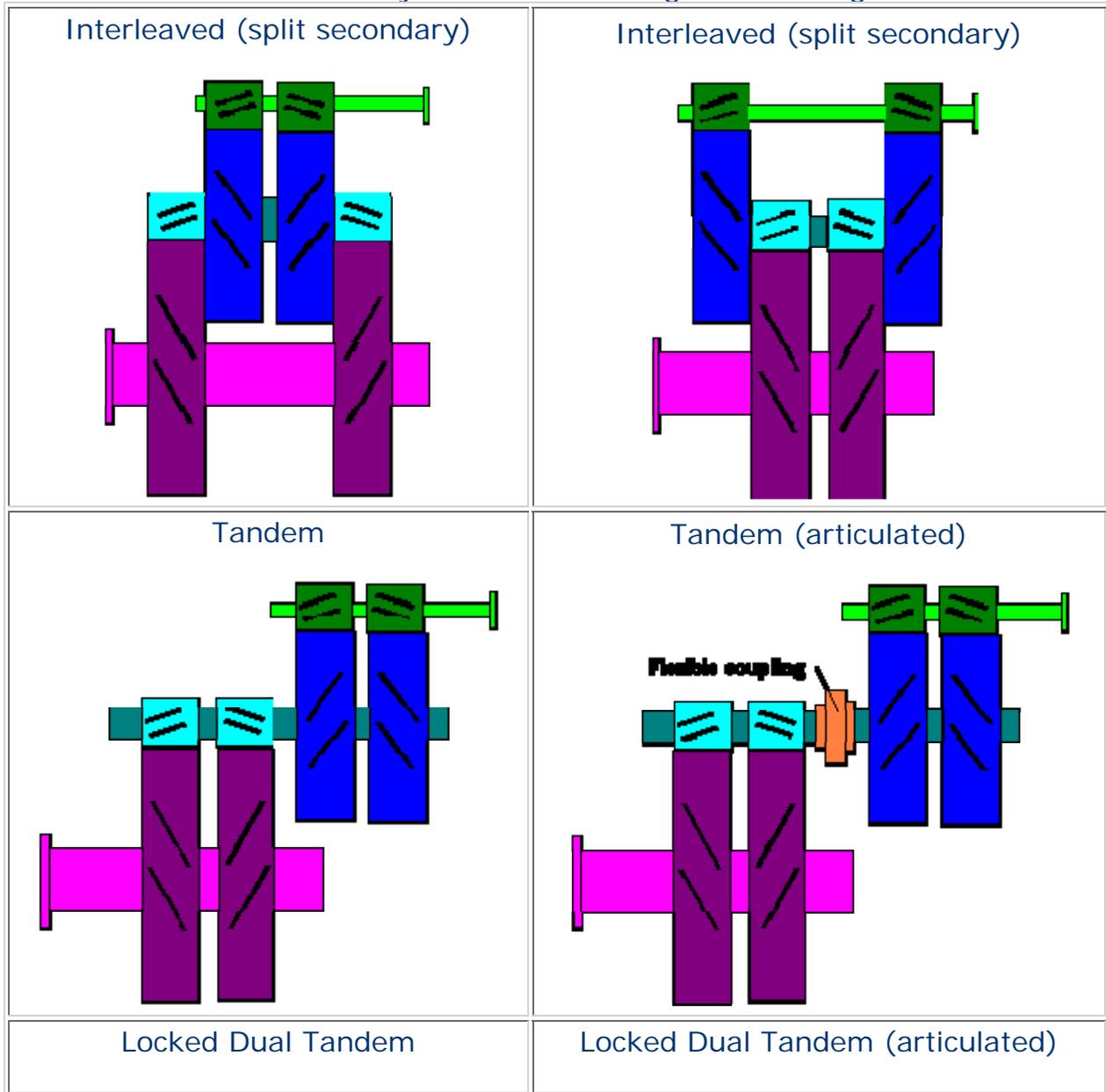
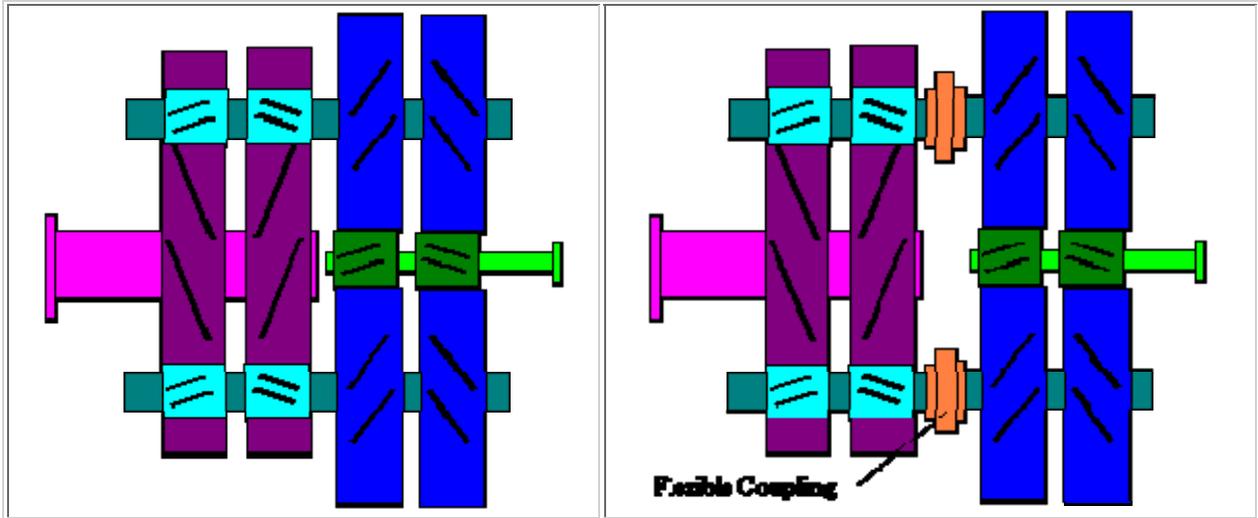


Marine Gear layouts

Excerpt from www.marineengineering.org.uk

Shown below are various layouts for a two stage reduction gearbox





The connection between the rotor and pinion shaft is always via a flexible coupling

The dual tandem arrangement has the advantage that there are two pinion contacts on the secondary wheel. This halves the tooth load and allows a much smaller wheel.

To achieve this, however, requires very accurate setting up so that one pinion does not sit in its backlash whilst the other is loaded.

This may be achieved by setting one pinion so that it gives the correct contact then slightly rotating the other pinion until it is fully contacted and then 'Locking' the whole arrangement. One method of doing this is by taper fit flexible couplings which can be moved relative to the shaft by application of hydraulic pressure between the mating surfaces.

Extensive use of quill shaft and flexible couplings is made to negate effects from pitch errors creating high dynamic tooth loading. Great care must be taken with the alignment of the primary pinion and primary wheels as this is very highly stressed.

Single Tandem

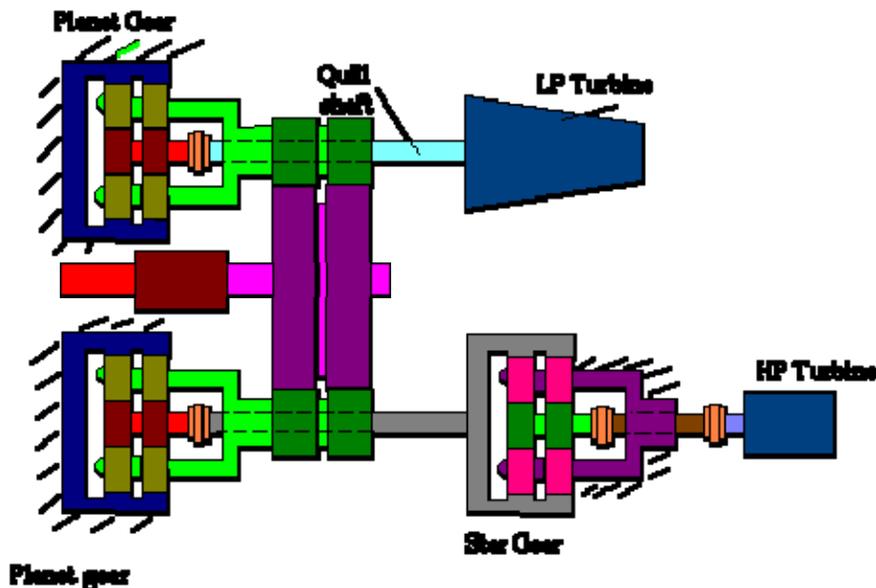
- Advantage
 - Simple
 - Length of shafting provides damping to vibration
 - carry very high loads
 - capable of accepting minor manufacturing errors
 - primary and secondary gear may be dismantled independently
 - large turbine axis / output shaft distance allows use of underslung condensers

- Disadvantage
 - Heavy
 - Large

Dual Tandem

- Advantage
 - Much smaller secondary wheel
 - Lighter
 - Small turbine axis / output shaft distance allows reduced height
- Disadvantage
 - Small turbine axis / output shaft distance requires axial flow condenser or angled prop
 - Complicated alignment procedure and fault intolerant
 - Multitude of parts

Triple/Double reduction steam plant gearbox



The main wheel pinions are free to move axially because of the axial freedom of the planets on their bearing oil film
 The first stage of the HP turbine is a start gear. This due to the high speed of the HP turbine causing centrifugal stress to distort a free planet carrier causing meshing problems. With a star gear the plane carrier is fixed.
 Sun wheels are connected via flexible couplings to allow for manufacturing and alignment errors