Sit-on-top Kayak First invented by Tim Niemeyer in the early 1980s with the advent of roto-moulded plastic technology, sit-on-top kayaks have revolutionized paddle sports. Today, these craft far outnumber the Eskimo (Inuit)-style decked kayaks. They are easy to use at the entry level, and thus suitable for paddlers lacking seamanship experience (see Fig. S14).

John Gray

SKOANZ: *see* **Sea Kayak Operators Association of New Zealand**

Slipway

1. The term slipway is sometimes used to refer to the docking area between two piers (though more often this will be referred to as a 'slip'). Typically, a slipway refers to a ramp. One type of slipway is a ramp from the shore to the water by which ships or boats can be moved to and from the water, often for the building and maintenance of vessels. Another type of ramp is used for launching and retrieving small boats on trailers (though the term 'boat ramp' is more often used in such cases).

2. The second meaning of this term is the stern slipway, which was introduced in 1925–1926 for the hauling of **whales** on deck for flensing (removing the skin and fat), thus allowing factory ships to operate at sea (Reeves and Smith, 2003). Large **trawlers** also pull their catches on board through a slipway in the stern. Some offshore support or standby vessels have special stern slipways (stern ramps) built into the transom that enable the direct launching and retrieval of **lifeboats** on board in extreme weather conditions (Sheinberg *et al.*, 2003).

Related internet sources

Stern slipway photo: http://www.ship-technology.com/projects/strill/strill2.html

Stern boat deployment systems and operability: http://www.skibstekniskselskab.dk/download/WMTC/B2(O21).pdf

Stern ramp engaged (photos): http://www.sintef.no/content/page1_2807.aspx

Dagmar Fertl

Smokestack Emissions Air pollution from **cruise** ships is generated by diesel engines that burn high-sulphur fuel, producing sulphur dioxide (SO_2), nitrogen oxide (NO_2) and particulate matter, in addition to carbon monoxide, carbon dioxide and hydrocarbons (Herz and Davis, 2002). Shipboard incinerators also burn large volumes of garbage, plastics and medical waste, producing dioxin, furans and other toxins. Annex VI of the **International Convention for the Prevention of Marine Pollution from Ships (MARPOL)** addresses prevention of air pollution from ships.

Opacity is the visible emission from a smokestack. It is measured by looking through smoke and determining how much of the background is obscured because of the smoke. Opacity cannot be used to measure public health **impacts**; however, the fact that cruise ships are emitting enough visible smoke to produce a haze over **ports** is of significant concern to local citizens, in particular in the State of Alaska. Alaska's Marine Vessel Emission Standards is legislation that provides for state monitoring of opacity air emissions from cruise ships. Violation of these standards is prosecuted, with cruise ship companies fined to pay penalties to the state and reduce their air emissions. Violations of Alaska's emission limits also violate the US Clean Air Act. The Alaska Department of Environmental Conservation is leading the **Alaska Cruise Ship Initiative**, with representatives from the US Coast Guard, Environmental Protection Agency, the South-east Conference, the public and the cruise ship industry to develop voluntary measures in addressing pollution problems associated with cruise ships.

The **cruise industry** is working on emissions reduction practices, such as the use of lower-sulphur fuels, adjusting engine timing, new diesel-electric propulsion systems known as the 'enviro-engines', gas-turbine engines and 'cold ironing', which is where ships are now being modified so they can turn off their engines while docked and plug into a nearby land-based hydroelectric power plant, also known as a shore power 'plug in programme'.

Related internet sources

Cruise Liner Emissions Reduction Incentives Project: http://www.westcoastdiesel.org/grants/files/Cruise%20Liner%20Project%20Fact%20Sheet.pdf