Challenges and opportunities for occupational health and new technologies

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Secretary General, ICOH
The changing workforce ...
The changing workforce ...

- Ageing
- Migration
- Gender differences
- Restructuring and downsizing
- Working hour
- Fragmentation
- Job insecurity
- Externalization

Source: Mario Ceroli, The Fifth State, 1984
The changing technology innovation...
The changing technology innovation...
The risk transition
Nano-technology
Potential impact at the workplace

- It is expected that by 2020 approximately 20% of all goods manufactured around the world will be based to some extent on the use of nanotechnology (ILO, 2010)

- The number of researchers and workers involved in one domain or another of nanotechnology was estimated at about 400,000 in 2008 worldwide, with average annual growth rate of approximately 25% (Roco MC, 2011)
Filling the gap toward sustainable and responsible nanotechnologies
Physico-chemical features of NPs associated with biological response

Size

Oxidative Capacity

Solubility

Shape

Functionalization
Life cycle of nanomaterials and exposure assessment at the workplaces

Source: Schulte PA et al, JOEM 53(6) Suppl. June 2011:S3-S7
Registry of workers involved in Nanotechnology: BASF Experiences

**Data Source/Owner**
- Product Stewards / Product Stewards
- Plant Management/ Medical Department
- Occupational Safety/ Occupational Safety

**Information Gathered**

**Matrix 1 – Inventory**
- Product name, chemical identity, particle size distribution, production site, number of employees

**Matrix 2 – Registry**
- Names and job description, medical data

**Matrix 3 – Exposure data**
- Particle concentration and size distribution during operation compared to background, chemical identity of material

*Source: David MR et al, JOEM, 2011, 53(6)*
green jobs

green jobs

green jobs

green jobs

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European Strategy 2020

SMART GROWTH
- reaching 3% of EU's GDP as well as better conditions for R&D and Innovation
- reducing school drop-out
  - rates below 10%

INCLUSIVE GROWTH
- at least 20 million fewer people in or at risk of poverty and social exclusion
- 75% employment rate for women and men aged 20-64

SUSTAINABLE GROWTH
- reducing greenhouse gas emissions by 20%
- increasing the share of renewables in final energy consumption to 20%
- moving towards a 20% increase in energy efficiency
# Renewable Energy Sector (RES), by select countries and world, 2006

<table>
<thead>
<tr>
<th>Sector</th>
<th>Global</th>
<th>Selected Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>PowerWind</td>
<td>300,000</td>
<td>Germany: 82,100</td>
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<tr>
<td></td>
<td></td>
<td>U.S.: 36,800</td>
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<tr>
<td></td>
<td></td>
<td>Spain: 35,000</td>
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<tr>
<td></td>
<td></td>
<td>China: 22,200</td>
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<tr>
<td></td>
<td></td>
<td>Denmark: 21,000</td>
</tr>
<tr>
<td>Solar PV</td>
<td>170,000</td>
<td>China: 55,000</td>
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<tr>
<td></td>
<td></td>
<td>Germany: 35,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spain: 26,450</td>
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<tr>
<td></td>
<td></td>
<td>U.S.: 15,700</td>
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<tr>
<td>Solar Thermal</td>
<td>624,000+</td>
<td>China: 600,000</td>
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<tr>
<td></td>
<td></td>
<td>Germany: 13,300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spain: 9,100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US: 1,900</td>
</tr>
<tr>
<td>Biofuels / Biomass</td>
<td>1,174,000+</td>
<td>Brazil: 500,000</td>
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<tr>
<td></td>
<td></td>
<td>US: 312,200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>China: 266,000</td>
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<tr>
<td></td>
<td></td>
<td>Germany: 95,400</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2.3 million</strong></td>
<td>(incl. small hydro and geothermal)</td>
</tr>
</tbody>
</table>

Source: *Green Jobs: Towards Decent Work in a Sustainable, Low Carbon World*
Are green jobs safe?
Are green jobs safe?

Traditional hazards:
Falls, electrical fire, chemical

Drivers

Challenges

New occupational hazards

- Introduction of new substances and materials
- Change in work environments
- New forms of employment and work organization
- Introduction of new technologies
The way forward safe jobs

1. Define, categorize and track green jobs
2. Evaluate all green jobs, processes, products for hazards to workers
3. Integrate worker safety and health, energy conservation and environmental protection efforts
4. Plan early for prevention
5. Make safety and health part of green jobs training
6. Add safety and health to green benchmarks

Source: NIOSH, 2007
Lesson learned from asbestos
Worldwide Production of Asbestos from 1900 to 2000 (thousands of tons)

3. SELIKOFF IJ et al. Asbestos exposure and neoplasia. JAMA 1964;188:22-26
4. First ban of asbestos for insulation in Denmark, 1972
5. 54 National Asbestos Ban worldwide, 2011 (www.ibasecretariat.org)

Source: Ro-Ting Lin et al., Lancet 2007
**OSH policy development**

- **1700** First organic treaty of Occupational Medicine
- **1900** End ‘800
  - First accident insurance regulations
  - First associations and movements for the protection of workers.
- **1906** ICOH
- **1919** ILO
- **1948** WHO
- **1965** IARC
- **1970** OSH Act USA
- **1975** Dublin Agency
- **1978** First directives UE OSH
- **1995** Institution WTO
- **1995** European Agency, Bilbao
- **2007** Workers Health Declaration WHO

**Step 1:**
- **1900**
  - Technical prevention
  - Risk assumption

**Step 2:**
- **1960**
  - Insurance, care, compensation and repression

**Step 3:**
- **1980**
  - Participation, prevention, multidisciplinarity and management
  - Risk assessment
  - Global safety

**Step 4:**
- **2000**
  - Towards well-being in the workplace
  - Contribution to productivity

**Step 5:**
- **2010**
  - Need of multidisciplinary approach

**1900 - 2010**
- Workers health declaration WHO
- Step V
- Contribution to productivity

**1900**
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A Paradigm Shift in OSH: the New Normal

OSH is a side activity
OSH as an outsider, 'observer'

OSH as a core activity
From reactivity to proactivity
From observations to prediction
OSH at work in cooperation with others

Source: modified from Vainio, 2012
OSH part of productivity

Economic impact for enterprises
Productivity
Absences from work
Injuries
Litigations

Ergonomics
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/terg20

Biomechanical evaluation of supermarket cashiers before and after a redesign of the checkout counter
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CULTURE OF PREVENTION

FORECAST

INNOVATION

Health well being and productivity at work

COMMUNICATION AND DELIVERY TO SOCIETY

SOCIAL DIMENSION

RAMAZZINI APPROACH