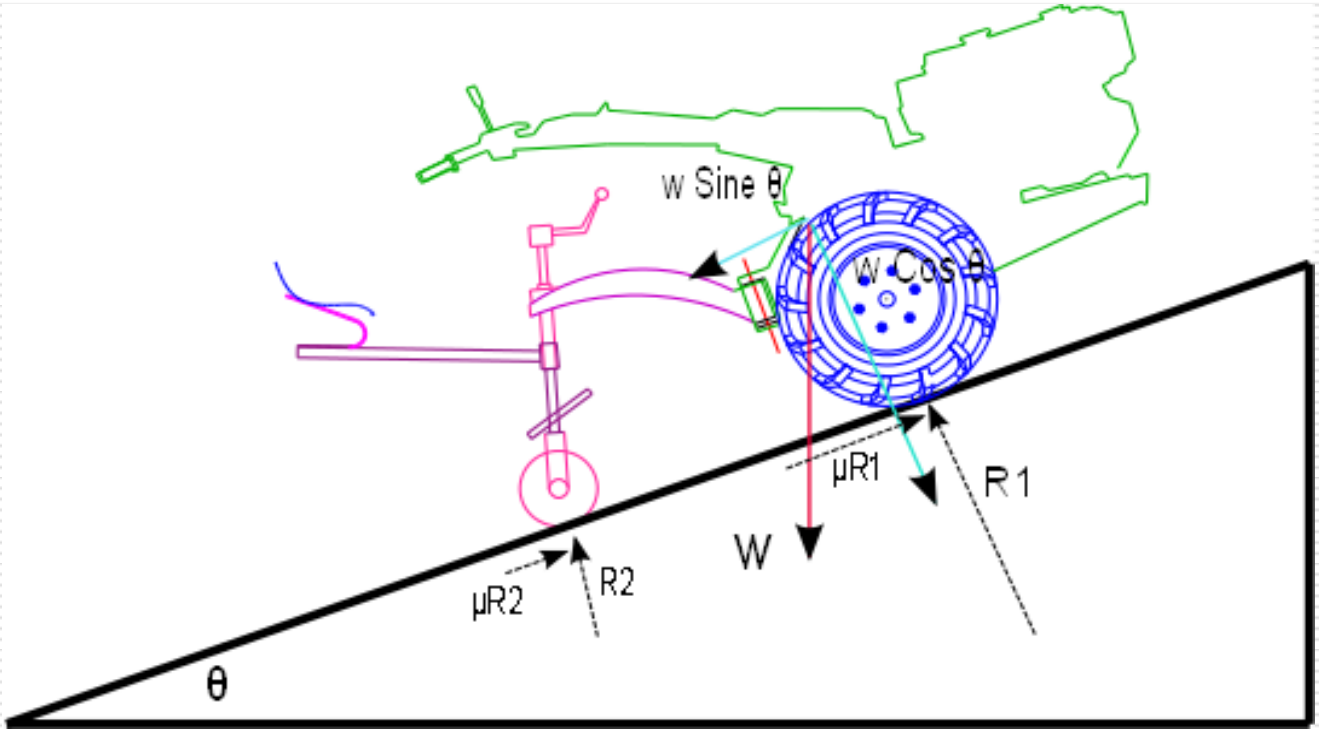
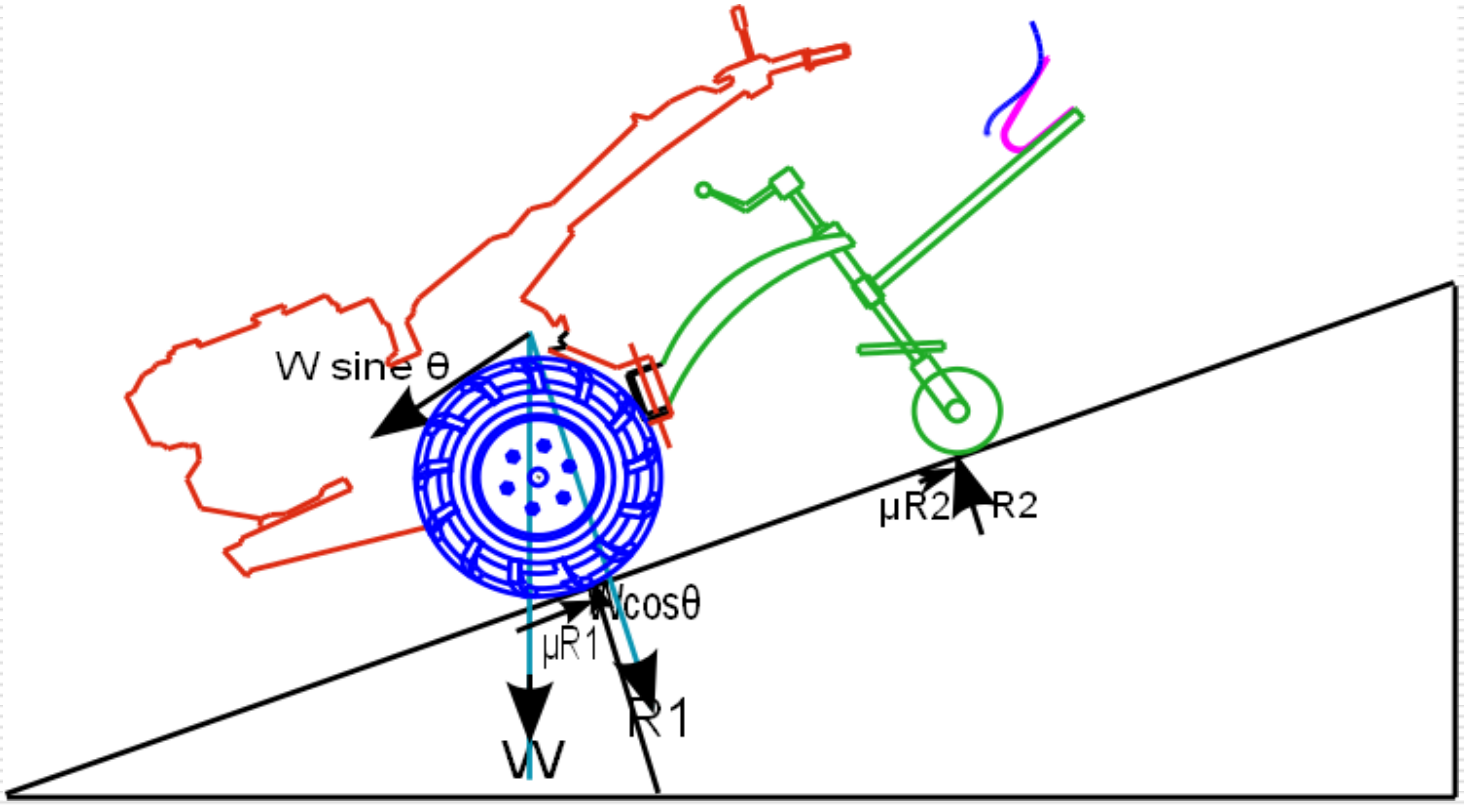
TRAINING ON ANTAM STANDARD CODE
For TESTING OF KNAPSACK MISTERS CUM DUSTERS

Theory 16: Parking Brake Test

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

Power tiller braked Up slope




W sine θ
μR2
R2
W cosθ
μR1
R1
W

- Mass of power tiller with rotary = 410kg,
- Slope of surface = 18 Deg.
- The normal reaction on tyres = 410X10X cos 18

  =410*10*0.951=3899N
- Component of Gravitational force along slope

  = 410X10Xsin18=0.309*10*410=1266N

Why the Power tiller brake are small compared to tractor brake?

- Static friction between tyre and firm dry ground=0.75
- Static rolling friction between tyre and firm dry ground=0.030
- Maximum frictional resistance against sliding of the power tiller down slope= 3899N*0.75 =2924N
- Rolling resistance of the tyre on firm dry ground
  =3899*0.03N=116.97N
- Net force along slope tending to roll the Power tiller down slope
  =1266-117=1149 N
- Torque on the wheel tending to rotate the wheel=wheel rolling resistance X rolling radius =117*(0.6/2)=35 Nm
- The gear ratio between the axle shaft and brake shaft (as shown in transmission)
  = 29.43:1
- Hence Torque on the brake shaft=40.95/29.43 N= 1.18 Nm

Friction data from http://hpwizard.com/tire-friction-coefficient.html

Tractor-Parking brake test procedure-

IS 12061 : 1994 , OECD *Code 2 – July 2012*

- **The force which is necessary to apply at the** control of the parking braking device to hold the tractor stationary when facing up and down at 18 percent gradient, when ballasted to its maximum weight, as in case of drawbar performance test, shall be measured.
- **The force which is necessary to apply at the** control of the parking braking device to hold a vehicle combination comprising the un ballasted tractor and an un braked trailer of the same mass as of tractor or 3 tonnes whichever is less,
- stationary when facing up and down a 12 percent gradient shall also be measured.

- **The measurements may be made either on** a sloping road or by applying a pull to the tractor on a level road/track with the
- equivalent gravitational force applied constantly and continuously for both forward and reverse directions.
- **If it is necessary to actuate the parking** braking device control several times in order to hold the tractor stationary, the maximum force applied shall be recorded.

Report-OECD *Code 2 – July 2012*

Parking braking device test

Braking device control force

Uphill	Downhill
kN	kN

PARKING BRAKE TEST

ANTAM-001-2016

- The performance of the parking brake shall be based on the ability to hold the power tiller stationary, facing up and down slopes.

- The power tiller shall be attached with any matching implement e.g. rotary, plough etc. and without ballast.
- The test shall be conducted on a clean, flat and dry concrete test track.

Procedure

ANTAM-001-2016

- The power tiller shall be placed
- **out of gear**
- On a slope of not less than 18 percent
- With the brakes applied.
- The power tiller shall be placed first facing up and then down the slope
- The rotation of the braked wheel shall be observed.
- The observation along with the factors allowing the rotation of the wheels shall be stated in the test report (IS 9935: 2002).

- The force, necessary to apply at the control of the parking braking device to hold the power tiller stationary when facing up and down shall be measured.
- The data shall be recorded in Annex D-5.

Reporting of result

ANTAM-2016

D-5 PARKING BRAKE TEST Power tiller mass, kg:		
Degree of slope (^{0}):		
Observations	*Parking Braking Device Facing up Slope*	*Parking Braking Device facing down Slope*
(1)	*(2)*	*(3)*
Parking device control force (N)		
Whether rolling of braking wheels noticed	*Yes/No*	*Yes/No*
Efficacy of brakes	*Yes/No*	*Yes/No*