



Selected health issues in electronic industries in Taiwan

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Outline

- **Occupational hygiene system in Taiwan**
- **Electronic industries in Taiwan**
- **Some health issues in electronic industries**

Occupational hygiene in Taiwan

- **Regulatory requirement by Labor Safety and Health Act since 1974**
 - Initially applicable to selected industrial sectors and mining only
 - **Safety and hygiene personnel**
 - Labor safety and hygiene practitioners for enterprises of designated sectors with 50 or more employees
 - Safety and health managers for small and medium enterprises

Occupational hygiene in Taiwan

Occupational hygiene practitioners

- **Two certificate levels:**
 - **Entry level: Occupational safety and health practitioner**
 - **Advanced level: Occupational health manager, Occupational safety manager**
- **Training may be obtained through university degree program or short-term training programs**
- **License through government-sponsored exams (three times annually)**



Occupational hygiene in Taiwan

Occupational hygiene practitioners

- **Certified occupational hygiene specialist**
 - Provide workers training, routine monitoring, consulting services
 - Qualified individuals take government-sponsored exam (once a year)
- **Safety and health inspectors in government agency (central, local)**
 - Regulatory inspection, accident investigation

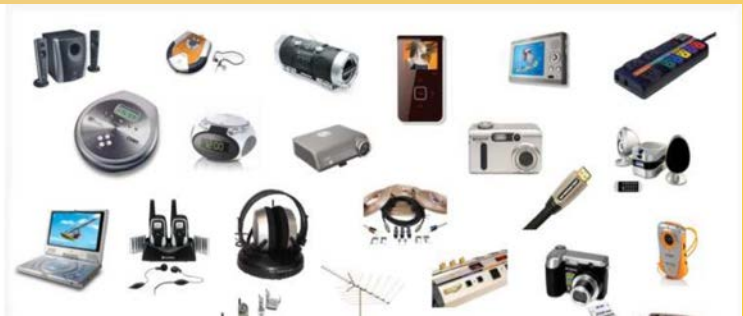
Occupational hygiene in Taiwan

Regulatory revision

- Major revision in 2013, renamed **Occupational Safety and Health Act**, and applies to **most occupations**
 - Depending on trade type and number of employees, company may be required to designate multiple occupational safety and hygiene specialists
 - More regulatory requirements related to occupational hygiene

Electronic industries in Taiwan

- Semiconductor, printed circuit board, network communication, computer, LCD, LED, etc.
- Over US\$130 Billion in annual production
- Wide range of products, manufacturing processes, occupational hazards





Health issues in electronic industries

- Chemical hazards
- Physical hazards
- Ergonomic hazards

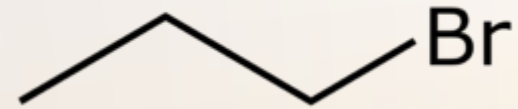




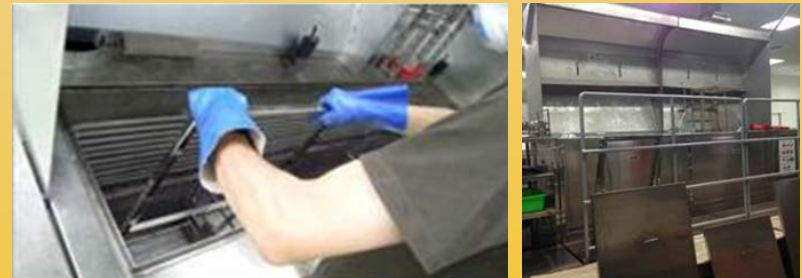
Chemical hazards in electronic industries

- **Wide variety of chemicals used**
 - **Chemical selection primarily for process needs, regulatory restrictions, etc.**
 - **Many with known hazards, some with acute toxicity or may be irritant**
 - **Even more with unknown hazards, no exposure limits**
 - **Exposure conditions mostly unknown**
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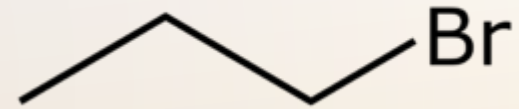
1-Bromopropane



- Replacement for trichloroethylene
 - Ozone depletion, health effects
- Considered safe initially until isolated cases of intoxication reported
 - Decreased muscle strength, loss of sensation, headache, dizziness, etc.
 - Toxic to nervous and reproductive systems



1-Bromopropane (cont.)



- **Occupational exposures**

- **Highly volatile**
- **Uptake through inhalation and skin contact**
- **ACGIH recommended TLV-TWA = 0.1 ppm (was 10 ppm)**





Chemical assessment and management

Regulatory requirements

- Exposure assessment for chemicals with known/set exposure limits
 - Monitoring, modelling, surrogates
- Control banding for chemicals without exposure limits

Physical hazards

Clean room

- Low humidity, dust (particle) maintained for product quality purpose
- Workers wear suit, hat (hair net) and face mask primarily for product protection purposes only
 - Time-consuming to put on and take off
 - Low humidity likely to cause dry skin, eye irritation, dehydration
 - Urinary tract infection, kidney problems



Ergonomic hazards: Musculoskeletal hazards



- Often begin with discomfort, which may slowly progress to aches and pain
 - Musculoskeletal diseases in upper extremities (arm, hand, elbow, shoulder)
 - Chronic lower back pain
 - Leading causes of occupational diseases



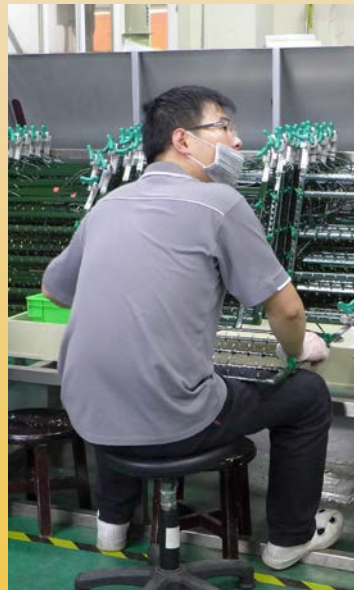
Ergonomic hazards

Musculoskeletal hazards (2)



Primary causes

- Overexertion
- Highly repetitive motions
- Awkward positions
- Lack of rest



Ergonomic hazards: Visual fatigue

- Strained visual functions due to prolonged visual work
 - Problem may worsen if lighting is poor
 - May cause dizziness, blurred vision, eye irritations, reduced productivity, prone to errors and accidents





Summary

- **Electronic industries still expanding in production values and new applications**
- **Occupational exposures must be evaluated for better worker protection**
- **Professional occupational hygienists can help reduce workplace hazards**



Thank you!

Questions, comments, please.
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