International Association of Public Transport
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Unión Internacional de Transporte Público

Summary: Workshop on "low-carbon and low impact waterborne transport operations"

Held in London 21-22 October 2012

Larry Jacobs, Chairman
UITP Waterborne Transport Committee

London River Services

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UITP Waterborne Transport Committee

Work Programme

Operational

- Operator Profiles
- Accessible waterborne transport
- Safety Incidents
- System Integration (land and sea)
- **Terminal Design***
- **Environmental*** (alternative technologies)

* Sustainable Development relevant

UITP Waterborne Transport Committee

Work Programme

Relational

- **Sustainable Development policies***
- **Waterfront Planning Integration***
- Human Resource management
- Public Transportation International (PTI)

* Sustainable Development relevant

UITP Waterborne Transport Committee

Membership List

One of the more international committees in UITP, with members from:

Belgium	Germany	Sweden
Bermuda	Italy	Switzerland
China	Netherlands	United Arab Emirates
Cote d'Ivoire	Norway	United Kingdom
Finland	Portugal	
France	Spain	

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Workshop on Low-carbon and low impact waterborne transport operations

London 21-22 October 2012

Why this Topic for a workshop?

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Workshop on Low-carbon and low impact waterborne transport operations

Why this topic for a workshop?

- Historically, waterborne transport has lagged behind land-based transport in sustainable technologies
  - ✓ Focus has been on land-based transport (bus/rail/automobiles)
  - ✓ The transformation of waterfronts from industrial to residential, business and recreational uses resulted in more emphasis in waterborne transport and environmental issues
  - ✓ Many members of the Committee have made significant advances in low carbon operations

Workshop on Low-carbon and low impact waterborne transport operations

As cities reclaimed their waterfronts, waterborne transport gained in importance

As waterborne transport became more important, more emphasis was placed on ensuring that the services reduced the impact on the environment

Workshop on Low-carbon and low impact waterborne transport operations

Countries represented at the Workshop

Australia	Germany	Portugal
Bermuda	Hungary	Sweden
Cote d'Ivoire	Italy	Switzerland
Denmark	Japan	United Arab Emirates
Finland	Netherlands	United Kingdom
France	Norway	United States

Workshop Presentations

- "Environmental issues and achievements on the River Thames": London, UK
- "Protection and enhancement of the environment on the River Thames River": *London, UK*
- "A model to measure waterborne transport emissions and initiatives to reduce pollution in Venice": *Venice, Italy*
- "Reducing the Impact of Waterborne Passenger Transport on Endangered Species through Innovation": *Queensland, Australia*
- "Super*capacitor vessel in Lorient":* Lorient, France
- "*Solar* and fuel cell boats, tomorrow's technology tested today": *Hamburg, Germany*

Workshop Presentations

- "Solar electric boats – 20 years experience with passengers transportation": *Switzerland*
- "Eco-sailing practices on the Thames River": *London, UK*
- "Reducing environmental impact of waterborne transport in Stockholm": *Stockholm, Sweden*
- "Hybrid Drive propulsion": Siemens: *Nuremberg, Germany*
- "Solar lighting systems on RTA marine stations": *Dubai UAE*
- "Terminal Design concepts": *Waterborne Transport Committee members*
- "Conclusions": *Chairman UITP Sustainable Development Commission*

Presentations available on the UITP Mobi+ site

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Examples of marine sustainable technologies

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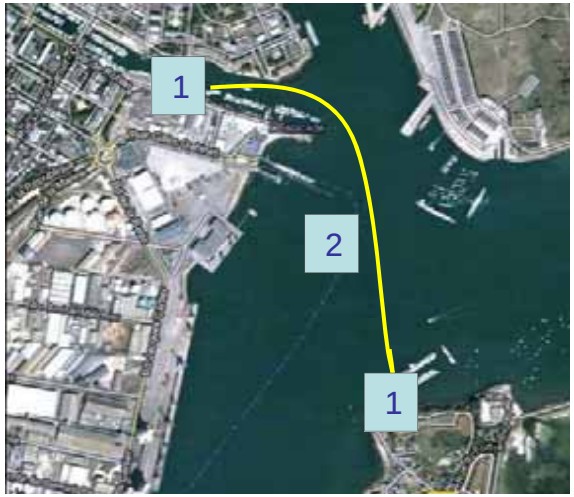
Supercapacitor vessel Lorient, France

- Zero emissions requirement by local authority
- Electric supercapacitor propulsion
- On-board production of energy
- Only takes power for one trip (14 min.)
- Rapid charging while boarding (4 min.)
- **Advantages**
  - ✓ Power density far above that of batteries
  - ✓ no chemical process
  - ✓ high efficiency
- Limitations
  - ✓ Energy density below batteries, therefore more suitable for short crossings

Electric vessel



1 4 minute charge

2 14 minute journey

Solar vessel
Hamburg, Germany

- Zero emissions requirement on Alster Lake
- It is the worlds largest solar catamaran
- The benefits of the solar propulsion system: no emissions - low operating costs - high popularity
- Positive experiences with the solar catamaran served as the basis for a new alternative propulsion system with renewable energy

Alstersonne

Alster Lake

Hydrogen fuel cell vessel Hamburg, Germany

- Proving fuel cell propulsion for vessels is possible
- Minimizing noise and other emissions
- Operating on a lake (Alster) as well as on a tidal river (the Elbe)
- Fuel cell propulsion (no auxiliary diesel-engine/generator)
- Retractable roof
- Barrier-free access via hydraulic platform

Alsterwasser

Retractable roof to pass under bridges

Solar and Fuel Cell boat in Hamburg
Lessons learned

- The operation of the vessel Alsterwasser in the future depends on approval of funding by the City of Hamburg
- infrastructure maintenance, such as hydrogen fuel cell station
- Project provides support to encourage other companies to build and operate vessels with alternative propulsion systems
- Both projects have been labour intensive on the one hand - very instructive on the other hand: therefore on the whole successful.

Examples of other presentations on eco-friendly marine technologies

Topic	Location	Note
Eco-sailing on the Thames	London, United Kingdom	Improving the efficiency of how vessels operate in order to lower emissions and fuel consumption on the Thames
Measuring emissions in Venice	Venice, Italy	Programme to measure vessel emissions in Venice. To be used to develop long-term solutions
Reducing vessel environmental impact	Queensland, Australia	Vessel design and operating parameters to reduce impact on mammals (vessel hull design and operating criteria)
Solar electric boats	Switzerland	Example of various solar boat in operation in Switzerland. Some in operation for 20 years
Hybrid Drive propulsion systems	Various locations	Siemens presentation on hybrid drive propulsion systems in operation at various locations
Solar lighting systems	Dubai, UAE	Examples of solar lighting at ferry terminals in Dubai

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Workshop on Low-carbon and low impact waterborne transport operations

Examples of Terminal Designs

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Terminal Design

Oslo, Norway

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Oslo – Nesoddtangen Terminal

Location

- Nesodden is a peninsula in the middle of the Oslo Fjord
- The Terminal is Norway's busiest, with approximately 10,000 passengers a day
- Frequent ferry service is provided from the Terminal to the city centre of Oslo
- Located in a largely residential area, with strict environmental controls

Oslo – Nesoddtangen Terminal

Terminal features

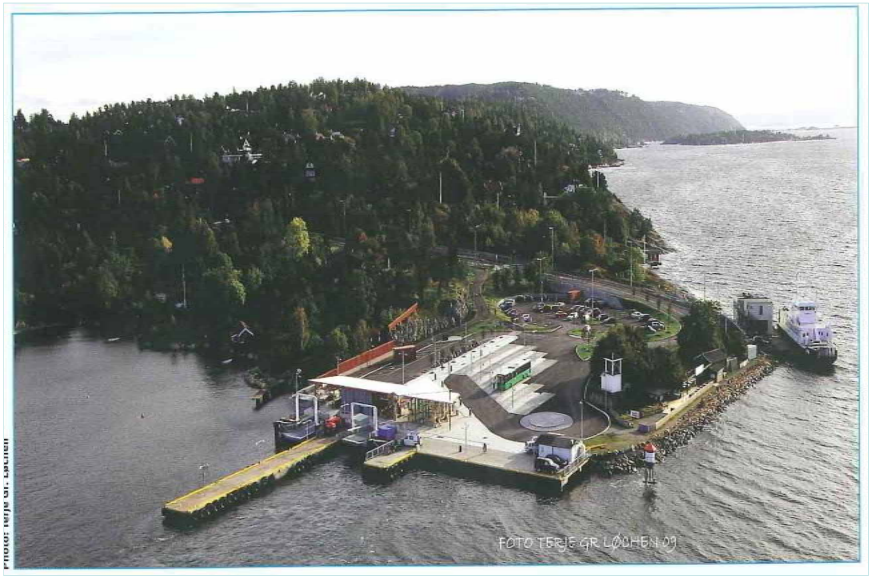
- Minimal parking to reduce traffic congestion and encourage use of bus services from parking areas located on the peninsula
- Green design to minimise the footprint of the Terminal facility
- Full accessibility features (tactile information map with audio information, markings on pavement for visually impaired passengers and real time ferry information)
- Kiosk for purchase of travel cards, passenger waiting room, toilet facilities, etc.
- 10 bus departure platforms

Oslo – Nesoddtangen Terminal

Ferry features

- Six new eco-friendly ferries (built in France) delivered in 2009
- The three ferries operating between Nesoddtangen and Oslo run on liquefied natural gas (LNG) and diesel fuel
- A maximum of 600 passengers are able to travel at each departure
- Bow loading feature to allow for full accessibility
- On-board passenger amenities

Oslo – Nesoddtangen Terminal



The Terminal offers a modern accessible design with good connections with buses, while minimizing the carbon footprint of the facility

Terminal building includes kiosk for ticketing, shelter from the elements and information for the visually impaired

Oslo – Nesoddtangen Terminal

Accessibility was an important design element of the facility

Tactile information map (audio readout) and markings on pavement enhances the accessibility features

Bow landing ramp ensures full accessibility for the physically and visually impaired. LNG and diesel propulsion

Other presentations on eco-friendly Terminal designs

Topic	Location	Note
Environmental-friendly terminals in Ivory Coast	Abijdan, Côte d'Ivoire	New terminals to minimise environemental impact
Terminal design in Lisbon	Lisbon, Portugal	Terminals with full integrated ticketing and multimodal connections with rail/bus and water
Terminal design in London	London, UK	Design criteria for designing of terminals on the Thames River
Terminal Design, Oslo	Oslo, Norway	Design criteria at Nesoddtangen Terminal, Oslo
Terminal design, Bermuda	Bermuda	Design criteria for ferry terminals in Bermuda

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Sustainability initiatives in Bermuda

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Bermuda Islands

British Dependent Territory
54 sq km (21 sq mi)in size
64,000 inhabitants
5,545 km (3,445 mi) km from London
1,127 km (774 mi) from New York

Bermuda's historical development

1) **Limited natural resources**
   - No fresh water sources (water collected in tanks built under most homes)
   - Limited export of goods
   - No energy production – everything imported

2) **Small size (land mass and population)**
   - 54 sq km (21 sq mi)in size
   - 64,000 inhabitants
   - Lack the land mass and population base to develop expensive sustainable development solutions

3) **Geographical location**
   - Hurricane and winter gale occurrences

Hurricane protection

During June – November, Bermuda is under threat from Atlantic hurricanes

Planning regulations require all buildings and ferry/cruise ship terminals be built to a high standard to withstand hurricanes

Homes constructed to withstand hurricane force winds, while conforming to the unique Bermudian style of architecture. Water catchment under each home.

Homes can withstand at least Category 3 wind speeds - Sustained/Maximum 111/130mph/178/208km/h

Sustainability initiatives in Bermuda

Transportation

- Cars limited to one per household (since 1946)
- Many condos in city centre not allowed cars
- Car dimensions regulated
- Speed limit 35 km/h
- High duty placed on cars - starting at 75% (Electric cars duty free)
- No rental cars allowed in Bermuda
- Tourists use public transport or cycles (mopeds)
- All motor vehicles must meet latest international emission standards

Pink and blue buses – Note concrete bus shelters

Implementation of these regulations resulted in the development of an excellent public transport system for an island of this size

Sustainability initiatives in Bermuda

Transportation

- 110 buses (diesel – mostly manufactured in Europe)
- Buses meet latest European emission standards
- 11 vessels, including 6 high-speed catamarans
- Bow loading vessels and terminals to enable full accessibility
- Leisure travel (Tourists) represent over 70% of daily journeys on buses and ferries
- Minimal scale and environmental footprint (design of Terminals blends in with adjacent land use)

High-speed catamaran

Rockaway ferry dock

Sustainability initiatives in Bermuda

Immigration and Business

- Strict immigration policies for citizenship, residency and employment (guest worker term limits)
- Preserves an environment for Bermudian entrepreneurship (60% local ownership)
- Maintains a sustainable population growth

Cultural

- St. George's: UNESCO World Heritage Site 2000 (town and fortifications)
- Preservation of historic buildings and items of cultural significance unique to Bermuda

Hamilton – capital and centre of commerce

St. George's – UNESCO World Heritage Site

Sustainability initiatives in Bermuda

Historic Wrecks Act 2001

- Established Historic Wrecks Authority to preserve and protect Bermuda's underwater cultural heritage
- Wrecks ‘classified’ to manage the archaeological and scientific examination of historic wrecks
- Related to scientific research, cultural resource management and tourism

Historic Wrecks in Bermuda

Sustainability initiatives in Bermuda

Protected Species Act (2003)
(Updated from Fisheries Act 1972)

- Established for the conservation and protection of plants and animals of Bermuda's threatened species. Uses the criteria in the International Union for the Conservation of Nature Red List of Threatened Species
- The Minister may designate a protected area
- Bermuda's caves contain many organisms not found anywhere else in the world
- Bermuda has some of the healthiest coral reefs in the world. They have been protected since 1966

Sustainability initiatives in Bermuda

The Sargasso Sea Initiative

- This N. Atlantic asset, nearly 2K miles wide, is described as “The Golden Floating Rainforest of the Atlantic Ocean”. Threatened by overfishing and global climate change
- Bermuda in lead role with International Union for Conservation of Nature, Woods Hole Oceanographic Institution and the World Wildlife Federation International
- Intended for Governments and international bodies to join us in considering protections for the Sea

Sustainability initiatives in Bermuda

Energy White Paper

- Aggressive goals to decrease our reliance on fossil fuels (diesel and gas)
- Promotes responsible adoption of alternative and renewable energy technologies
- Outlines efforts for ongoing education campaigns to improve public knowledge of energy efficiency
- Advocates conservation and reduction of energy, while increasing the use of renewables and other energy saving technologies
- Alternative technologies for buses and ferries

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Thank you

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