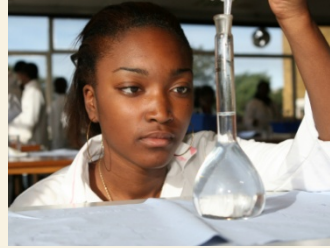


# **Ergonomics Initiatives at an International Level**

**Prof. David C Caple, President  
International Ergonomics Association**





# Ergonomics Definition

Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance.

Ergonomists contribute to the design and evaluation of tasks, jobs, products, environments and systems in order to make them compatible with the needs, abilities and limitations of people.

Definition; IEA - [www.iea.cc](http://www.iea.cc)

# Ergonomics Domain

- Multi-disciplinary science
- Applies theory, principles, data and methods

Goals:           Optimise human well being

Overall systems performance

# International Ergonomics Association

- Founded in 1956 meeting, The Netherlands
- 42 Federated Societies
- One Affiliated Society
- Networks of regional societies
- Estimated 20,000 ergonomists are members

# IEA Federated Societies - 2008

- All-Ukrainian Ergonomics Association
- Asociación de Ergonomia Argentina
- Associação Brasileira de Ergonomia
- Associação Portuguesa de Ergonomia
- Association of Canadian Ergonomists
- Belgian Ergonomics Society
- Chilean Ergonomics Society
- Chinese Ergonomics Society
- Croatian Ergonomics Society
- Czech Ergonomic Society
- Ergonomics Society (U.K.)
- Ergonomics Society of Korea
- Ergonomics Society of South Africa
- Ergonomics Society of Taiwan
- Ergonomics Society of the Federal Republic of Yugoslavia
- FEES
- Gesellschaft für Arbeitswissenschaft
- Hellenic Ergonomics Society
- Hong Kong Ergonomics Society
- Human Ergology Society
- Human Factors and Ergonomics Society (U.S.A.)
- Hungarian Ergonomics Society
- Indian Society of Ergonomics
- Inter-Regional Ergonomics Association
- Iranian Ergonomics Society
- Irish Ergonomics Society
- Israel Ergonomics Society
- Japan Ergonomics Society
- Nederlandse Vereniging Voor Ergonomie
- New Zealand Ergonomics Society
- Nordic Ergonomics Society
- Österreichische Arbeitsgemeinschaft für Ergonomie
- Philippines Ergonomics Society
- Polish Ergonomics Society
- Slovak Ergonomics Association
- Sociedad Colombiana de Ergonomia
- Sociedad de Ergonomistas de Mexico
- Società Italiana di Ergonomia
- Société d'Ergonomie de Langue Française
- South East Asian Ergonomics Society
- Spanish Association of Ergonomics
- Swiss Ergonomics Society
- The Human Factors and Ergonomics Society of Australia
- Turkish Ergonomics Society
- ULAERGO

# Topics:

1. Education and Research
2. Systems Approach
3. Ergonomics design -EQUID
4. Communication Strategies
5. Ergonomics Checkpoints
6. Media and Promotion
7. ICOH Links



# 1. Ergonomics - Promotion of Education

- IEA recognise Master level and above Education programs
- Frequently now involve joint degree courses
- IEA has Guidelines on Education Programs  
[http://www.iea.cc/browse.php?contID=edu\\_accreditation](http://www.iea.cc/browse.php?contID=edu_accreditation)
- Main foundation degree programs
  - Physiology / Medicine
  - Engineering / Industrial Engineering
  - Psychology
  - Management / Organisational Design

# Education Programs – International Profile

[http://www.iea.cc/browse.php?contID=study\\_ergonomics](http://www.iea.cc/browse.php?contID=study_ergonomics)

## 16 University Courses in Taiwan

- Chang Gung University
- Chaoyang University of Technology
- National Cheng Kung University
- National Chiao Tung University
- Chung Yuan Christian University
- Feng Chia University
- Fu – Jen University
- Hua Fan University
- Hsiuping Institute of Technology
- I-Shou University
- Kaohsiung Medical University
- Mingchi Institute of Technology
- Ta Hwa Institute of Technology
- National Taiwan University of Science and Technology
- National Tsinghua University
- National Yunlin University of Science and Technology

# Ergonomics – Research and Practice

- Domain has diversified into sub speciality areas:-
  - Primary research e.g. MSD, ageing, cognition, gender
  - Application based research e.g. Healthcare, mining, aerospace, agriculture
- Certification of Ergonomists program - The IEA website contains;

[Summary of Core Competencies in Ergonomics](#)

[Criteria for IEA Endorsement of Certifying Bodies](#)

[Guidelines for Process of Endorsing a Certification Body](#)

[IEA Code of Conduct for Ergonomists \(COCE\)](#)

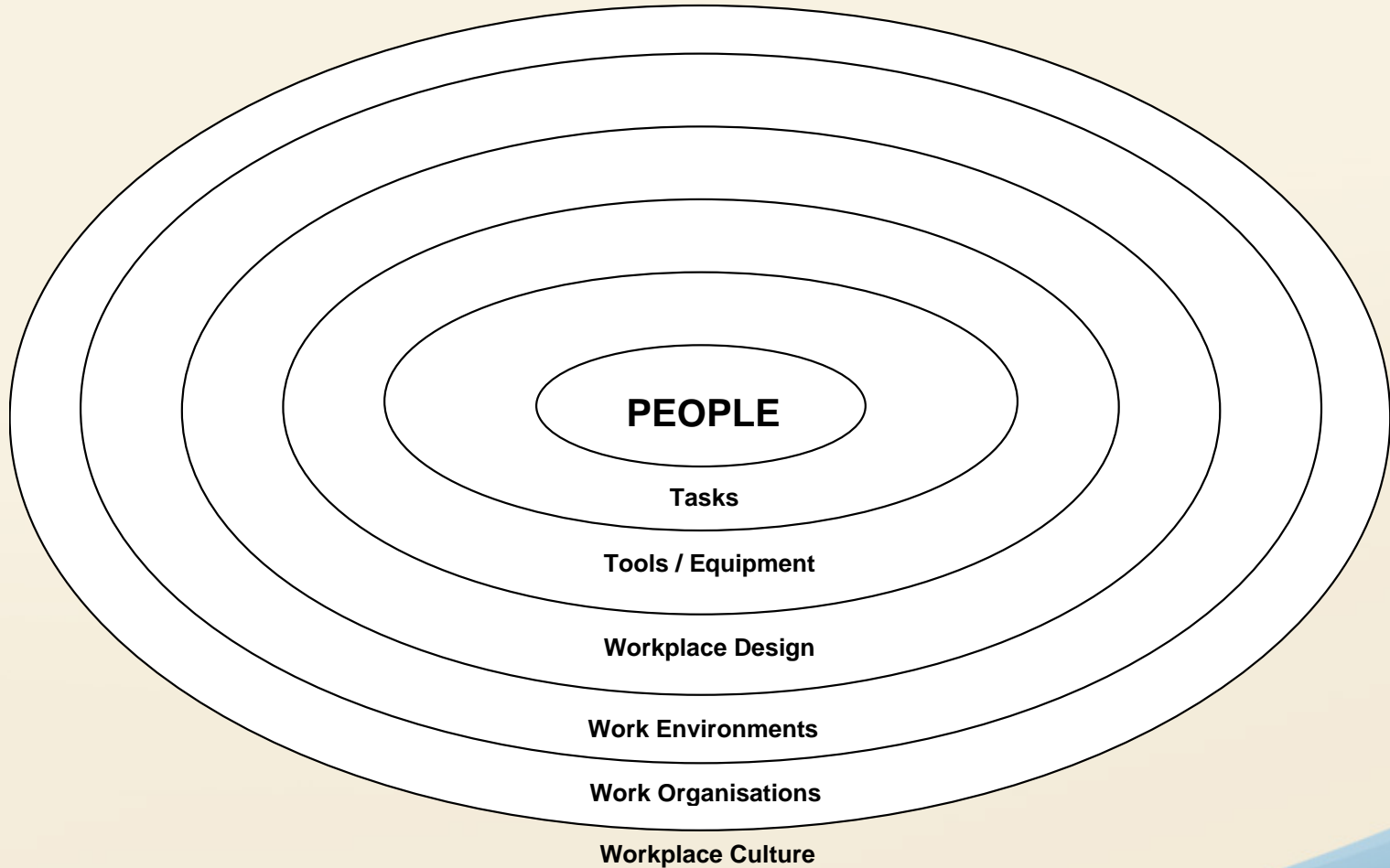
## 22 Active Technical Committees

- Activity Theories for Work Analysis & Design
- Aerospace HFE
- Affective Product Design
- Aging
- Agriculture
- Auditory Ergonomics
- Building & Construction
- Ergonomics for Children & Education Environments
- Ergonomics in Design
- Gender and Work
- Healthcare Ergonomics
- Human Aspects of Advanced Manufacturing
- Human Reliability
- Musculoskeletal Disorders
- Organizational Design And Management Process Control
- Primary Industries
- Process Control
- Psychophysiology in Ergonomics
- Quality Management
- Safety & Health
- Slips, Trips and Falls
- Work With Computing Systems

# Recent Initiatives in Ergonomics Research

- ODAM (Organisational Design & Management)
  - “Macro Ergonomics” studies
- Affective Ergonomics in Design
  - “Emotional input” into design
- Gender in Ergonomics
  - Agriculture in developing countries
- Aerospace Ergonomics

## 2. Ergonomics

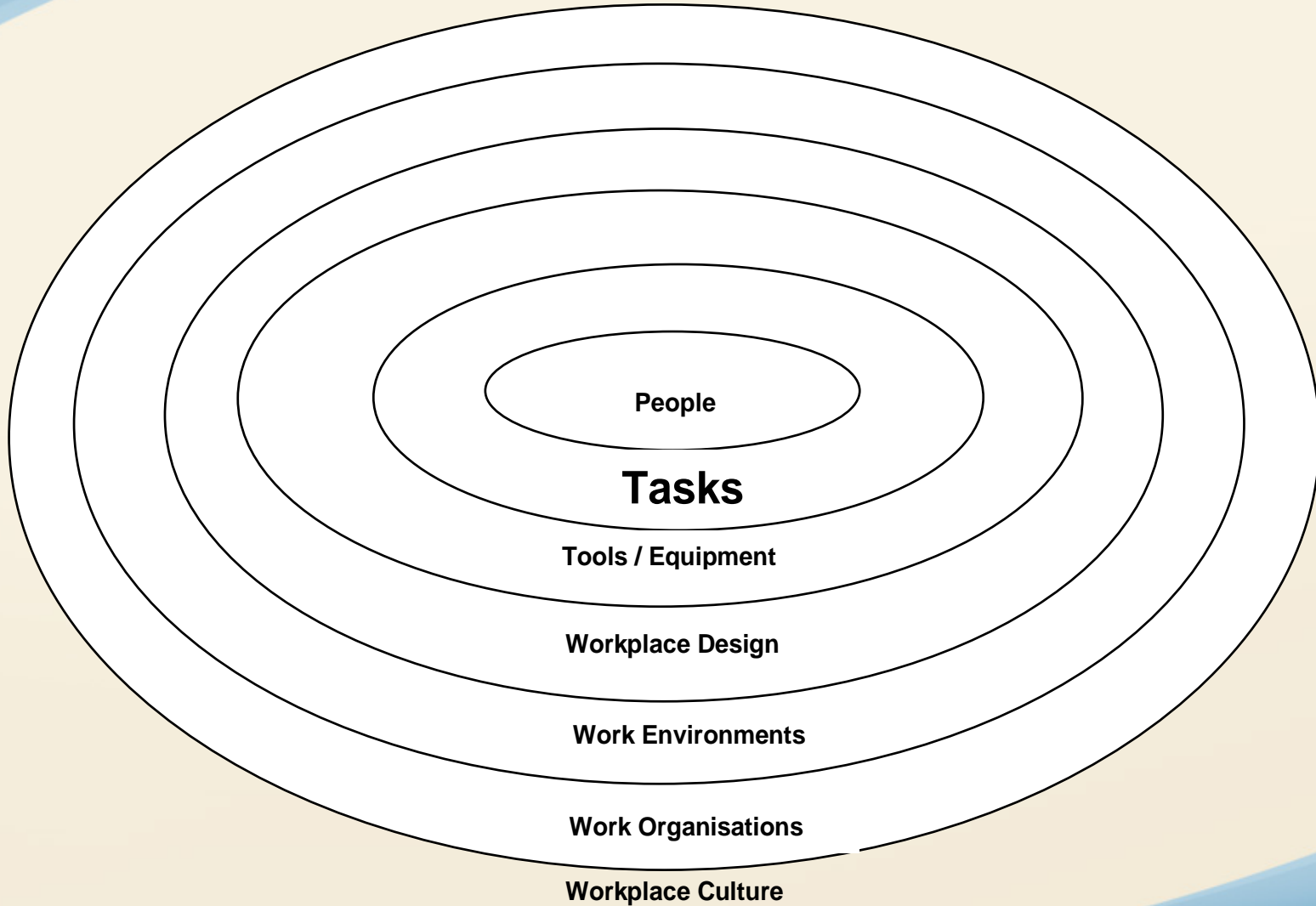


# Ergonomics Systems - Approach

## People:-

- Physical capacities
- Psychological drivers
- Expectations
- Individual differences

# Tasks



People

**Tasks**

Tools / Equipment

Workplace Design

Work Environments

Work Organisations

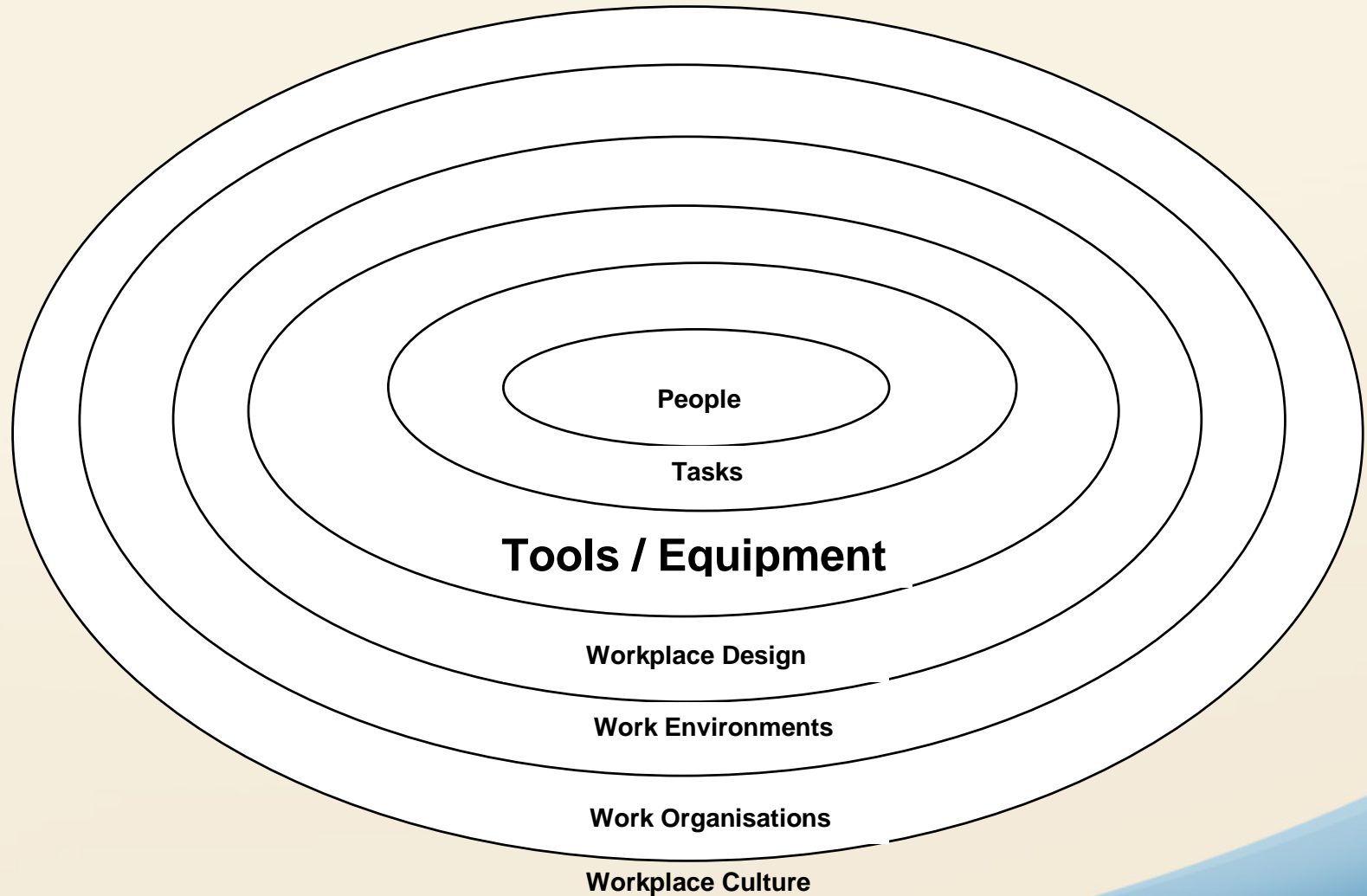
Workplace Culture



# Task Analysis

- What, how, when details
- Performance measures
- Quality requirements

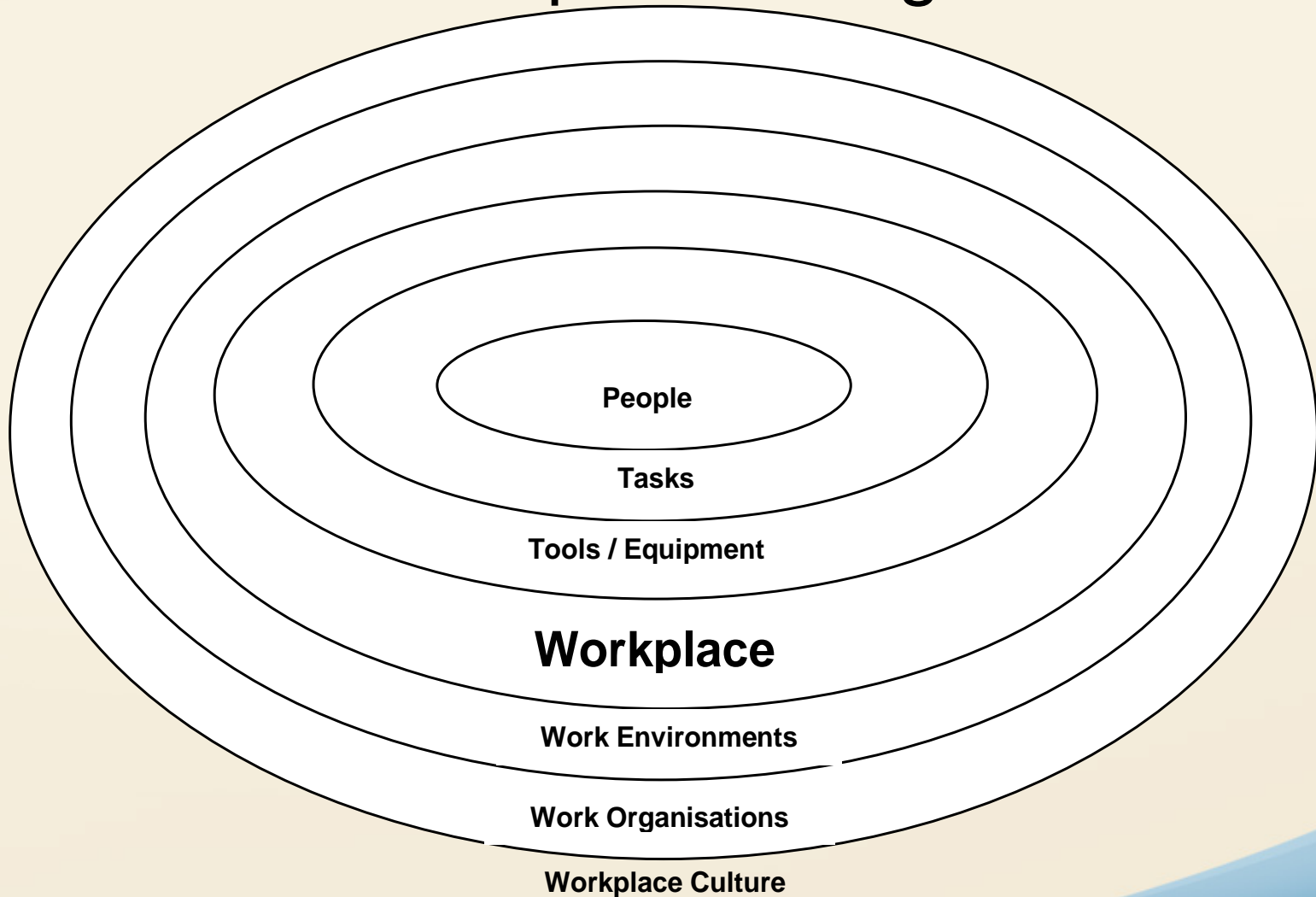
# Tools & Equipment



# Tools & Equipment

- Design of tools to suit
  - Persons
  - Tasks

# Workplace Design



People

Tasks

Tools / Equipment

**Workplace**

Work Environments

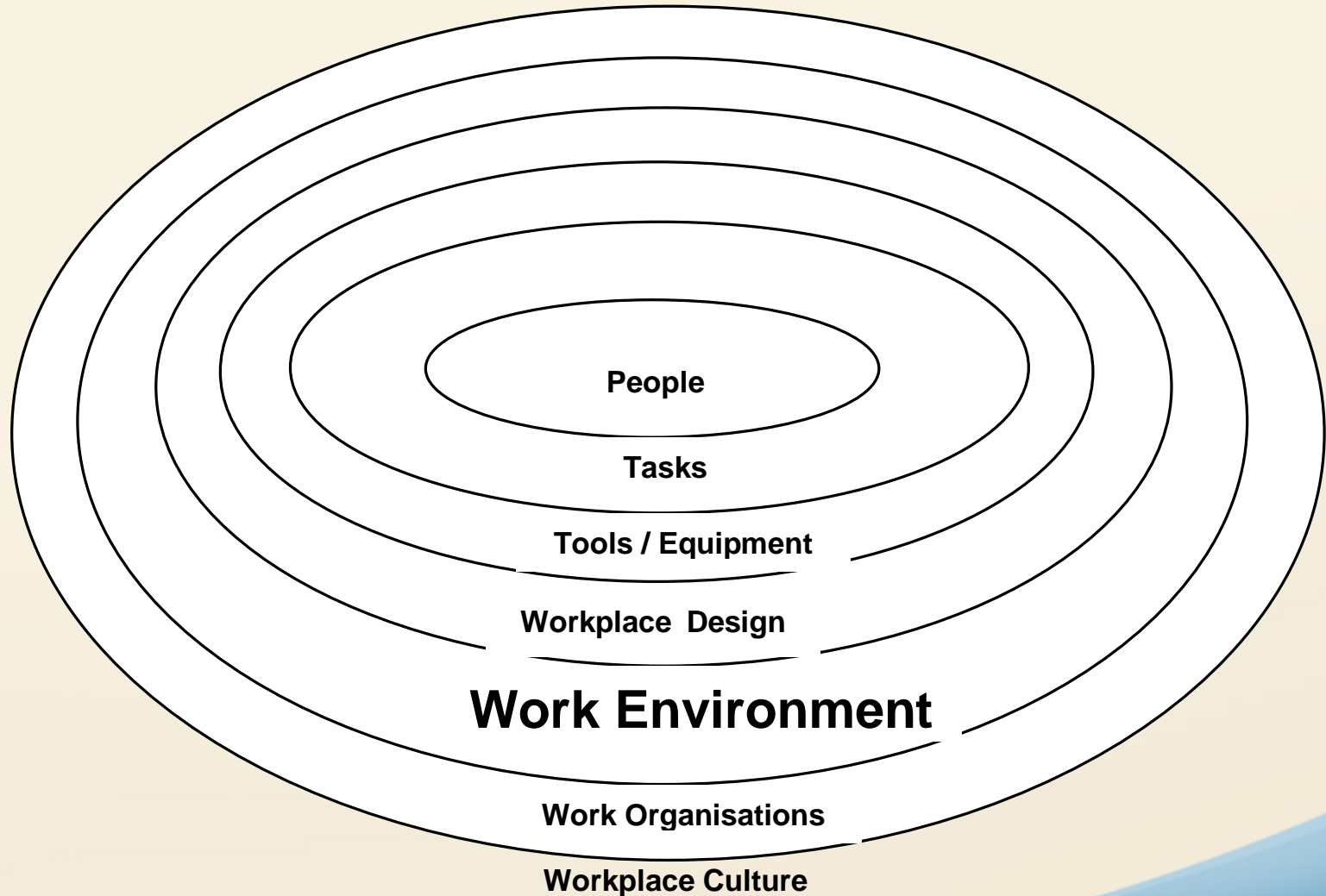
Work Organisations

Workplace Culture

# Workplace Design

- Layout of workplace
- Workstation design
- Adjustability / adaptability
- Storage / transport of items

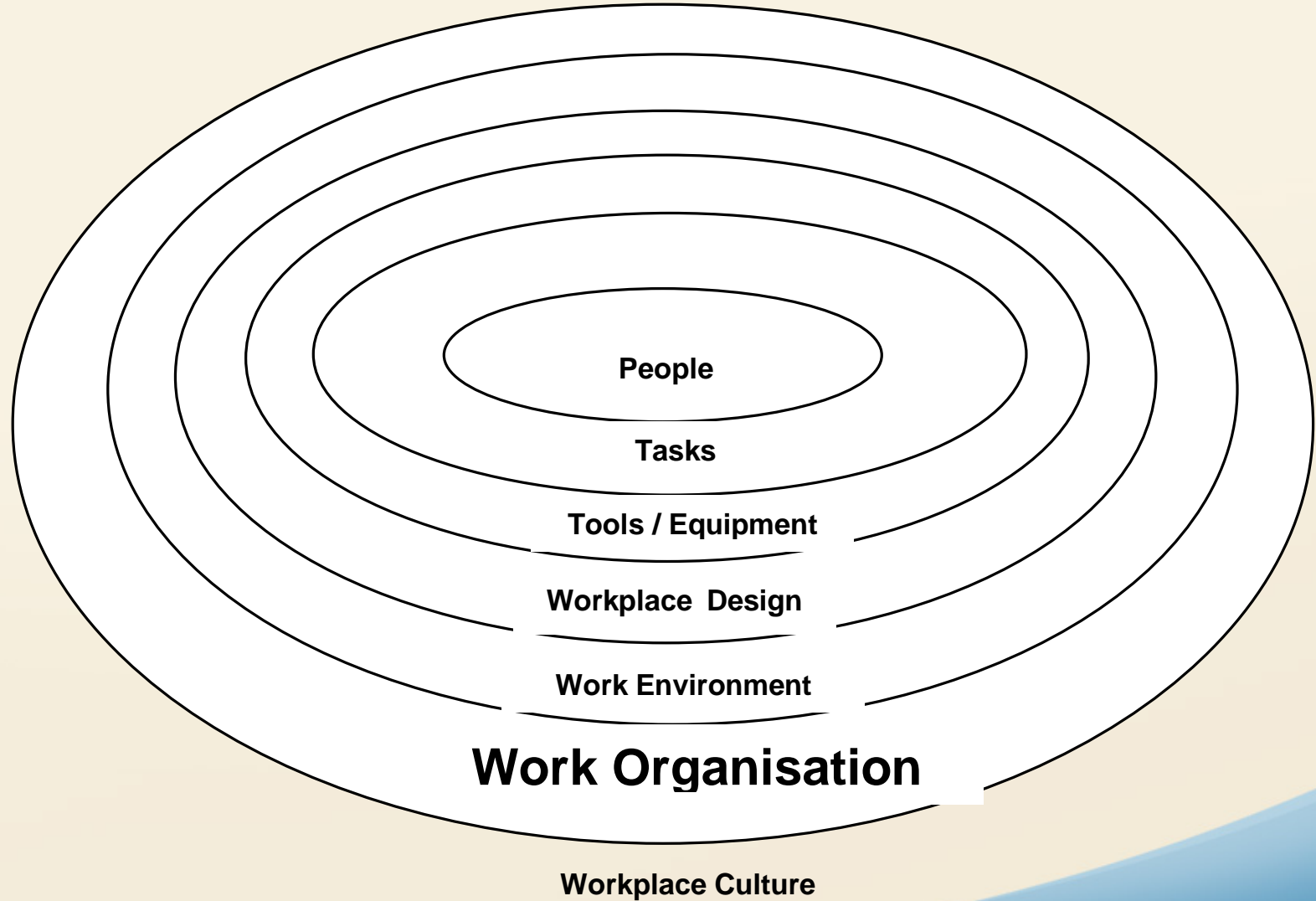
# Work Environment



## Work Environment

- Physical – thermal, vibration, noise, lighting, dusts, chemical
- Psychological – psychosocial risks e.g. Control, autonomy, feedback

# Work Organisation

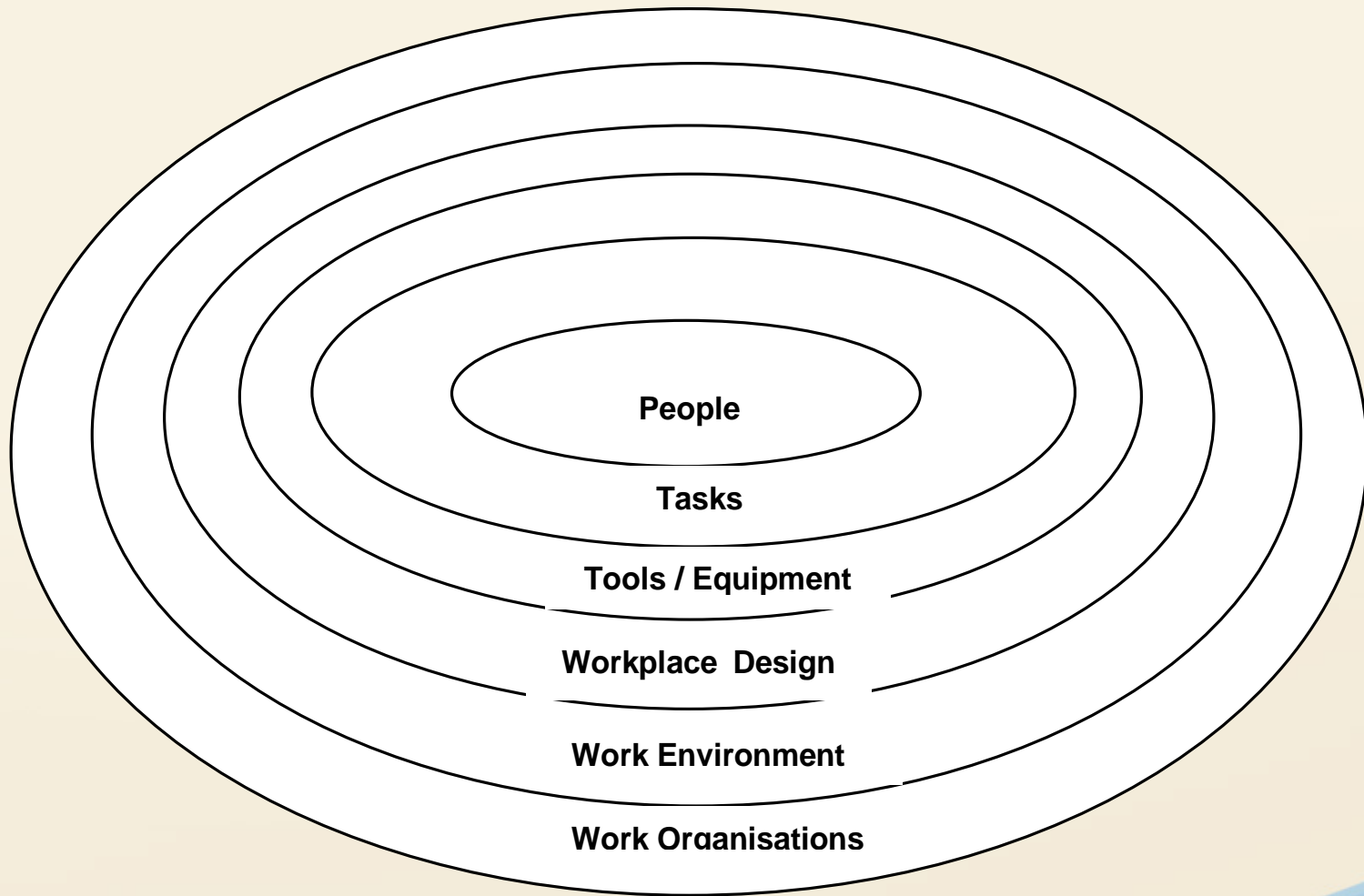




# Work Organisation

- Job design
- Team based requirements
- Working hours / shift work
- Rest breaks
- Task specialisation

# Workplace Culture

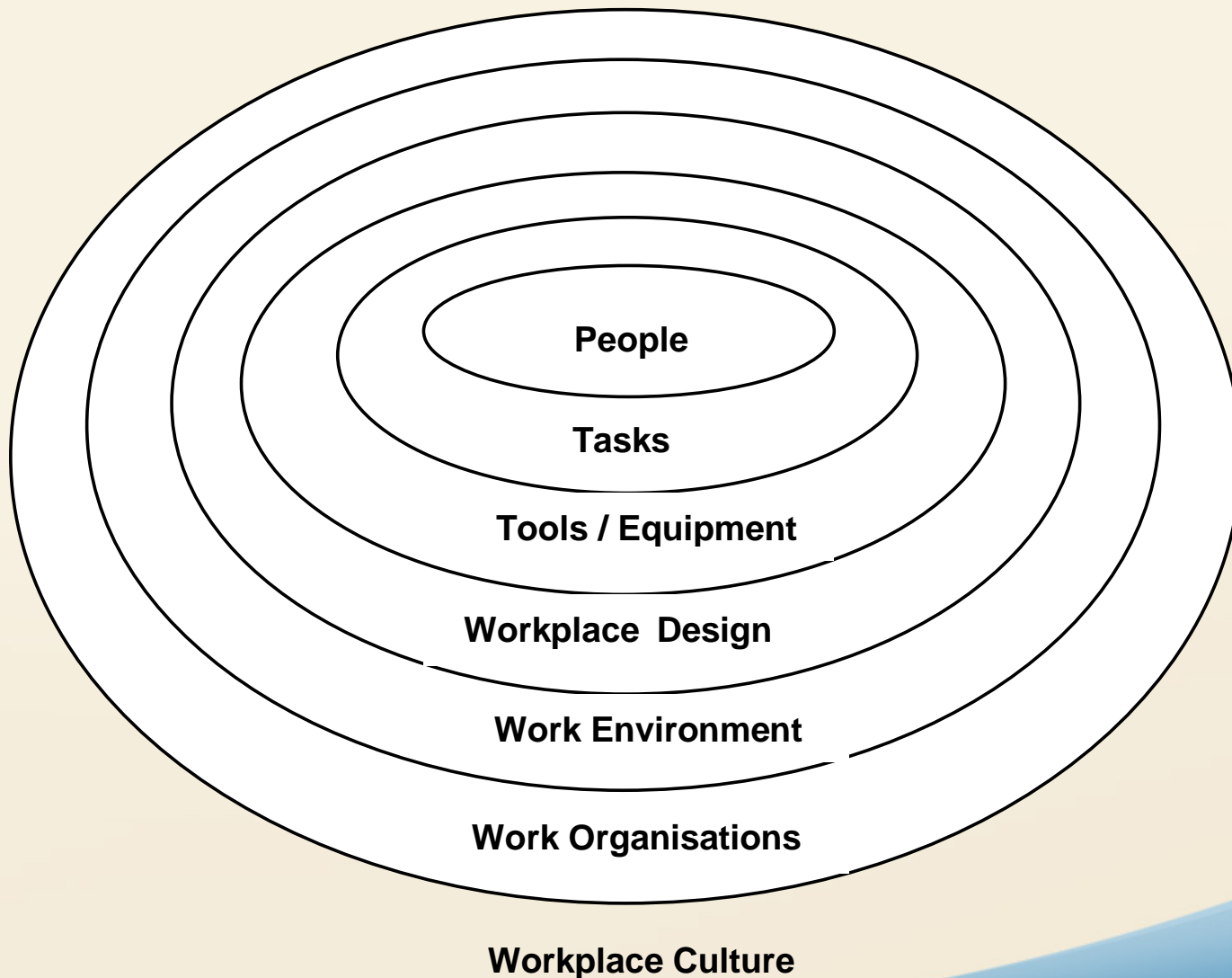


# Workplace Culture

## Workplace Culture

- Management commitment / leadership
- Communication / consultation processes
- Feedback / performance management

# Systems Ergonomics Model



## Micro Ergonomics

- Focus on specific task, tool or product design e.g. Farming tool, computer workstation
- Research specific physiological systems to determine risks from exposure to body stressors

## New Initiative Area – Holistic Approach

- Combines micro and macro ergonomics theory, principles, data and methods to assess issues holistically.

NOTE: Difficult to define MSD Control Banding recommendations for World Health Organisation (WHO) due to holistic approach

## 3. Ergonomics Design Process

**EQUID**

(Ergonomics Quality in Design)

-For products and systems

*EQUID Design Process Version 1.07*

4 December 2007

**EQUID Design Process**

Requirements for ergonomic quality management in the design process for products and services

# EQUID Process Steps

1. Organisational management
2. Initial definition of the user requirements
3. Design reviews
4. Final ergonomic evaluation
5. User satisfaction evaluations



## EQUID Partnerships

1. Product designers / Industrial Designers / Ergonomists
2. Managers / Manufacturers
3. International Standards Organisation
4. Federated Ergonomics Societies

# 4. Communications

- IEA [www.iea.cc](http://www.iea.cc)



The screenshot shows the homepage of the International Ergonomics Association (IEA) website. At the top left is the IEA logo with the text "International Ergonomics Association". Below it is a vertical navigation menu with the following items: Home, What is Ergonomics, About IEA, IEA Members, IEA Projects, Study Ergonomics, Stay Informed, and Contact Us. The main content area features a large banner with the text "Ergonomics human centered design" and a background image of a person carrying a large bundle of harvested crops on a shoulder pole. To the right of the banner is a search bar with a magnifying glass icon, the text "Search:", an input field, and a "Send" button. Below the banner, the text "International Ergonomics Association" is followed by a paragraph: "This website has been developed by the International Ergonomics Association (IEA) to provide information and opportunities to interaction on international issues relating to the science of ergonomics." Below this is another paragraph: "The IEA has developed this website to facilitate open access to information on ergonomics to researchers, practitioners, students, and members of the public interested in exploring the history and development of ergonomics." On the right side, under the heading "Upcoming Events", there are three entries: "National Conference on Information Technology in Multi-Domain Industries" (20-21 April 2007, Maharashtra, India), "WWCS 07" (21-24 May 2007, Stockholm, Sweden), and "Better Work 2007" (29-31 May 2007, Marina Congress Center, Helsinki, Finland).

# Websites – Computer Ergonomics

Ergonomics 4 Schools - [www.ergonomics4schools.com](http://www.ergonomics4schools.com)

- created by the UK Ergonomics Society

System Concepts health and safety risks of laptop computers

<http://www.system-concepts.com/articles/article0081.html>

Healthy computing for young people

<http://www.healthycomputing.com/kids/>

Learn how to keyboard on a laptop ergonomically

<http://www.ergoindemand.com/ergonomic-laptop-keyboarding.htm>

Mobile ergonomics-safety for people on the go

<http://www.healthycomputing.com/mobile/laptop/page2.htm>

How to make your laptop workstation ERGONOMIC

<http://www.ergoindemand.com/laptop-workstation-ergonomics.htm>

## 5. Ergonomic Checkpoints

- Joint project between the IEA with the International Labour Office (ILO), Geneva to provide practical advice for workers in industry
- Simple guidance targeted to workers
- Plan to develop “ILO Guidance” on Ergonomics and Musculo Skeletal Disorder prevention

# Agriculture Checkpoints

Manual Handling – use of large wheels to reduce force



Labelling and storage of chemicals



# Future Checkpoint Industries

- Healthcare
- Mining
- Stress
- Call Centres
- Education

## 6. Promotion and Media Programs

- Ergonomics month – regional, international
- Ergonomics exhibitions - UK
- Links with major national and international campaigns  
e.g. Road safety, Occupational Health and Safety

# Links with International Standards

- Maintain strong participation of ergonomists in National / International Standards Committees
- Host the ISO159 Standards meeting with IEA 2009 Congress in Beijing, China, in August 2009
- Introduce “Ergonomic Guidance” with ISO Standards relating to Design Processes



## 7. Potential Partnerships between Ergonomics and Occupational Hygiene

- Face mask design for SARS, Avian influenza
- Chemical labelling, storage, handling from cognition and manual handling aspects
- Joint checkpoint publications / website links
- Input into design process requirements
- Joint conferences with IOHA, ICOH and IEA

## IOHA and IEA - Future Initiatives

- Open discussion between regional or country based IOHA and IEA societies -  
[http://www.iea.cc/browse.php?contID=federated\\_societies](http://www.iea.cc/browse.php?contID=federated_societies)
- Joint participation in future IOHA and IEA congress programs on areas of common interest e.g. Labelling, materials handling
- Create direct Website links between IOHA and IEA Technical areas of research and study

Thank You

David C Caple  
IEA President