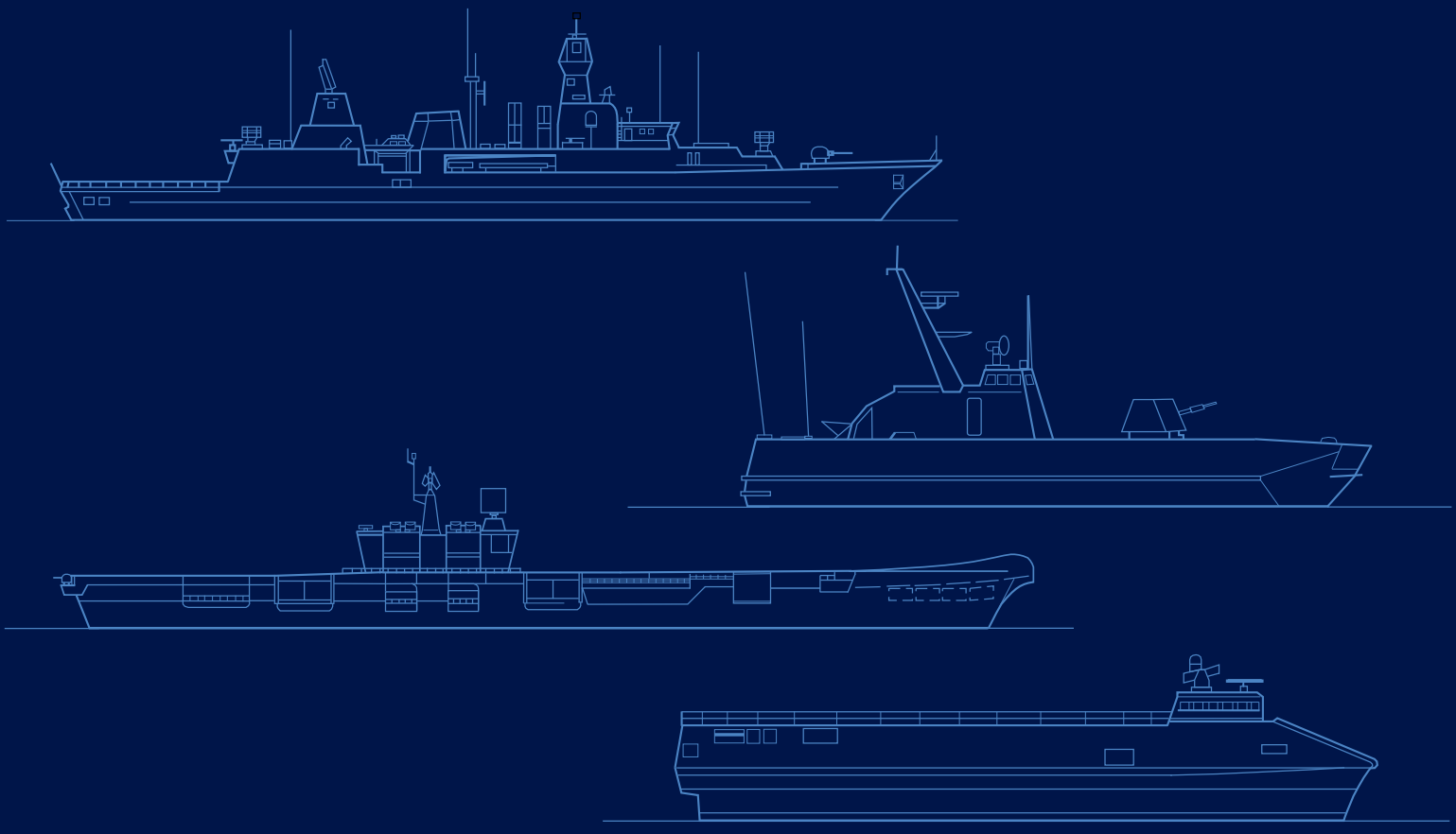
Innovative Power Transmission



Naval Applications

General Information

Innovative Gear Solutions in Naval Propulsion Systems

RENK on 600 vessels of 40 Navies

Developments in gear technology continue to orientate at increasingly sophisticated propulsion systems. Starting from classic CODOG arrangements initiated in the early eighties, enhanced systems are available. In today's cost and efficiency sensitive times, alternative naval propulsion concepts have been developed, such as CODAG, supported by high speed controls, leading to the CODELAG, the "hybrid" in naval propulsion.
RENK main propulsion gears follow the technical needs, based on renowned experience with more than 600 installations aboard fleets of 40 Navies. Extremely compact gears such as high speed COGAG systems are required for specialised vessel designs. The trend with all applications are highly efficient compact solutions at low weights, including low noise signatures, even extinguishing tooth mesh frequencies in audible and structure borne noise. To combine all these factors to a reliable gear system is the challenge in the yet again enlarged market place for surface combatant propulsion gears.

- 100 CODOG/CODAG and 300 CODAD/ Single DE gears up to 40 MW aboard destroyers, corvettes and frigates in Europe, Mid-/Fareast are equipped with RENK gears
- 32 NATO vessels with RENK propulsion gears
- Continuous logistic and maintenance support since 1960 according to Navy standards
- German Navy F 124 as first CODAG system worldwide, continued with US Coast Guard NSC
- No major failure experienced for 40 years
- World record in low noise with SAN CODAG system

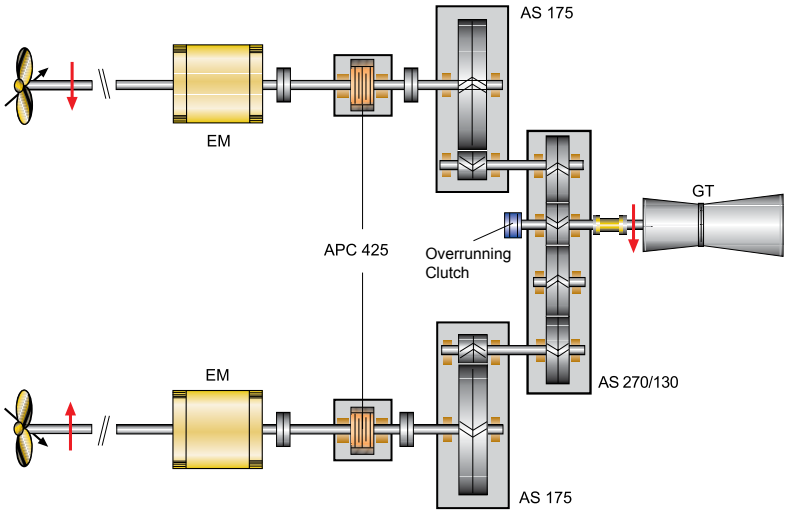
CODAD Gear with fluid couplings for 16 MW shaftline power

Flexible Support Ship Danish Navy

Sigma Class, Netherland

CODELAG System for FREMM

FREMM Italian Navy



German Navy Sachsen Class Frigate

Amatola Class Corvette for SAN

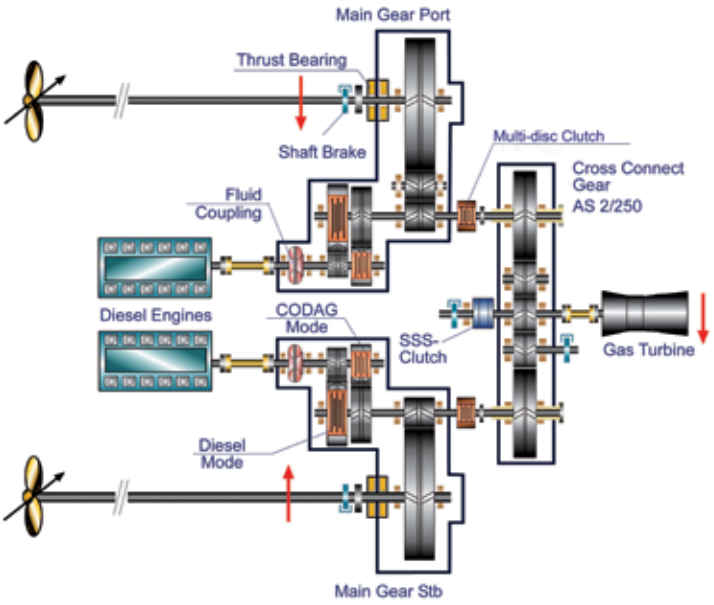
Sigma Corvette Indonesian Navy

National Security Cutter (NSC)

USCG National Security Cutter "Bertholf"

Vessel Data	
Overall Length:	418 ft (127.5 m)
Max. Displacement:	4,300 tons
Max. Speed:	29+ knots
Shipyard:	Northrop Grumman
Shipowner:	US Coast Guard

CODAG Propulsion	
Input Power:	1 GT 23 MW + 2 DE 7.4 MW



LCS Independence Class

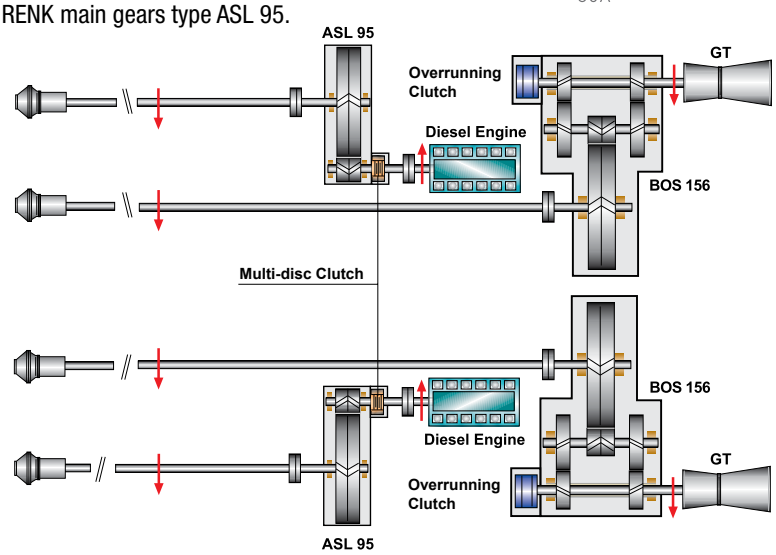
The US Navy faces new requirements and mission profiles for their surface fleet. For littoral duties this has resulted in the evaluation and building of a new class of ship. For this specialized role RENK AG was chosen to deliver two shipsets of high-sophisticated main propulsion gears in a CODAG arrangement for the Littoral Combat Ship (LCS) built by AUSTAL shipyard, USA. The propulsion system features 2 x diesel engines combined with RENK main gears type ASL 95.

Vessel Data	
Overall Length:	127 ms
Max. Displacement:	2,800 tons
Max. Speed:	45+ knots
Shipyard:	AUSTAL, USA
Shipowner:	US Navy

AUSTAL
USA

ASL 95
Diesel engine gear

BOS 156
Gas turbine gear



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