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

Theory 4: Nominal Traveling speed measurement

(B-11 of Annex-B)

2nd Training of Trainers on ANTAM Codes
16 - 28 October2016, Nanjing China

Nominal Traveling speed

- The Nominal speed of operation of a Power tiller is the speed at no load, at rated speed of engine.
- The Nominal speed can be calculated or measured
- For calculating the nominal speed, the transmission ratio between the engine and axle for the different gear ratios is required
- The tyre rolling radius is required

Calculation

$$\text{Nominal speed (km/h)} = \frac{\text{Tyre Rolling radius (m)}}{1000} \times \frac{\textit{Engine speed (rpm)}}{\textit{Transmission ratio}} \times 2\pi \times 60$$

Tyre Rolling Radius

The effective radius corresponding to the average distance travelled by the power tiller in one rotation of the driving wheels (that is, forward distance traveled divided by 2π). When the power tiller is driven without drawbar load at a speed of approximately 2 km/h.

Measuring tyre lug height

- Power tiller tyre-6.00-12

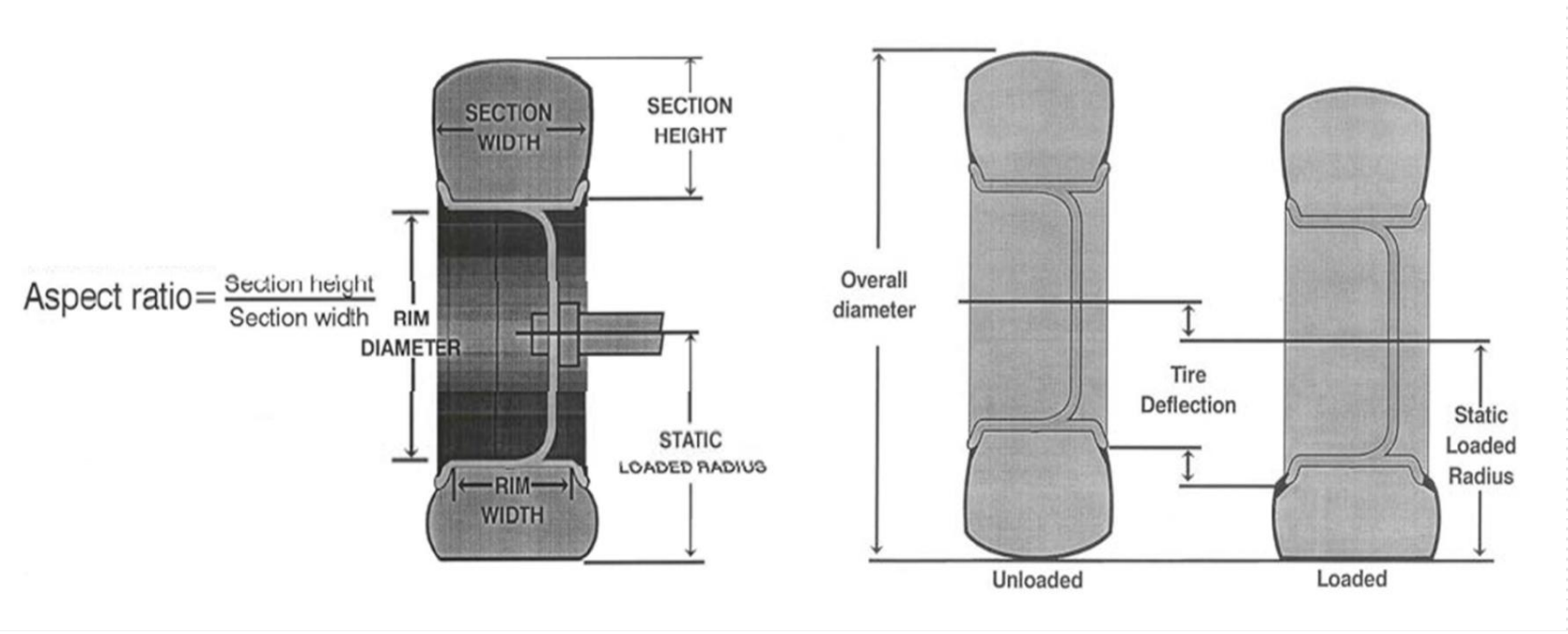
Measuring rolling radius-measuring tyre revolutions

Rear wheel mounted enCoder

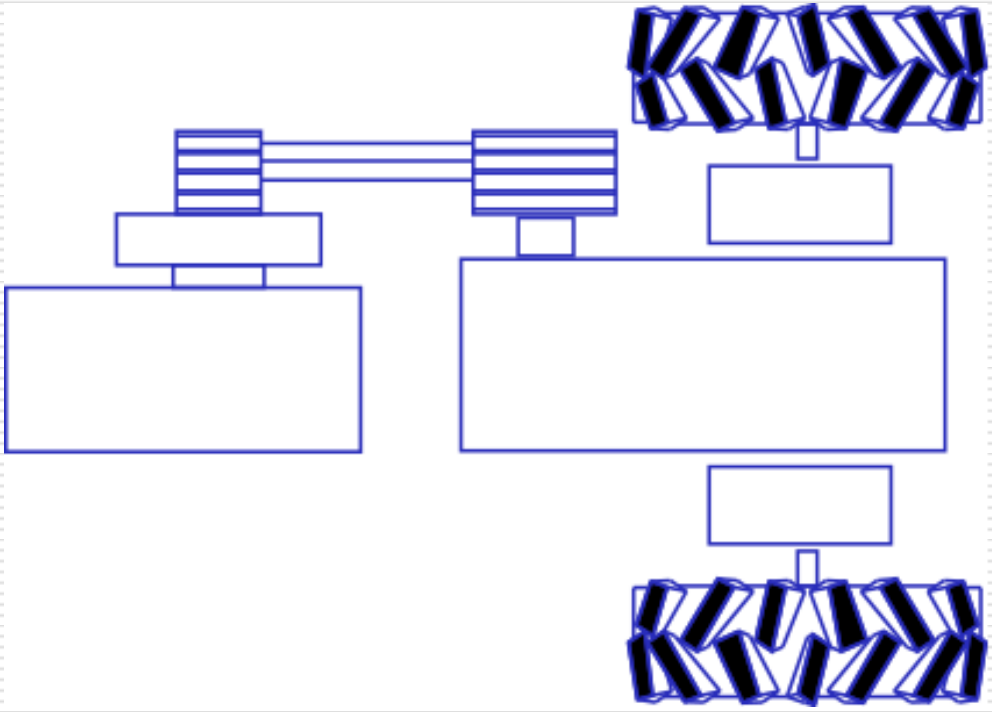
Specification of typical power tiller tyre

Size	Pattern	Ply Rating	Rim Width	Inflated Dimensions + / - 2%		Load Capacity (KG)	I.P. (Bar)
				OD (mm)	CSW (mm)		
5.00 12	52	6 PR	4.00	545	127	220	3.40
6.00 12	52	6 PR	5.00	600	157	270	2.00

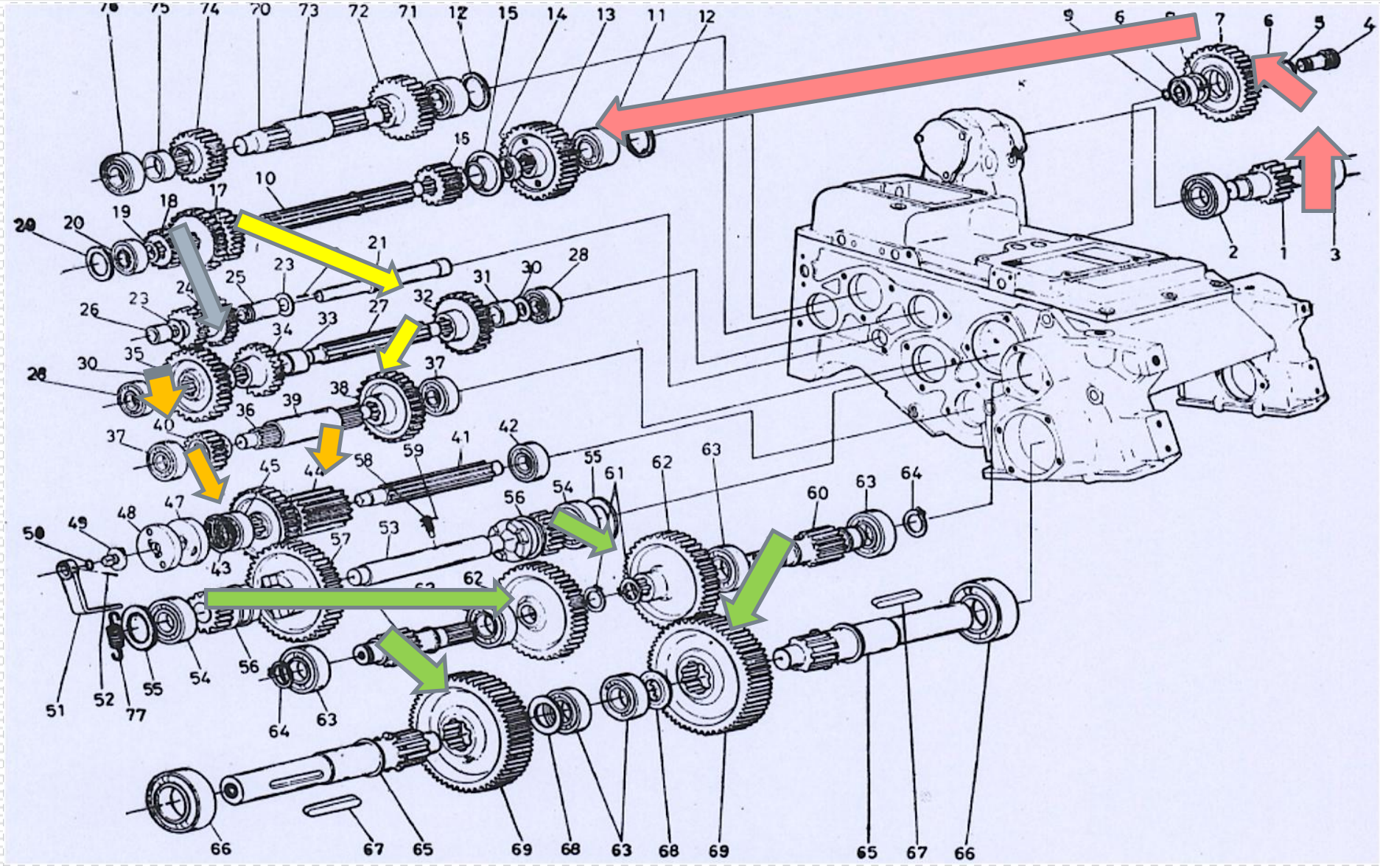
Tyre terminology



Transmission ratio



Transmission of a typical power tiller



Typical belt reduction

- The overall transmission ratio between the engine and the gearbox is the product of the ratios of the primary and secondary reduction

Overall ratio between engine and drive axle

Belt resuction	1.66

Gear selected	Gear reduction	Overall reduction
Low- I	71.38	119.0
Low- II	65.47	109.1
Low-III	46.87	78.1
High-I	19.01	31.7
High-II	17.44	29.1
High-III	12.48	20.8
Rev-I	83.98	140.0
Rev-II	22.37	37.3

Work sheet

Measuring overall transmission ratio

- If the overall transmission ratio is not provided by the manufacturer, it can be found out by accurately marking the position of a tyre and cranking the engine and counting the number of revolutions required to make one revolution of the drive wheel.
- Alternatively the engine can be run with the wheels in the jacked up position and the speed of the engine and the axle can be measured by a tachometer.

Measuring the engine speed

- One of the main difficulty in making field measurement is the practice adopted in holding the engine speed constant.
- Always warm up the engine and allow the engine to run steady at rated speed.
- The throttle setting should be finely adjustable and should not have backlash/ creep.
- Suitable digital engine speed measurement and display arrangement should be provided for the operator to maintain the rated speed

Measurement of nominal speed

- Set the engine to rated speed
- Select the gear ratio
- Make two markings on a level concrete test track at a distance of 20m
- Time using a stop watch, the travel time between the marks.
- Travel at rated speed between the marks without slowing down

Reporting Nominal traveling speed

	Gear number	Nominal traveling speed (*) at the rated engine speed of … rpm (km/h)
Forward	L1	
	L2	
	L3	
	H1	
	H2	
	H3	
Reverse	L1	
	H1	

* Calculated with a pneumatic tyre dynamic radius index of ….. mm (ISO 4251-1:2005)