



PROPULSION MOCKUP REDUCTION GEAR, DEVICE 19E5/2

TRAINING CATEGORY:

PROPULSION ENGINEERING (Maintenance Equipment)

ORIGINATING AGENCY:

CNET

SECURITY CLASSIFICATION:

Device 19E5/2 is unclassified.

INTENDED USE:

Device 19E5/2 is intended for use in a classroom to present principles of operation and general arrangement of a locked train double reduction gear to military personnel.

a. To identify parts, show relationship between parts, and demonstrate the sequence of actions in the propulsion reduction gear.

b. To demonstrate operation and fundamental shipboard maintenance procedures associated with the locked train double reduction gear.

FUNCTIONAL DESCRIPTION:

Device 19E5/2 is a 1/4th scale, 3-dimensional, hand-operable mockup of the propulsion reduction gear utilized in a DD963 Class Destroyer. It is made of metal, wood, and acrylic plastic.

A transparent plastic enclosure representing the gear housing is provided. The plastic enclosure is stylized and is provided with the controls necessary for operation of the mockup extended outside of the enclosure. The plastic enclosure is removable from the mockup for maintenance purposes. The mockup is mounted on a table type castered support stand at eye level viewing height of a seated class.

The reduction gear mockup includes all the shafts and gearing of the operational equipment. The inputs of the first stage reduction are operable through a hand cranking mechanism.

The input speed is reduced through the gear train so that the ratio of output shaft speed to input shaft speed corresponds to the reduction ratios of actual equipment.

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When viewed from the output shaft end, rotation is in a clockwise direction only. The operation of the engine to propeller shaft connect/disconnect mechanism is manually demonstratable. Flexible shaft couplings connecting the free turbine output shafts to the reduction pinions are shown. The main gear reduction shaft connection to the propeller shaft is shown. The turning and locking gears are depicted and are operable.

One (1) chart 16" x 20" is supplied with this device. It is mounted on the vertical backboard and is removable for storage below. The chart illustrates the gear train in schematic form and gives a sample calculation of input to output speed. Components on the chart are numbered and color coded to match the device.

Parts are color coded as follows:

Yellow	1st reduction pinion Input shaft Clutch Flexible shaft coupling
Red	1st reduction gear
Orange	2nd reduction pinion
Blue	2nd reduction gear Output shaft, propeller shaft
Brown	Coupling Hydraulic oil pump Turning gear Tachometer & revolution counter
Clear	Hydraulic oil pump drive assy

The device may be used to demonstrate how different input speeds of the high and low pressure turbines are combined by means of different 1st reduction pinions to yield a common output speed. The instructor can readily relate the two (2) dimensional chart and the three (3) dimensional model by means of the color coding. The labeling and the mathematical example of gearing are virtually self teaching. The instructor may repeat all or any part of the demonstration or may permit trainees to participate in the demonstrations.

OPERATION:

Rotate clutch engaging handle of the clutch until it is off the block on which rests. Release the handle to engage the clutch connecting the input shaft to the 1st reduction pinion. Turn the hand crank on the input shaft counter clockwise (direction of arrow) turning gears to operate output shaft.

To illustrate operation of turning gear, push handle in to engage and turn counter clockwise (direction of arrow).

PHYSICAL INFORMATION:

Number of Pieces: One (1)

Size: Assembled Device 56" x 51" x 57"

Weight: 740 lbs.

ENVIRONMENTAL CHARACTERISTICS:

Operates in a temperature range of -13° to +125° F and a humidity range of up to 95%.

PUBLICATIONS FURNISHED:

Guide for T/A Operable Mockup, Propulsion Reduction Gear NAVTRADEV P-3973 (U).

PERSONNEL:

Instructor: One (1) qualified to instruct in DD963 propulsion system power train.

Trainees: Class of up to Twenty (20) students

Maintenance: No maintenance other than routine cleaning is required.

CONTRACT IDENTIFICATION:

Manufactured by Lester Associates, Inc., Thornwood, NY under NAVTRASYSCEEN Contract No. N61339-73-C-0126.

LOCAL STOCK NUMBER:

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