Capacity building workshop on sustainable port development and improving port productivity among ESCAP member countries

Strategies on Sustainable Port Developments and Operations : Case in Korea

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Dr. Lee, Ki Youl
Associate Research Fellow
Port & Logistics Research Division
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I. Environmental Issues at Ports
Environmental Issues

Ships are the largest source of emissions at ports

- Sulfur content in marine fuel oil is 3,500 times higher than diesel burned by most trucks and cars
- Various negative impacts on human health including heart attack, asthma, and premature death

Mobile Sources’ Emission in Korea(2015)

Source: National Institute of Environmental Research
Environmental Issues

Level of PM$_{2.5}$ in port cities is much higher than inland cities

- Avg. level of PM2.5 in 2015: Busan 26 μg/m$^3$, Incheon 29 μg/m$^3$, Seoul 23 μg/m$^3$
- Ships are the largest source of emissions in port cities
  - Busan 37.8%, Ulsan 14.1%

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Source: National Institute of Environmental Research
Environmental Issues

**Strengthening regulations for ocean-going vessels**

- IMO’s new global cap on sulphur content of no more than 0.5% m/m (mass by mass) will implement from 2020
- EU has also reinforced its regulations for sulphur content of marine fuel oil for ships


II. Policies to Reduce Emissions from Vessels and Port Areas
Emission Reduction Policies at Port Areas

Developing special law for emission reduction at ports

- Reducing particulate matter is top priority of Korean government
- The Bill passed the National Assembly on 14th March, 2019 will be proclaimed on 2nd April.
  - Including vessels, equipment, trucks and dry cargo handling activities at Port areas
- This Act shall enter into force on 1st Jan., 2020

Developing master plan for Improving air quality in port areas

- MOF (Ministry of Oceans and Fisheries) is developing a master plan to manage air quality in shipping and port areas every 5 years

Review the introduction of integrated management system of port emissions

- Development of port emission index based on circumstance in Korea
- Establishment of comprehensive management system for sustainable policy promotion
Reducing Emissions from Vessels

- **Introducing Emission Control Area (ECA)**
  - Controlling bunker fuel oil for ships is the most effective measurement to reduce pollutant emissions from ships.
  - Conducted a feasibility study on introducing ECA to coastal areas in Korea by MOF in 2018.
  - Under review the level and range of the ECA regulation.

- **Review the introduction of slow steaming program**
  - Slow steaming in the coastal area of Korea (20 nautical miles away from ports).
  - Encouraging voluntary participation of ship owners through implementation incentive system.

- **Install AMP (Alternative Maritime Power)**
  - Port authorities of Busan, Incheon, Ulsan and Gwangyang agreed to install AMP at their respective berths in 2017, and Incheon port installed AMP at their partial berths.
  - MOF has a plan to expand AMP to all nation-wide ports.
Emission Reducing from Vessels

Boosting LNG-related industry
- Planning to construct LNG bunkering infrastructure in major ports
- Strengthen international cooperation with country that is preparing LNG bunkering service as well as international organizations

Promoting adoption of Eco-ship
- Introduction of subsidy support system for early demolition of old ships
- Promote pilot project for LNG ship, prioritize ships at ports such as tug boat, pilot boat or government vessel
Emission Reducing from Port Area

- **Replace & upgrade equipment including trucks**
  - Conversion of fuel from diesel to electricity for container and transfer cranes
  - Transition fuel oil for yard tractor to LNG (subsidy for the conversion cost, up to 50%)
  - Switching regular to LED (Light Emitting Diode) lights at ports

- **Building a real-time monitoring system**
  - 5 stations for emission measurement were installed in Busan (3) and Incheon (2) port in 2018
  - The station will be expanded to the entire Korean ports
  - Investigating the status of air quality in the port area

- **Building scattering dust reduction facilities**
  - Investigating the air quality and handling facilities at the dry cargo handling ports such as coal, ore, sand and grains
  - Recommend installation of dust suppression facilities base on the result
Eco-friendly Facility and Plans

Expansion of the new renewable energy production
- Expansion of solar power facilities in port areas
- In the long-term, reviewing the introduction of wind turbine cluster is needed
  - Potential of offshore wind turbine at port: approximately 134MW
- Development of supporting wharf for the biomass power plants

Improve waiting for berth through productivity enhancement
- Reduce waiting time by sharing berths between terminals
- Introduce automation to enhance port productivity and sustainability, and strengthen promotion of its related R&D
III. Autonomous & Smart Port
4th IR & Smart Port

Evolution of maritime and port system

- Adaptation of IT, IoT, and AI technologies to the global maritime and port operation system
- Smartification of major ports in the world through autonomous port & ships, block chain, intelligent logistics information platform, and so on

Trend of Port system

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<td>Traditional Port</td>
<td>Industrial Port/Im-Export Port</td>
<td>Automated Port/Gateway-Hub</td>
<td>Smart Port City</td>
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Smart Port/Chain Port
Development of Smart Port Roadmap

- **Establish mid to long-term strategy for the smart port development**
  - Establish optimum operation plan through investigation of changes in port operation model due to introduction of port automation system
  - Establish the concept of Korean Smart Port and construction strategy

- **Pilot test for smart port technologies**
  - Port automation facilities test (Gwangyang), port intelligence and data linkage test (Busan, Incheon)
  - Start-up business training and establish logistics information system (Ulsan)

- **Investigating port employment maintenance plan for smart port**
  - Analyze the changes and impacts of existing port employment,
  - Establish practical countermeasure such as expansion of duties, conversion of jobs, provision of alternative jobs
Thank you!

kylee@kmi.re.kr