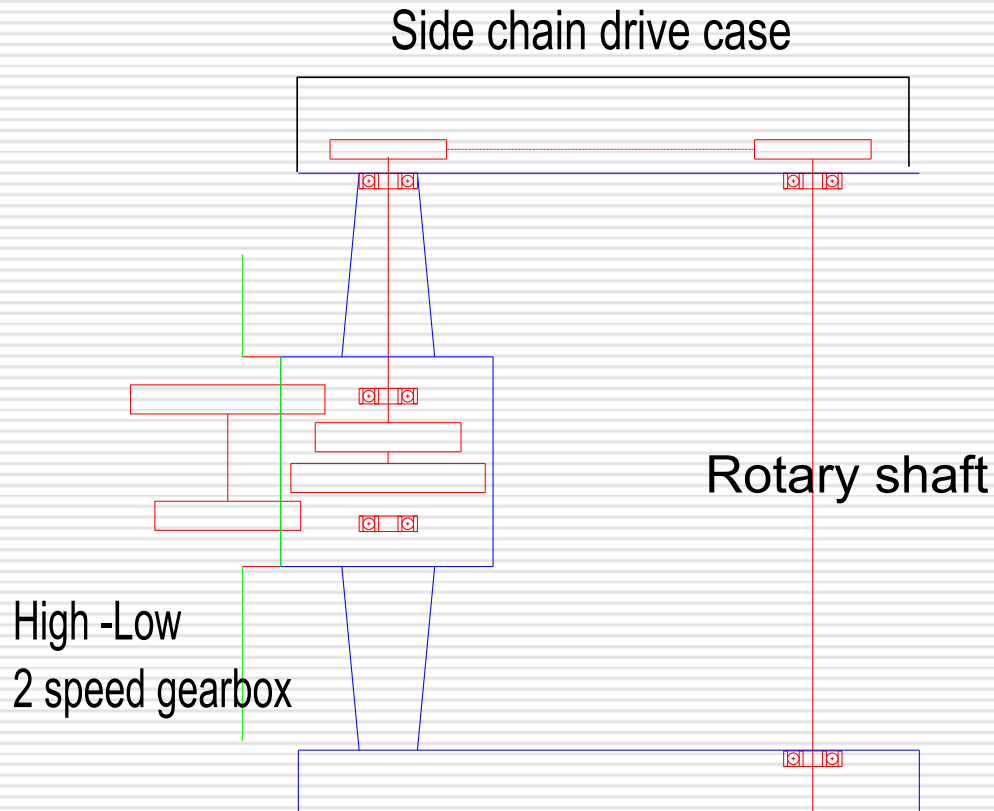

TRAINING ON ANTAM STANDARD CODE For TESTING OF KNAPSACK MISTERS CUM DUSTERS

Theory 9: Rotary shaft performance Test

2nd Training of Trainers on ANTAM Codes
16 - 28 October 2016, Nanjing China

Power transmission to rotary shaft



Coupling Rotary shaft to dynamometer

- ❑ Some power tillers are provided with Power Take off shaft for driving machinery.
 - ❑ The capacity of the PTO of a power tiller may not be sufficient to transmit full power of the engine
 - ❑ The power available at the rotary gearbox can be taken out through a separate adapter shaft from the Rotary side of gearbox
 - ❑ The power to the rotary shaft can be taken through suitable coupling mounted at the end of the rotary gearbox output shaft
-

Requirement of Dynamometer

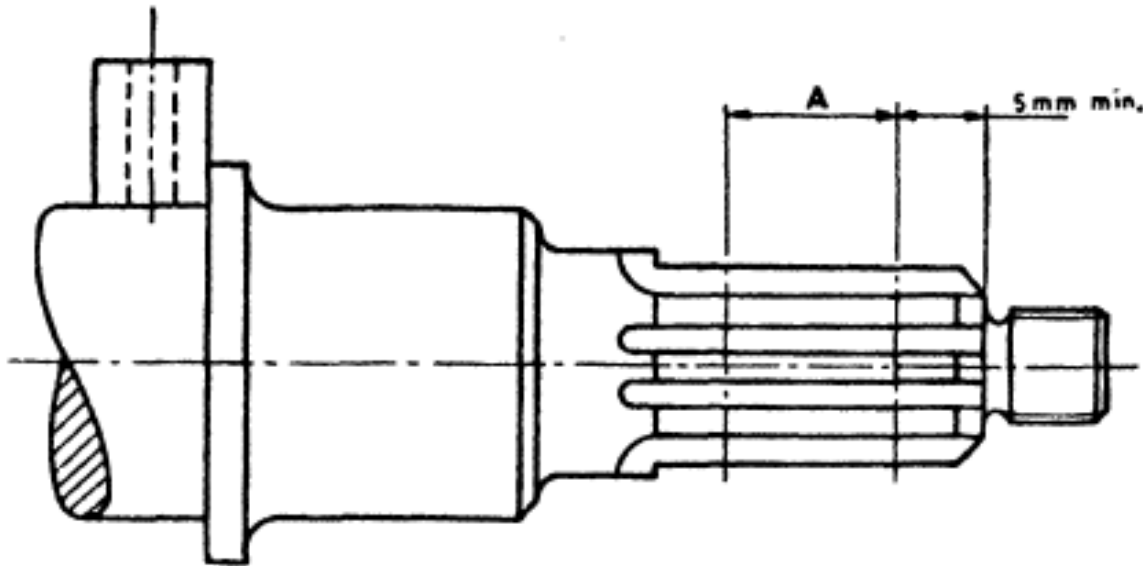
- Consider a typical Power tiller developing 9.56 kW at 2400rpm, and 42Nm at 1600 rpm
- Speed of rotary = 300 (H) and 188 (L)
- Ratio of reduction between engine and Rotary shaft = 12.76
- The torque on rotary shaft at low speed during max torque condition assuming Transmission efficiency of 80 %

$$= 429 \text{ Nm}$$

Speed obtained during maximum torque = 125 rpm

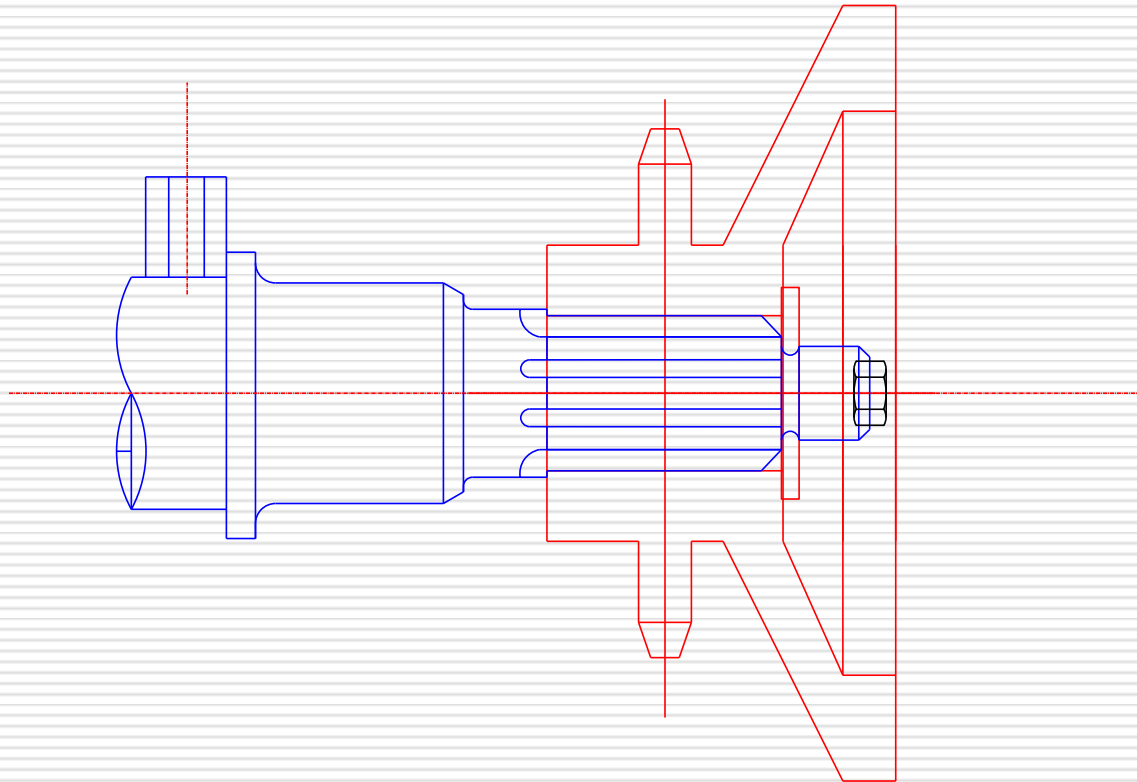
Hence the dynamometer should be suitably chosen. For the torque – speed combination.

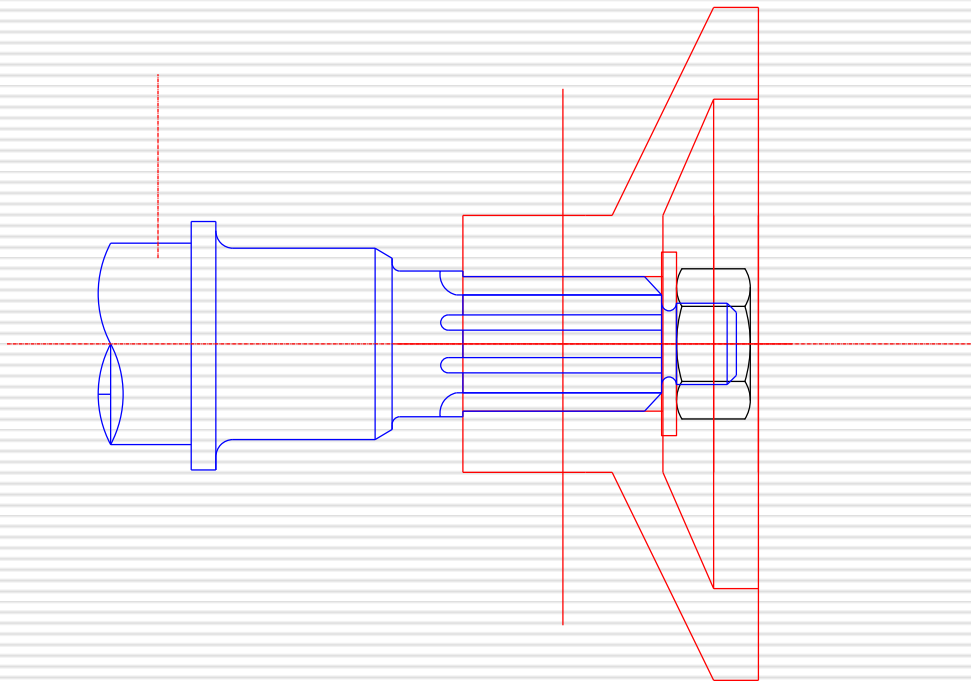
The rotary shaft

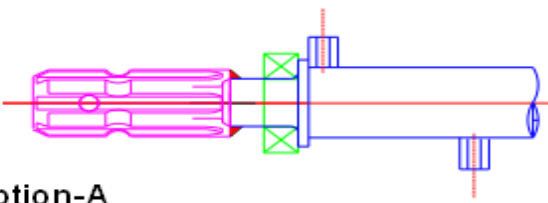


IS 11905-1986- Rotary shaft

Flanged adopter for rotary shaft

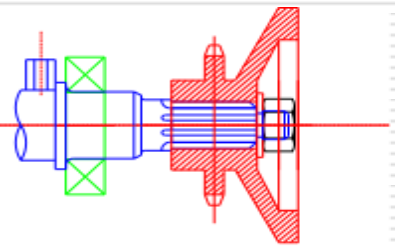






Option-A

Std. 540 rpm PTO shaft
stub welded to
non drive end



Option-B

Flanged adapter mounted
to standard Rotary shaft

Varying Speed Test

- The test will be conducted on rotary shaft at with lowest rotary shaft speed ratio being selected, in case of multiple speed provision in rotor speed.
 - Ambient temperature to be 27 ± 7 °C
 - Power, torque and fuel consumption are recorded
-

Varying Speed Test

- ❑ The throttle (rack position is held constant at Maximum fuel position.
 - ❑ The Engine is loaded gradually starting from no load. The load is gradually increased by the dynamometer.
 - ❑ The load/ Torque, speed, and fuel consumption are recorded for every change of engine speed by 1 to 2 % .
 - ❑ The test is continued until the speed reduces to 15 % below max torque speed.
 - ❑ This will result in complete mapping of engine performance envelop.
-

Five Hour Test at Rated Power of Rotary Shaft (IS 9935:2002)

- ❑ The rotary shaft shall be run at 90 percent of load (torque) corresponding to maximum power continuously for 4 hours.
 - ❑ During the 5th hour, the engine shall be run at a load corresponding to maximum power.
 - ❑ During the test the power, torque and fuel consumption will be reported after every half-an-hour during the first 4 hours
 - ❑ Measurements will be done after every 15 minutes during the 5th hour.
-

Points to be considered.

ANTAM 1001-2016

- If the engine speed recommended for field tests is different from rated engine speed, then tests at the recommended speed setting shall also be conducted
 - The throttle position should be adjusted so that the Maximum Power is developed at the rated speed. And then at this position of throttle the varying speed test is to be conducted.
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