



International Naval Technology Transfer Lessons Learned from the Spanish and Chilean Shipbuilding Experience

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Agenda

- **Introduction**
- **International Technology Transfer in the Naval Industries: Historical Context**
- **Evolution of Technology Transfer in Spanish Naval Shipbuilding, 1890-2010**
- **Evolution of Technology Transfer in Chilean Naval Shipbuilding, 1960-2010**
- **Conclusions and Lessons for Naval Shipbuilders**

Introduction

1977: Spanish shipbuilder Bazán (later Navantia) authorized to build US-designed frigates and carrier under license



2007: Navantia sweeps Australian Navy contracts for three Air Warfare Destroyers plus two amphibious ships

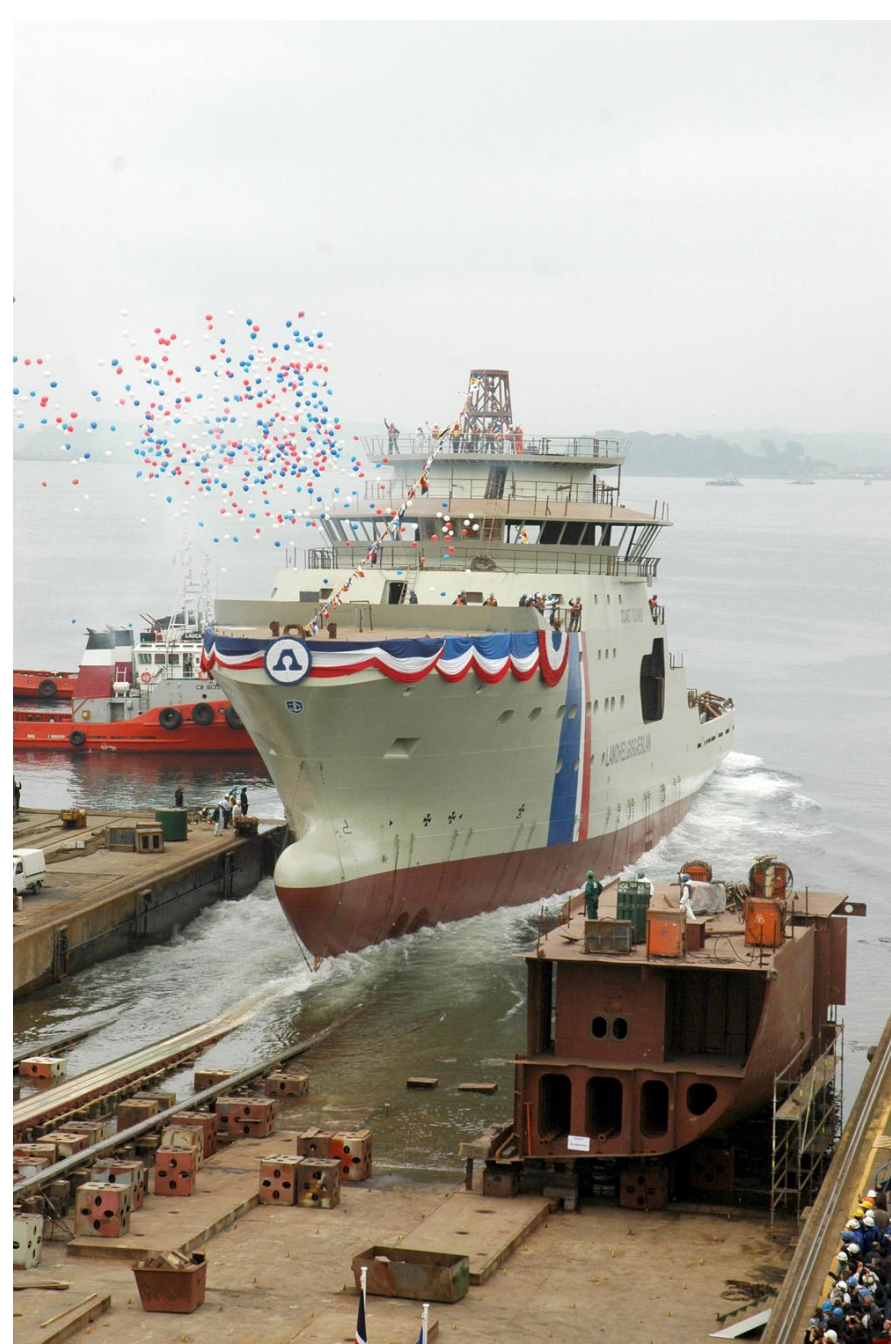


Introduction

1977: Chilean
shipbuilder ASMAR
builds *Maipo* LSTs
under French license



2007: ASMAR wins
contract to build
Icelandic Coast
Guard vessel *Thor*



International Technology Transfer in the Naval Industries: Historical Context



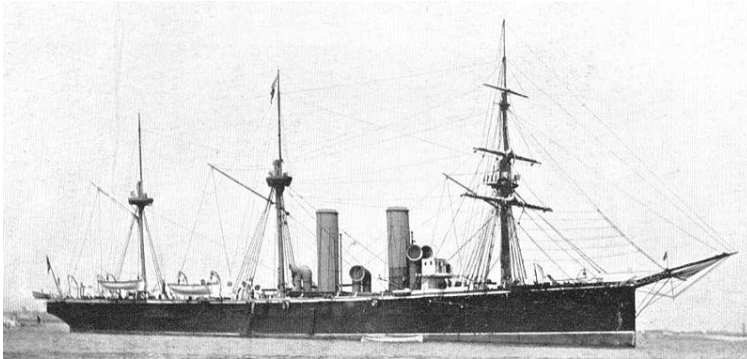
Trafalgar:

- Spanish flagship *Santísima Trinidad* designed by Matthew Mullan
- Other Spanish ships designed by François Gautier
- British 74-gun ships closely derived from French
- Copper sheathing borrowed from Britain

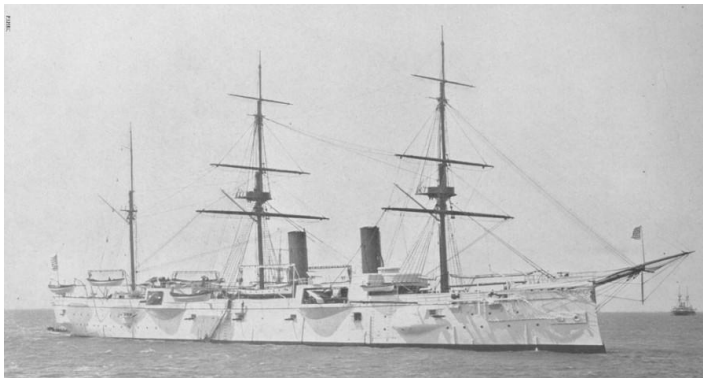
International Technology Transfer in the Naval Industries: Historical Context

Britain to USA

HMS *Leander* 1882

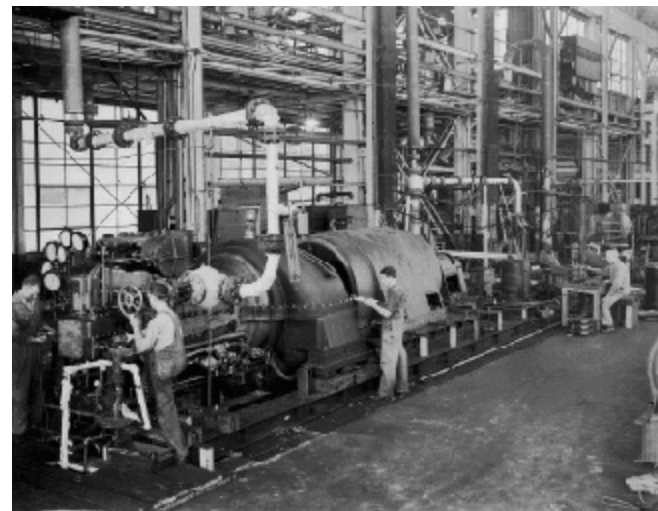


USS *Chicago* 1886



Britain to Japan

Charles Parsons licenses
steam turbines to
Mitsubishi, 1907



Evolution of Technology Transfer in Spanish Naval Shipbuilding, 1890-2010

I. Import industrial expertise (Britain to Spain)

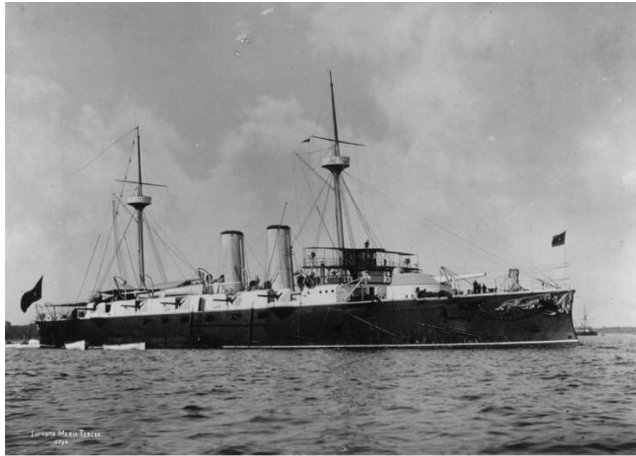
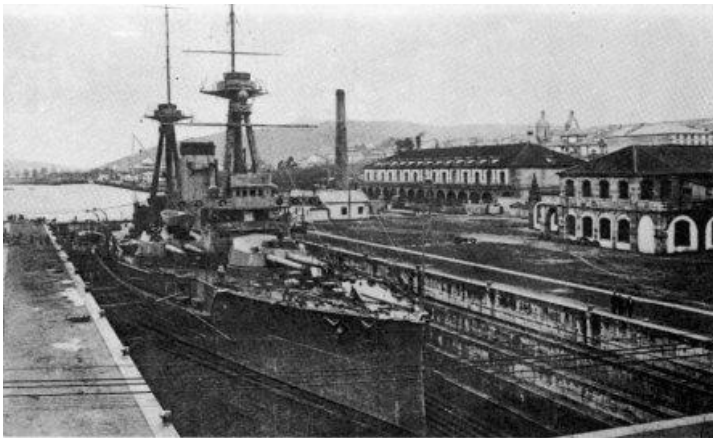


Photo #: NH 88603 Spanish cruiser Infanta Maria Teresa

1890s: British-Spanish company Astilleros del Nervión builds British cruisers under license



1909: British-Spanish company Sociedad Española de Construcción Naval (SECN) builds British battleship under license

Evolution of Technology Transfer in Spanish Naval Shipbuilding, 1890-2010

2. Design/build under license (US Navy / Gibbs & Cox to Bazán)



1966: DE 1052 *Knox* (later FF 1052) to
DEG 7 (later F 70) *Baleares*



1977: FFG 7 *Perry* to F 81 *Santa María*



1977: Sea Control Ship (SCS) to
R 11 *Príncipe de Asturias*

Evolution of Technology Transfer in Spanish Naval Shipbuilding, 1890-2010

3. Create indigenous design/build capability (Izar/Navantia)



Chakri Naruebet (to Thai land)



A 14 Patiño (with NL)



F101 Alvaro de Bazán



L51 Galicia (with NL)



L61 Juan Carlos I

F310 Fridtjof Nansen (Norway)

Evolution of Technology Transfer in Chilean Naval Shipbuilding, 1960-2010

I. Import industrial expertise (Britain & Canada)



1980s: Refit of frigates



1990s: Refit of cruisers

Evolution of Technology Transfer in Chilean Naval Shipbuilding, 1960-2011

2. Design / build under license



Maipo (with France)



Aquiles (with Canada)



Vigilant (with Canada)
(to Mauritius)



Piloto Pardo
(with Germany)



Arni Fridriksson
(with /to Iceland)



Thor (with Norway)
(to Iceland)

Conclusions and Lessons for Naval Shipbuilders

International technology transfer can improve market position, transform importers to exporters



2009: Italian shipbuilder Fincantieri buys Marinette Marine (Wisconsin), builder of Littoral Combat Ship (LCS): aims to rationalize construction, reduce costs and vie for exports. As of Feb 2012, labor hours have decreased 30%.

Epilogue – ASMAR 2010-2011



Earthquake-Tsunami Feb 2010



Fenix capsule rescues miners, Oct 2010



Final recovery ops Jan 2011



Icelandic OPV *Thor* delivered Sep 2011