang interaksi manusia --- dengan segala kemampuan, kelebihan, kekurangan maupun keterbatasannya --- dengan mesin (fasilitas produksi) maupun lingkungan kerja di industri. Pemahaman dan penguasaan materi studi akan memberi manfaat di dalam upaya menghasilkan APK yang optimal dan memungkinkan terwujudkannya kondisi kerja yang efektif, nyaman, aman, sehat dan efisien (ENASE). Studi ini juga akan mengenalkan APK bagi analisis dan perencanaan pengukuran & perancangan kerja sistem manusia-mesin yang akan menjadi landasan dalam proses pengukuran performans dan produktivitas kerja manusia

Tujuan Instruksional…[2]

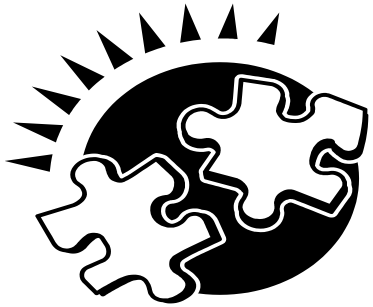
- Setelah selesai mengikuti proses belajar-mengajar, makamahasiswa diharapkan akan memiliki pengetahuan, pemahaman, dan kompetensi mengenai (1) metode-metode & teknik-teknik analisis --- dengan mengenali sifat, perilaku, kelebihan, keterbatasan, dan kemampuan manusia --- untuk memperoleh metode pengukuran sistem kerja & metode perancangan kerja yang ergonomis, (2) konsep & prinsip dasar ergonomi dalam pengukuran kerja yang selanjutnya mampu pula mengaplikasikannya didalam setiap upaya peningkatan kerja melalui sebuah pengukuran & perancangan sistem manusia--- mesin (dan juga lingkungan fisik kerjanya) yang layak, dan (3) mengaplikasikan dan mengkaitkan hasil pemahaman materi studi di dalam aktivitas penelitian dan pengembangan untuk peningkatan dan metode pengukuran kinerja manusia, organisasi, dan industri.

Isi Materi Pokok Ajaran…[1]

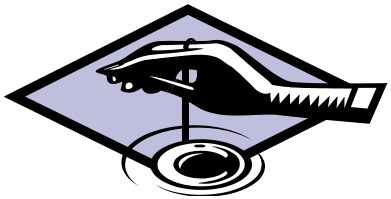
APK I…



- Pendahuluan
- *Ergonomi*: Manusia Sebagai Komponen dalam Sistem Kerja
- *Ergonomi* & Pengukuran Kerja di Industri
- *Ergonomi*, Perancangan Tata Cara Kerja & Pengukurannya
- *Ergonomi* & Pengukuran Peralatan/ Fasilitas Kerja dan Produk Industri
- Pengukuran Kerja dengan Kriteia Waktu
- Pengukuran Waktu Gerak Kerja
- Metode Pengukuran Kerja
- Studi Gerakan
- Antropometri: Kalibrasi Dimensi Tubuh Manusia
- Pengukuran Energi Fisik Sebagai Tolok Ukur Perbaikan Teknik Tata Cara Kerja
- Aplikasi Teknik Tata Cara kerja dan Pengukuran Kerja dalam Sistem Produksi
- Analisis Produktivitas
- Studi Kasus
- etc.



Isi Materi Pokok Ajaran…[2] APK II…



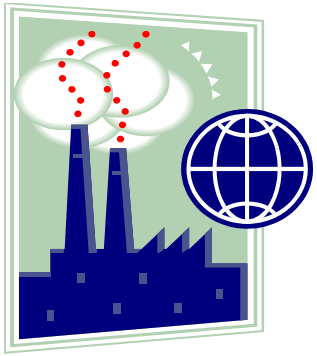
- Pendahuluan : Prinsip dan Dasar Perancangan Sistem Kerja dan Ergonomi
- Penelitian Kerja (Work Design/Study)
- Penataan Sistem Kerja
- Ergonomi : Faktor Manusia dalam Sistem Produksi
- Studi Kasus Riset APK: Jurnal, Skripsi, KP, dll
- Perkembangan *Software* PSK & E dalam Aplikasi Ergonomi Industri
- Perancangan Kerja (Job Design) : Upaya Pendekatan dalam Restrukturisasi Kerja
    - Telaah Metode : Pengembangan Metode untuk Mengefektifkan dan Mengefisienkan Kerja
        - Ergonomi : Faal Kerja dan Biomekanika Kerja
- Ergonomi : Climate Chamber / PenginderaanPresentasi Tugas Besar PSK

Reference

- Barnes, Ralph M., *Motion and Time Study: Desihn and Measurement of Work*, New York: john Wiley & Sons, 1980
- *Bridger, R.S.,* Introduction to Ergonomis*, McGraw-Hill Co. Singapura, 1995*
- Granjean, E, *Fitting the Task to the man: an Ergonomics Approach,* London; Taylor & Fabrics Ltd, 1982
- Huchingson, Dale R, *New Horizons for Human Factors in Design,* New York: McGraw-Hill Book Company, 1981
- Konz, Stephen, *Work Design: Industrial Ergonomics*, Scottsdale, Arizona: Publishing Horizon, Inc., 1995
- Nurmianto, Eko, *Ergonomi: Konsep dasar dan Aplikasinya*, Edisi 1, Cetakan ke-2, Guna Widya, Jakarta, 1998
- Pulat, B. Mustafa, *Fundamentals of Industrial Ergonomics*, Englewood Clifts, N.J.: Prentice-Hall, 1992
- Sanders, M.S., and McCormick, E.J., *Human Factors in Engineering and Design*, New York: McGraw-Hill Inc., 1992
- Sutalaksana, Iftkar Z., *Teknik Tata Cara Kerja*, Departemen TI-ITB Bandung, 1979
- Tayyari, Fariborz and Smith, James L., *Occupational Ergonomics: Principles and Applications*, London: Chapman & Hall, 1997
- Wignjosoebroto, Sritomo, *Ergonomi, Studi gerak dan Waktu: Teknik Analisis untuk Peningkatan Produktivitas Kerja*, Edisi 1, Cetakan ke-2, Guna Widya, Jakarta, 2000
- Etc…..

Arti & Definisi

- Ergonomics (Greek/Yunani), ergon = kerja (work), nomos = hukum (law)
- Human Factors, Human Factor Engineering, Human Engineering, Engineering Psychology, Bio Mechanics/ Bio Engineering, etc.
- *Human Engineered (design for human use)* : to describe a design that conforms with human expectations, or which people use without undue stress
- Aktivitas yang berbasiskan pendekatan multi-disiplin (kedokteran, teknik, psikologi, anthropometry, manajemen, dsb.)
- Mengaplikasikan segala macam informasi yang berkaitan dengan faktor manusia (kekuatan, kelemahan/keterbatasan) dalam perancangan & pengukuran sistem kerja yang meliputi perancangan & pengukuran produk (man-made objects), mesin & fasilitas kerja dan/ atau lingkungan kerja fisik yang lebih efektif, aman, nyaman, sehat, dan efisien (ENASE)
- The study of the interaction between human beings and the objects they use and the environments in which they function (B. Mustafa Pulat, 1992)
- A Discipline concerned with designing man-made objects (equipments) so that people can use them effectively and safety and creating environments suitable for human living and work (Sanders & McCormick, 1987)



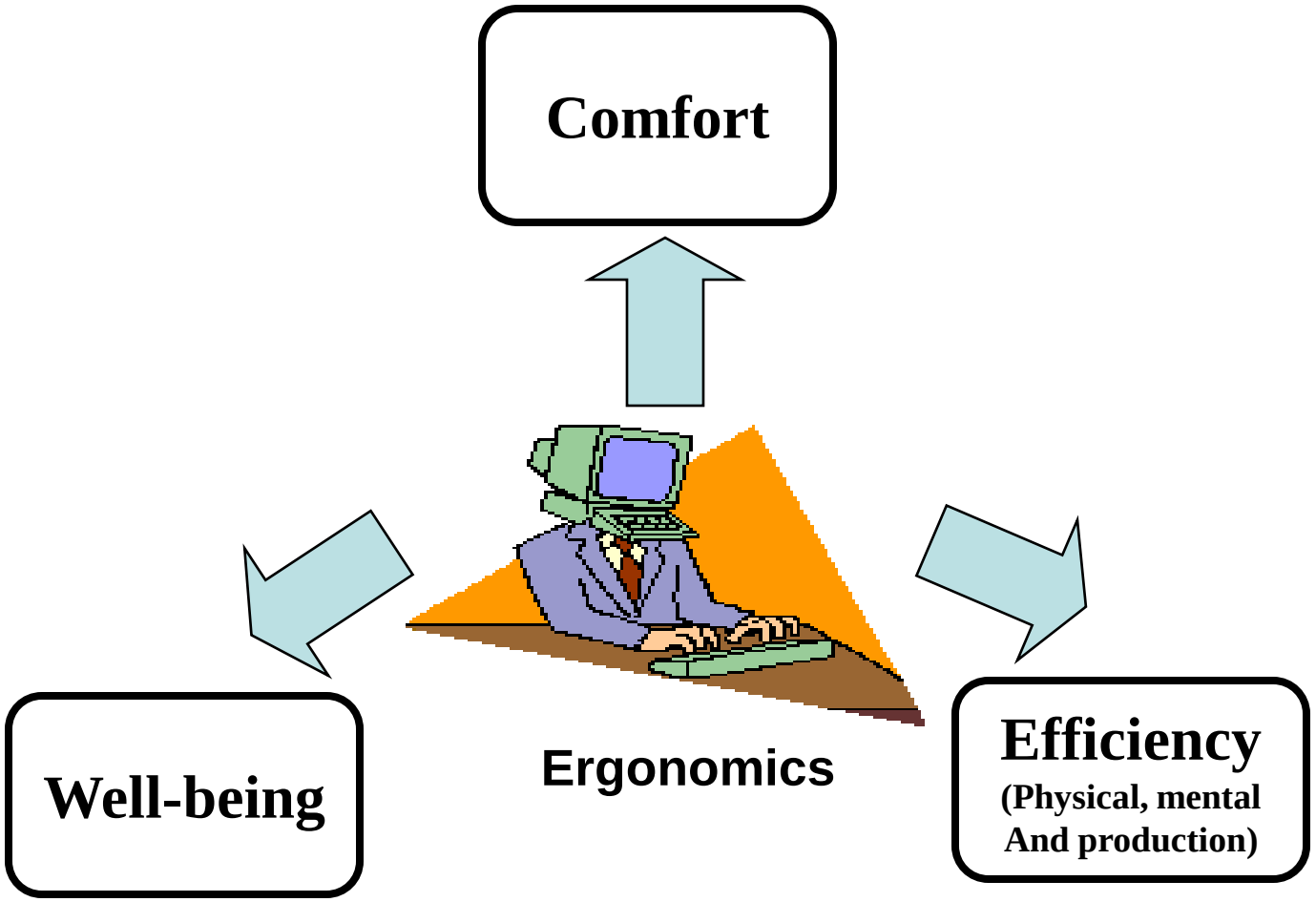
Fokus Pendekatan

- Meningkatkan "*functional effectiveness*" dari interaksi kerja dalam sebuah sistem kerja manusia-mesin dan kenyamanan penggunaan peralatan, fasilitas maupun lingkungan fisik kerja untuk meningkatkan produktivitas serta memperbaiki kualitas kerja (*Quality of Work Life*)

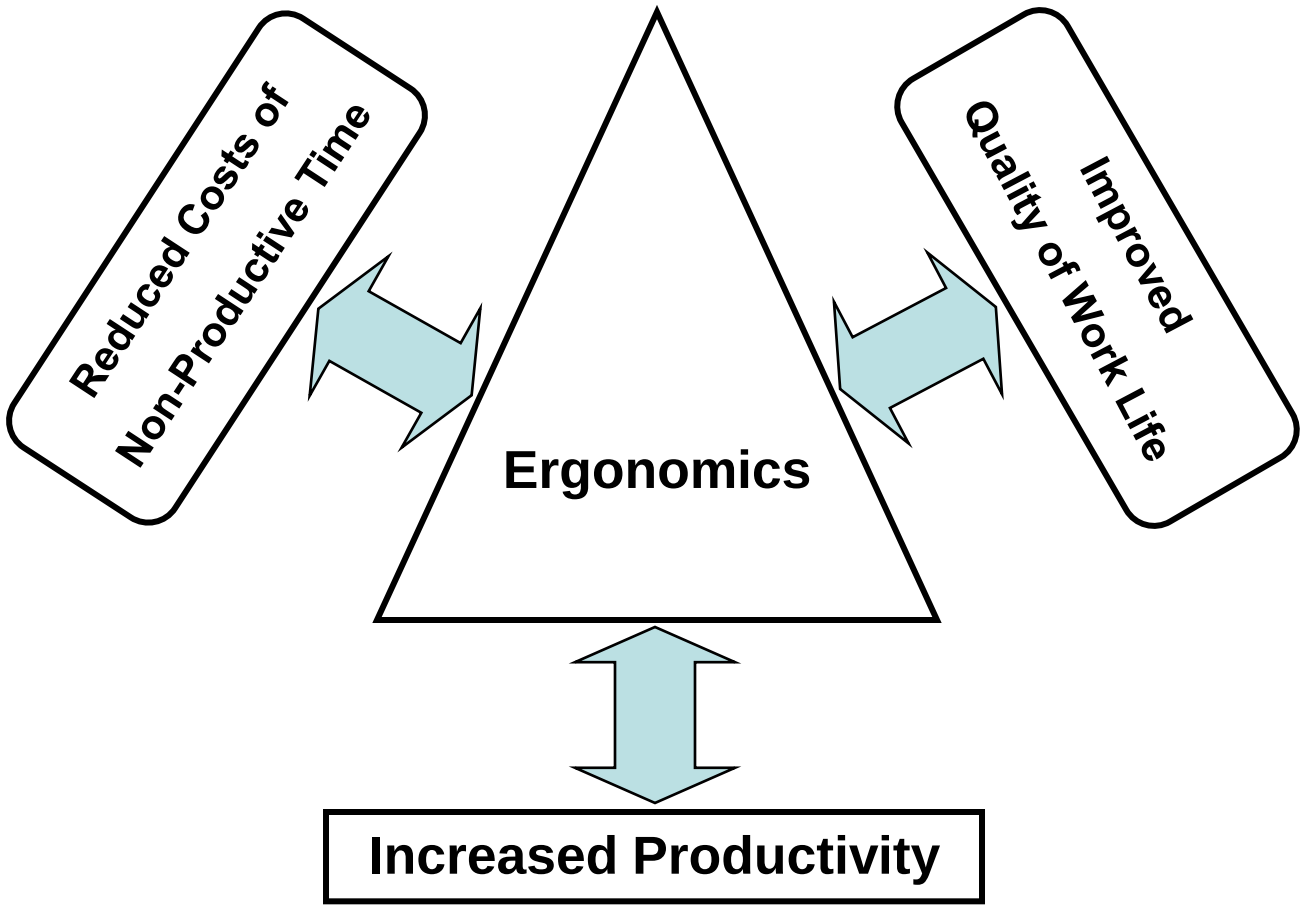
- *Fitting the tasks to the man* (Granjean, 1982) : "*Fitting the demand of work to eficiency of man in order to reduce stress*"

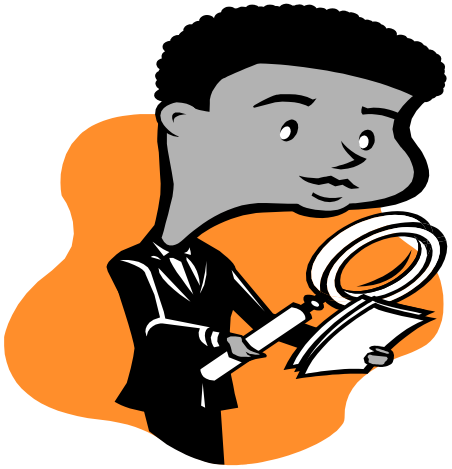
  Perancangan sistem kerja dan pengukurannya dengan memperhatikan faktor manusia (kelebihan dan keterbatasannya) baik secara fisik maupun non-fisik (psikologis)

Objective of Ergonomics



Justification of an Ergonomics Programs

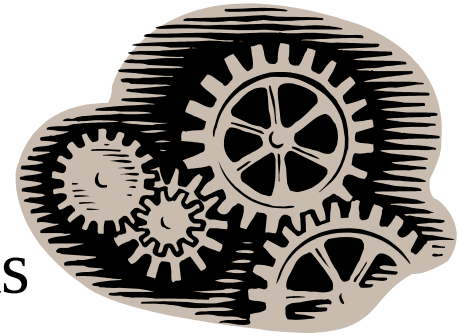




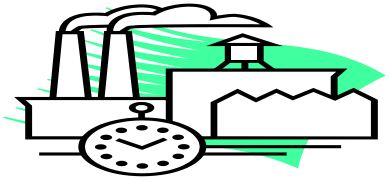
Ergonomics Research

- Study of the ill-effects of poor posture and poorly designed tools on the health of workers. Working out of proportions and conditions of the work place to ensure correct body posture
- To fit (adapt) work to individuals, as opposed to fitting worker to the work, through developing knoledge thet results in efficien adaption of work methods to the individual's psychological characteristics
- To identify and alternative those work stresses that adversely affect the health, safety and efficiency of workers. Designing machines, equipment, and installations so that they can be operated with great efficiency, accurately and safety.
- To ensure that human needs for safe and efficient working are met in the design of work systems. Adapting lighting, air-conditioning, noise, etc. to suit man's physical requirements.

Industrial Ergonomics



- The science of people at industrial works
- The application of those science relating human performance (physiology, psychology, and industrial engineering) to the improvement of the work system, consisting of the person, the job, the tools and equipment, the workplace and work space, and the immediate environment
- The world of industial ergonomic is the real world



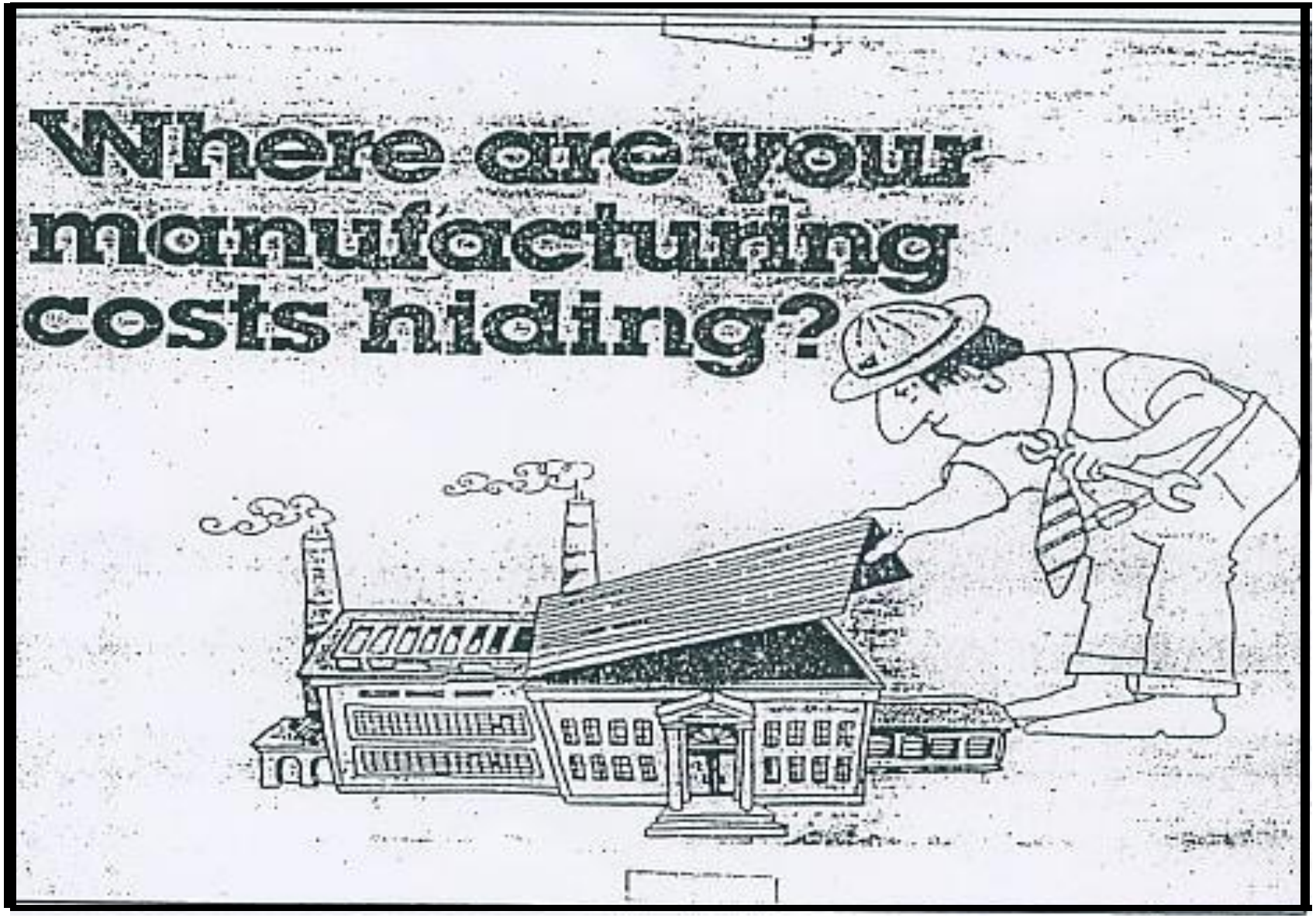
Some Importance Ergonomics Conceps

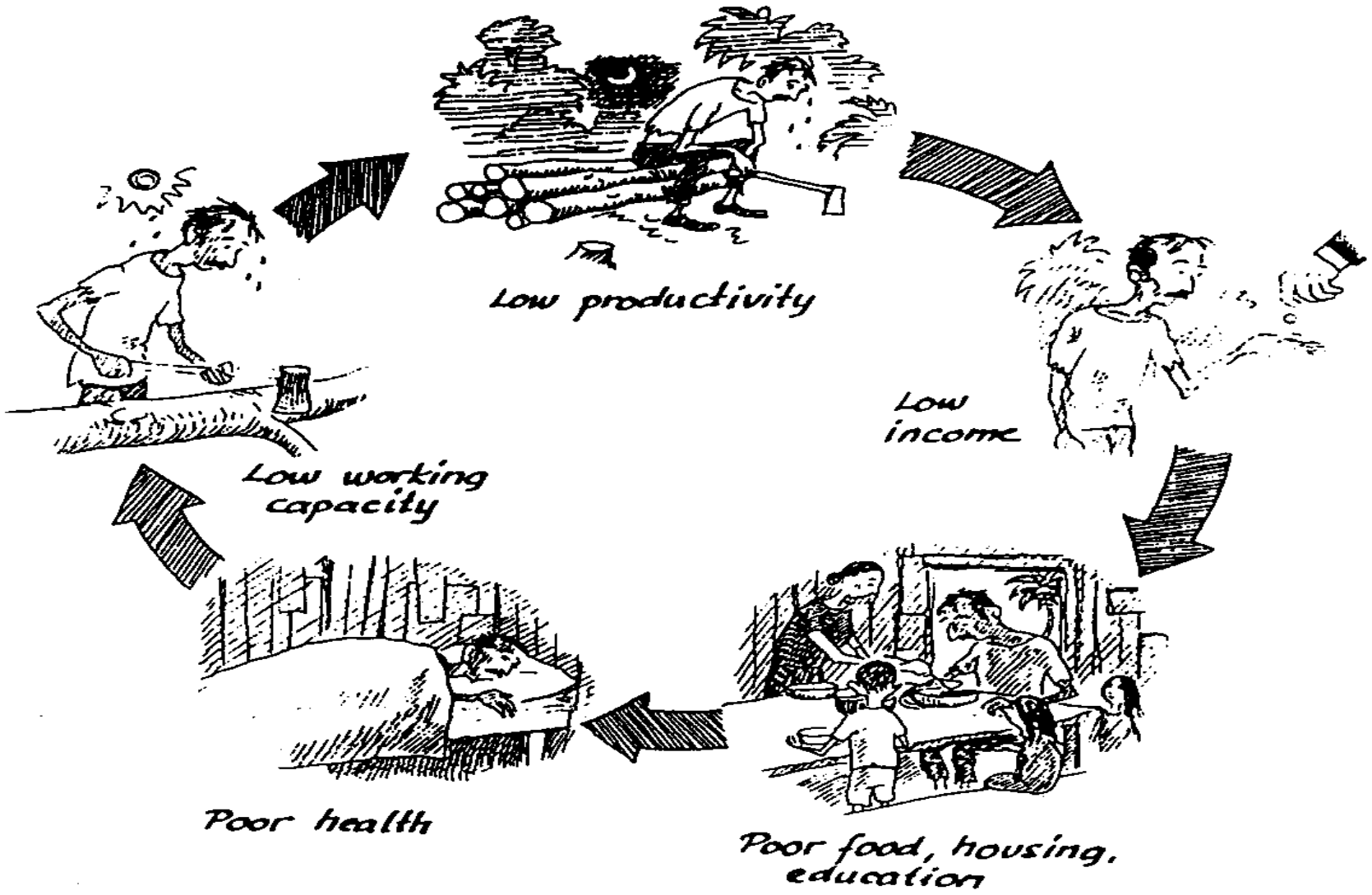
- ***Human performance's concept.*** Centerd on the peson (human), not on the equipment or facilities. If people are not involved with the system, ergonomic problems simply do not exist
- ***The system centerd around the person concept***. Person must operate, service, install, and/or repair that equipment. A person is in that working environment
- ***Work system concept***. The boundaries (industrial situation) that will include work duties
- ***Improvement concept***. The improvement of the work system that surrounds the person. It should be measurable in quantitative and qualitative senses.

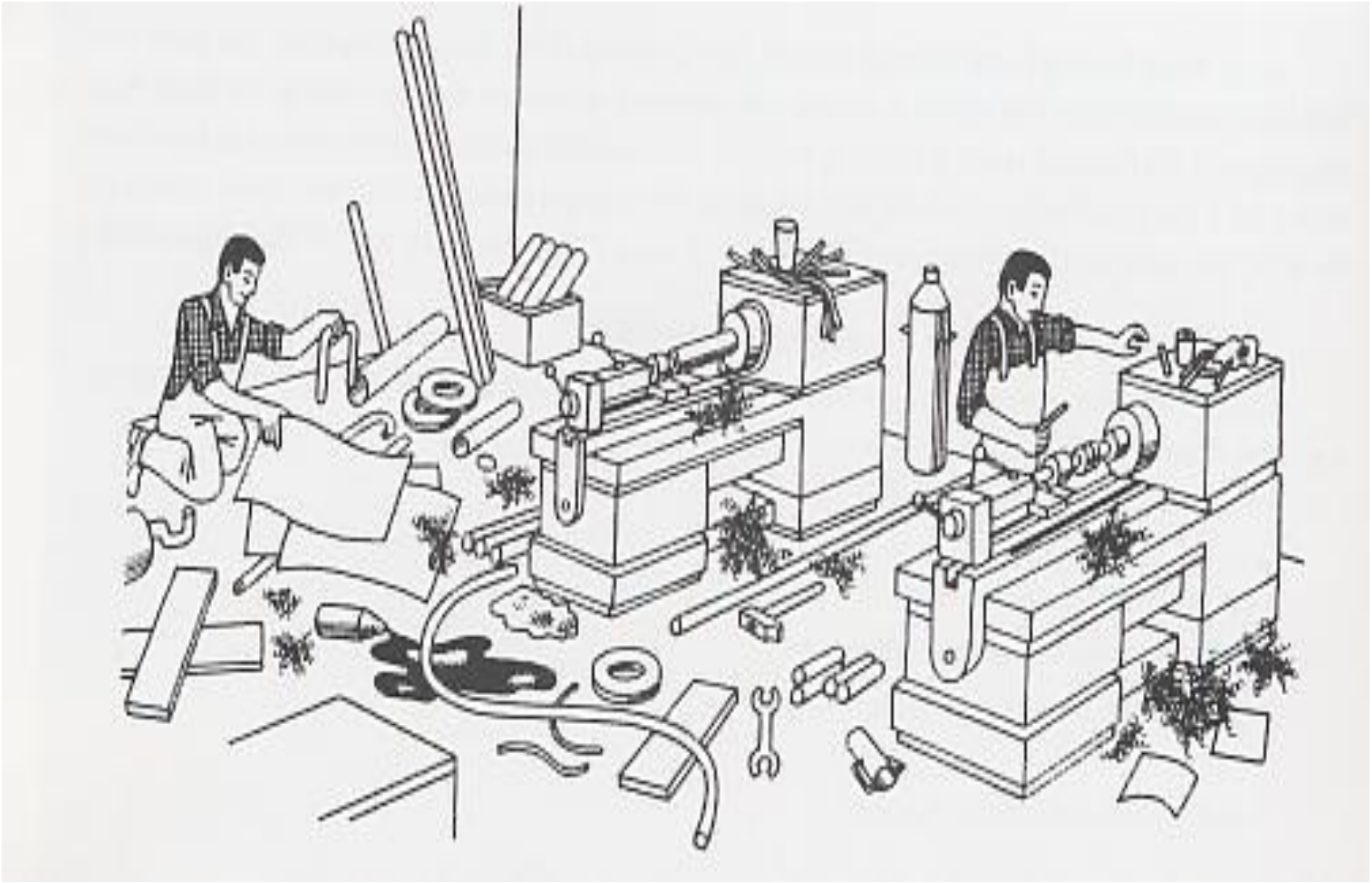
6 Problematika dalam Aplikasi Ergonomi di Industri

- Three separate areas of application (a) employee safety and health concern, (b) cost-or-productivity related fields, and © the comfort of people
- ***Physical size (anthropometric).*** Anthropometry is the science dealing with the human body dimensions. Anthropometric problems are those that deal with a physical conflict between the person and some aspect of the work area. The most common problems (a) workplace & workspace, and (b) facilities/equipment's design
- ***Endurance (cardiovascular).*** Endurance problem are characterized by the stress that they place on the cardiovascular system (heavy job, extensive physical effort). Endurance problem can result in the establishment of work/recovery cycles or of standard for a fair day's work. Designing tasks and jobs to comform to a predetermined expenditure of energy (or kcal expenditure)

- ***Strength (biomechanical).*** Strength problem are often characterized by need for large muscular effort (can cause injuries on the job). Can be analyzed through biomechanical techniques
- ***Manipulative (kinesiology).*** Manipulative problem are characterized as inability to perform the fine motion required on the job or difficuly in the performing tasks at the required speed. Show up in assembly tasks or task requiring fine control of deals and instruments. Assembly errors, alignments problems, and dropped pieces are the outcome of manipulative problems
- ***Environmenttal (external).*** Environmental problem are those which involves the surroundings of the worker. Some typical problems : heat/cold stress, lighting, noise, vibration, etc.
- ***Cognitive (thought).*** Cognitive problem typically show up as operating errors of some type. The limit of short-term memory and the associated difficulty with long and complicated string of numbers are common cognitive difficulties. Similar, perceptual problem associated with vision and hearing can be result in errors.


Where are your
manufacturing
costs hiding?


Low productivity
Low income
Poor food, housing, education
Poor health
Low working capacity




ER
GON
NO
MOS