

Occupational Health & Safety at the China Shipbuilding Corporation

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Shipbuilding and repair industry

- ❑ Among top three most hazardous industries in US
- ❑ Five fatalities in 2003
- ❑ Injury rate in US (BLS, 2003): 9.7 per 100 FFW (compared to 4.7 national rate)
 - Sprains/strains, bruises, fractures
 - Overexertion, struck by/against object, falls, exposure to harmful substances
- ❑ Illness rate in US (BLS, 2003): 1.4 per 100 FFW (compared to 0.3 national rate)
 - Skin and respiratory diseases



Shipbuilding and repair industry

- ❑ In Taiwan?? – manufacturing overall in 2002, 66.4 injuries per 100 workers
- ❑ Constantly changing complex work environment
- ❑ More automation, but many tasks and conditions remain the same

China Shipbuilding Corporation

- State-owned enterprise,
established 1973
- Commercial and naval
shipbuilding
 - 10 per year
- Repairs/conversions
 - 50-60 per year
- Other industrial products
 - Steel structures,
pipelines,
petrochemical towers,
offshore facilities



Company background & workforce

- ❑ 47% of workforce laid off since 2001
- ❑ Salaries cut by 1/3
- ❑ 2,200 employees (10% female)
- ❑ Contract workers?? 1,500 (10% female)
- ❑ Average age 46.5 years old
- ❑ Day shift only (8:00-5:00)
- ❑ Average salary 50,000 NT per month

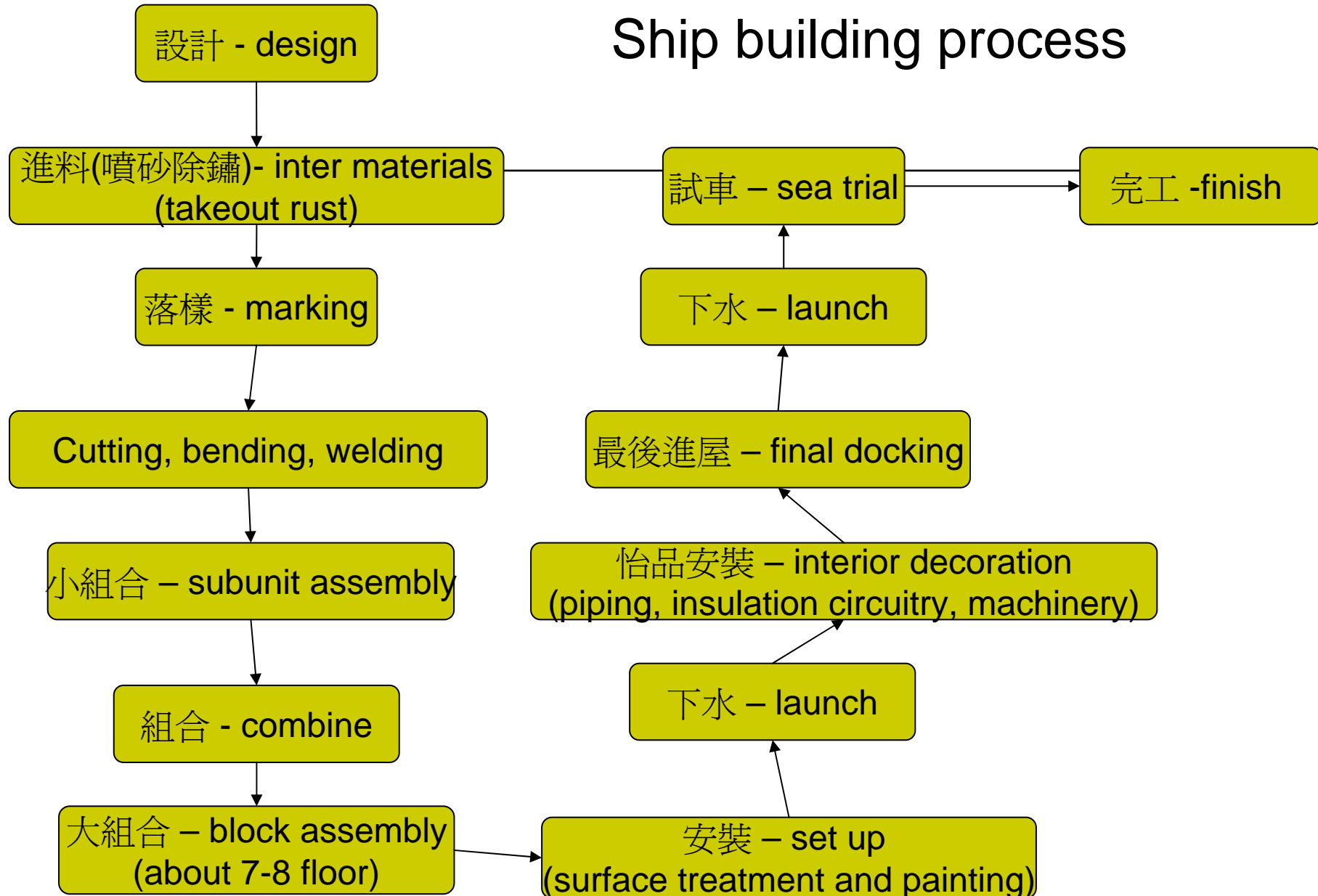


Facilities

- ❑ Two shipyards (Kaohsiung and Keelung)
- ❑ 12 piers (3,000 meters)
- ❑ Dry docks
- ❑ Repair docks
- ❑ Indoor areas for fabrication, abrasive blasting and pretreatment of steel, and assembly of subunits
- ❑ Outdoor areas for abrasive blasting



Ship building process



Shipbuilding

- ❑ Steel obtained from China Steel Company
- ❑ Moving towards complete automation
- ❑ Manual cutting and welding for smaller pieces
- ❑ Abrasive blasting with copper slag
- ❑ Solvent-based paints
- ❑ Total turnaround 6 months: 2 months in shop, 2 months on dock, 2 months on water



Hazards

- ❑ Slips, trips and falls (most common injury)
- ❑ Greatest concern by management:
 - Electrocution
 - Paint fumes



Hazards

- ❑ Other hazards:
 - Welding fumes
 - Confined spaces
 - Dust
 - Noise
 - Heat stress
 - Ergonomics – back muscle sprain (from welding)
 - Fires and explosions
 - Falling objects and overhead injuries



Occupational health and safety

- ❑ Injury rate: 3 per 1 million working hours
- ❑ 2 fatalities in 2003 (contract workers)



Occupational health and safety

- On-site health clinic
 - Emergency alarm in place to alert clinic
 - 1 FT physician and 5 FT nurses
 - Provide first-aid for emergencies
 - 3 to 4 events per month
 - Slipping injuries and heat exhaustion most common
 - Workers with more severe injuries transported to nearby hospital
 - 1 of 10 workers have to be trained in first-aid



Occupational health and safety

- Training
 - New employee provided with required safety training
- Approximately 20 safety engineers
- Every shop has 5-6 safety workers
- Monthly OSHA inspections – concerned about ladder safety and fall protection

Occupational health and safety

- ❑ PPE (face shields, gloves, hard hats, protective shoes, safety belts, ear plugs, dust masks and charcoal-filter respirators) provided but not required to be worn
- ❑ Contract workers only provided safety belts



Occupational health and safety

- ❑ Use of airless spray application
- ❑ Use of copper slag
- ❑ Automation of cutting and welding
- ❑ Outdoor welding and blasting
- ❑ Exhaust ventilation in confined spaces
- ❑ Fall protection:
 - Safety belts
 - Scaffolding and safety nets





Recommendations

- ❑ Further evaluate fall protection areas and requirements – provide training on fall protection
- ❑ If not in place, develop plan for recognition of confined spaces, monitoring, protocol for entry and rescue

Recommendations

- Need formal respiratory protection program
 - Provide medical evaluations, including PFTs, and fit testing for employees required to wear respiratory protection
- Improve worker use of PPE that is provided
 - Increase health and safety awareness through training programs
- Provide training and PPE for contract workers as well



Recommendations

- ❑ Periodic environmental and personal monitoring of dust, metal, noise, and paint fumes to ensure workers are not overexposed
- ❑ Hire on-site occupational medicine physician and nurse and train existing staff in recognizing occupational illnesses

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