

# Lean Manufacturing Comes to China -- Its Impact on OHS

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APHA -- November 2007

# China: Global Factory Floor

- 10 years of 10% annual growth
- Became 4th largest economy in 2005
- Manufacturing accounts for 41% of GDP (v. 17% in US)
- Over \$600B in foreign direct investment since 1980s -- \$63B in 2006 alone

# Global Factory Floor

- Trade surplus in 2006 of \$177.5B with the world and \$232.5B with the US
- Starting in 2003 -- world's largest producer of color TVs, refrigerators and washing machines, DVD players, cameras, cell phones, microwave ovens, toys and many other products

# Global Factory Floor

- Over 50,000 US-based corporations have operations in China
- World Bank estimates that 55% of China's exports to US are actually intra-company transfers from directly owned or contracted factories

# Traditional Sports Shoe Production Hazards

- Scale of factories
- Chemical exposures
- Noise exposures
- Ergonomic hazards
- Machine guarding
- UV-RF radiation
- Organization of production











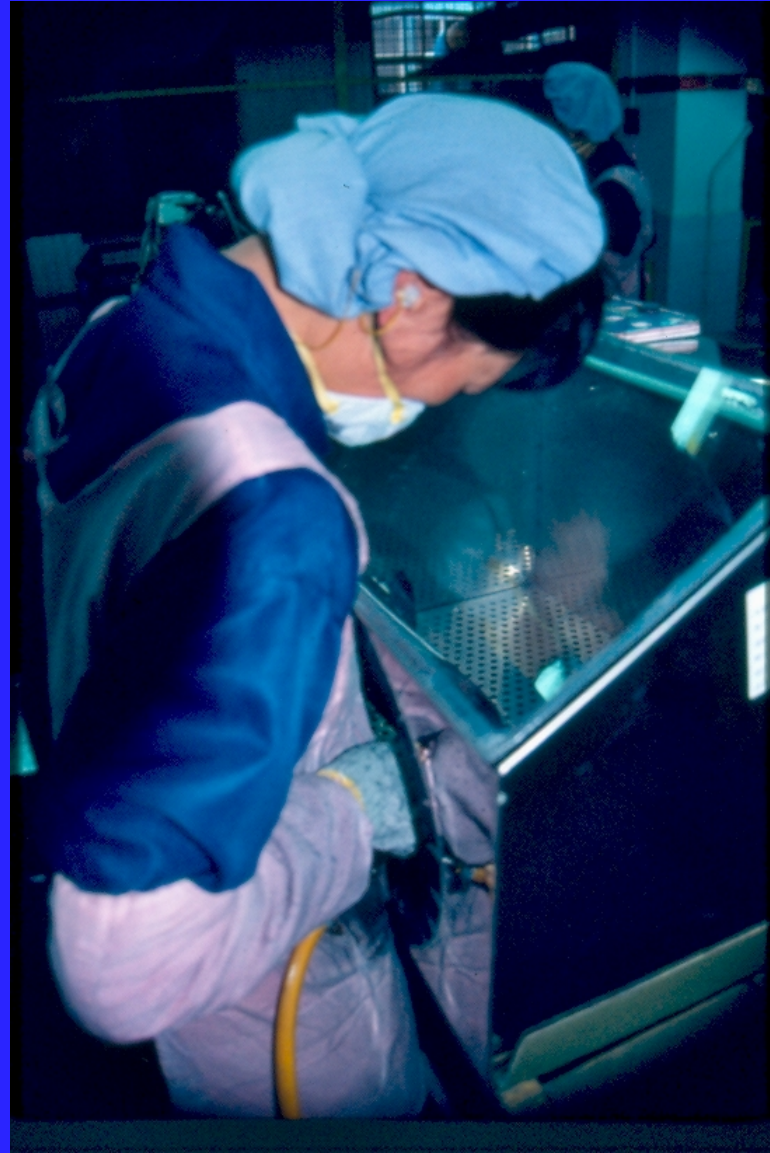








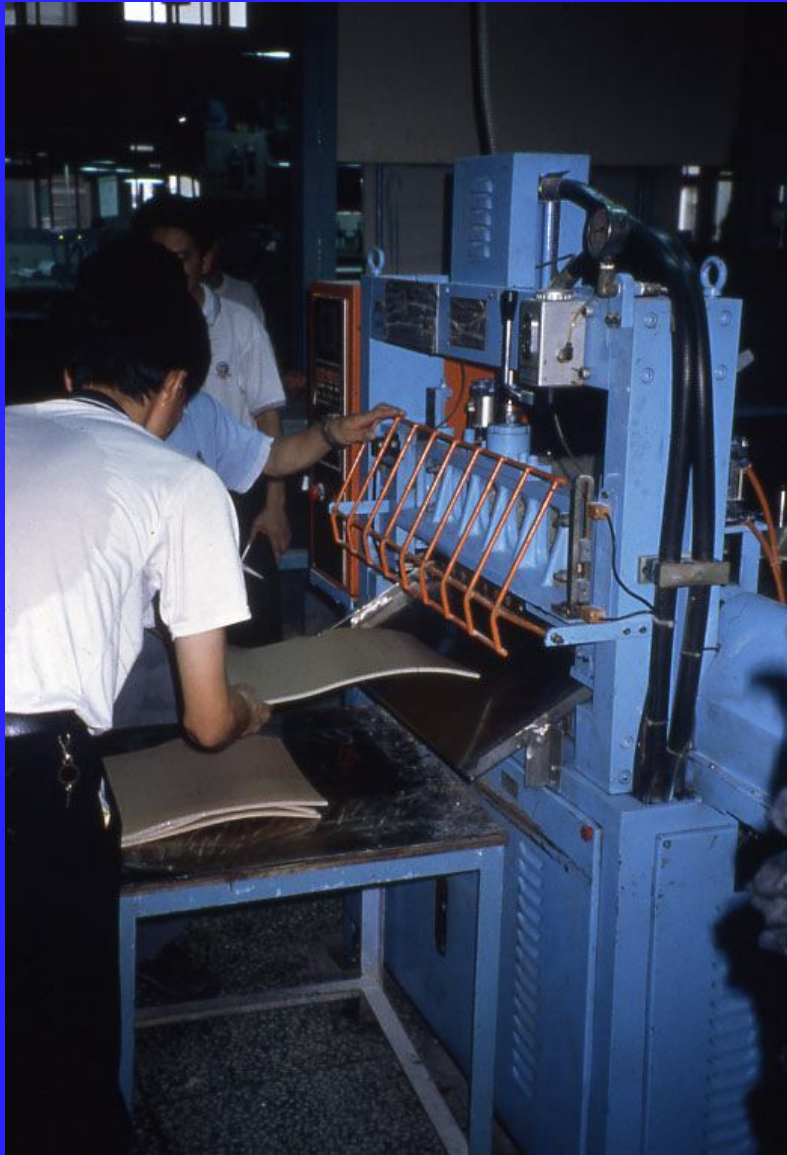


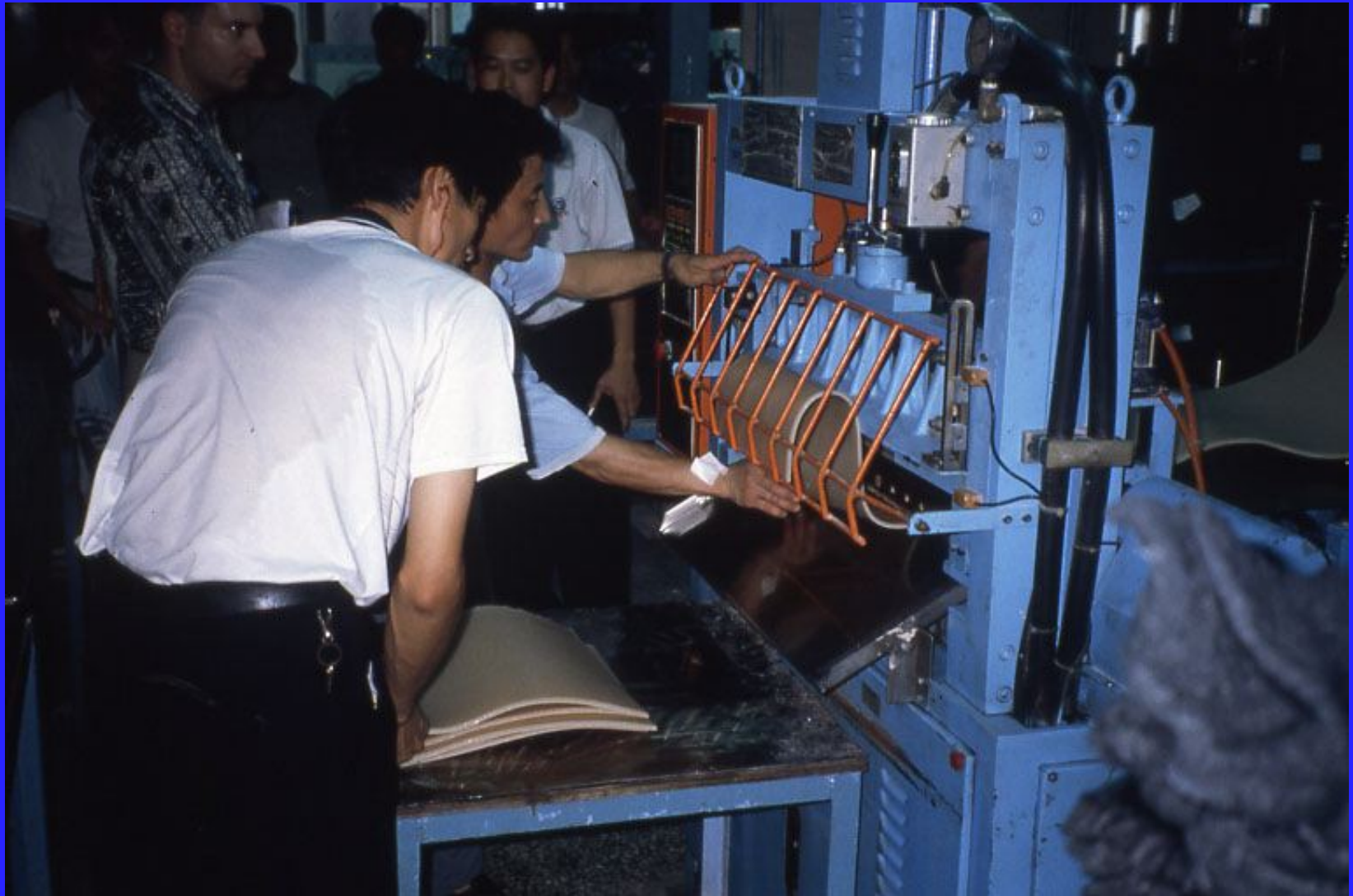
















# Organization of Production Hazards

- Long, long hours
  - Increased accidents
  - Irrelevance of OELs
- Intense rate of production
  - Carrot: pay based on quotas
  - Stick: close supervision
- High turn-over rates
  - Accidents
  - Training challenges

# China Goes “Lean”

Global shift from “Fordist” organization:

- Replace massive, single-process dept
- Establish small production cells integrating various operations completed by a single team of workers
- Lean production cells often in “U” or “S” configuration

# China Goes Lean

Example of sports shoe production:

- Eliminate separate departments for cutting, stitching, stock fit, assembly, inspection and packaging
- Replace with lean cells performing and completing all operations -- start with raw materials and end with boxed shoe



# China Goes Lean

- All the traditional hazards remain
- Add new hazards through combining operations -- mixing previously separated exposures with additive and cumulative effects
- Increase ergo hazards and safety hazards related to moving machinery









# Effective OHS Programs

- Three key players in factory OHS
  - Government
  - Employers
  - Workers

# Effective OHS Programs

In effective OHS programs, workers play key roles in:

- Hazard recognition/inspections
- Accident investigation and prevention
- Worker training

# Effective OHS Programs

Under lean production in China --

- Giant factories
- Small mgmt EH&S committees
- Widespread hazards
- High employee turn-over rates



# Effective OHS Programs

Best example within shoe sector was  
Kong Tai Shoes (KTS) in Longguan

Keys to success:

- 1) Training of worker OHS committee members
- 2) Overlap with elected factory union committee

# Effective OHS Programs

## Worker OHS Ctte Members at KTS:

- 1) Regular monthly inspections -- the fearsome “Red Hats”
- 2) Verification of hazard correction
- 3) Accident investigations
- 4) Peer training of co-workers

# Workers Participation

## KTS Worker Participation in the plant OHS Committee:

- August 2001 training
- September 2001 formation of “Red Hats”
- March 2002 follow-up visit
- Late 2002 - change in plant ownership
- 2003 Red Hats fade away.....



# Further Reading

- 1) “Lean Manufacturing Comes to China,” International Journal of Occupational and Environmental Health, Jul-Sept 2007
  - 2) Special Issue on “Occupational Health and Safety in China,” IJOEH, Oct-Dec 2003
- PDFs available at: [www.ijoe.org](http://www.ijoe.org)

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