“You do what?!
You’d better show me....”

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“It’s all in a Days Work” [NEON September 2004]
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Mic Porter – Ergonomist – School of Design
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Ergonomics (UK)

Human Factors (USA)

Engineering Psychology (Pacific Rim)

Petr Šmalec
Ergonomia pilnie poszukiwana
Ergonomics urgently required
Ergonomics is concerned with:

- People
- Comfort, health and well-being
- Science
- Technology
- Psychology/sociology/medicine/philosophy….
- Unbounded situations
- Complex interactions
- Emergent properties
- Interacting systems, rigorously evaluated & interpreted

In fact – just like real life!
The Specified Problem Boundary
Systems, Investigative, Applicable Ergonomics and organisational financial appraisal and culture and the interactions.

Musculoskeletal criteria for work-place design
(Anthropometry, Physiology, Biomechanics, etc.)

Personal & Group Attributes
(Owners, Users, Customers, & Bystanders, etc.)

Environmental, Stressed Ergonomics (Individually and in combination)

Information Ergonomics (Interaction/interface Ergonomics).

The Wider Systems (Meta Level) interactions, innovations Forensic, Systems & Investigative ergonomics
Individual/group considerations

- Gender, intelligence, age, physique, body size, training/experience/motivation, task, work group behaviour, internal stressors (e.g., sleep debt, position on circadian and other rhythms, effects of alcohol, tobacco, pharmaceuticals and street drugs, individually and/or in combination)
Person – task/machine communications considerations

• Task type, Information in/out format, quality and quantity, mode, image, display/control design, individual and group stereotypes, display/action/control compatibility, cognitive engagement with software
Person – task/(work)space considerations

• Anthropometrics, biomechanics and physical/personal/defensible space, built and filled environments, spatial layout, machine size and positioning, furniture dimensions, “obstructions”. Pace/frequency/load musculoskeletal interactions – (slow/infrequent/heavy or fast/frequent/light), ease/awkwardness of object handing etc.
Person – Environment considerations
(especially in combination)

Physical

Light, colour, sound, vibration, heat, ventilation, movement, electromagnetic radiation, pressure

Chemicals

Dusts, fumes gas, liquids, (micro) biologicals, animals, insects

(Socio)Psychological

Work team behaviour, command structure, pay, welfare, shift conditions, urban/village location, cultural factors
Person-System considerations

• Legal/regulatory, organisational, strategic, corporate, and cultural, groupthink, emergent properties, motivational issues (inc pay scheme), weltanschauung related issues, criticality of task/operation, accidents, catastrophic failures, secondary health/safety and counter-intuitive behaviour, feedback -v- feedforward control
A few examples:
Teaching ("chalk & talk) - Richard Feynman
(Image © CalTech – c1972)
Striking firefighters
North Shields 1992

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Garda Officer/making a call – Dublin (2003)

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Cleaning the hotel windows/painting the house (2000 & 2003)
Barge work - 1996
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Celebration cake icing - 1996
A factory sewing task – North East (1998)
University Sports Centre – Reception (During a critical rugby match, 2003)
Musculoskeletal evaluation/recording techniques (1)

- Pace – slow/fast
- Frequency – infrequent/frequent
- Weight – Light/heavy
- Other: ease to grip/hold/move load stability consequences of dropping environment/terrain/journey length
Musculoskeletal evaluation/recording techniques (2)

• Overview
• MAC – Manual Handling Chart (HSE)
• RULA – Rapid Upper Limb Assessment
• REBA – Rapid Entire Body Assessment
• OWAS – Overall Work Assessment System
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Outline checklist

• Individual/group considerations
• Person – task/machine communications considerations
• Person – task/(work)space considerations
• Person – Environment considerations
• Person-System considerations
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Thank you – any questions?