

# The Haulage Tractor

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# Road map

- ◆ “Short Haul” transport
- ◆ The “Haulage Tractor”
- ◆ Haulage Tractor regulations
- ◆ The way forward
  - New legislation
    - ◆ Drivers licence
  - Public Roads
  - Drive axle loads
- ◆ Discussion

# The transport chain (60's)

- ◆ Extraction vehicle
- ◆ Ag Tractor
- ◆ Truck Tractor
- ◆ Gap for 0.5km - 15km

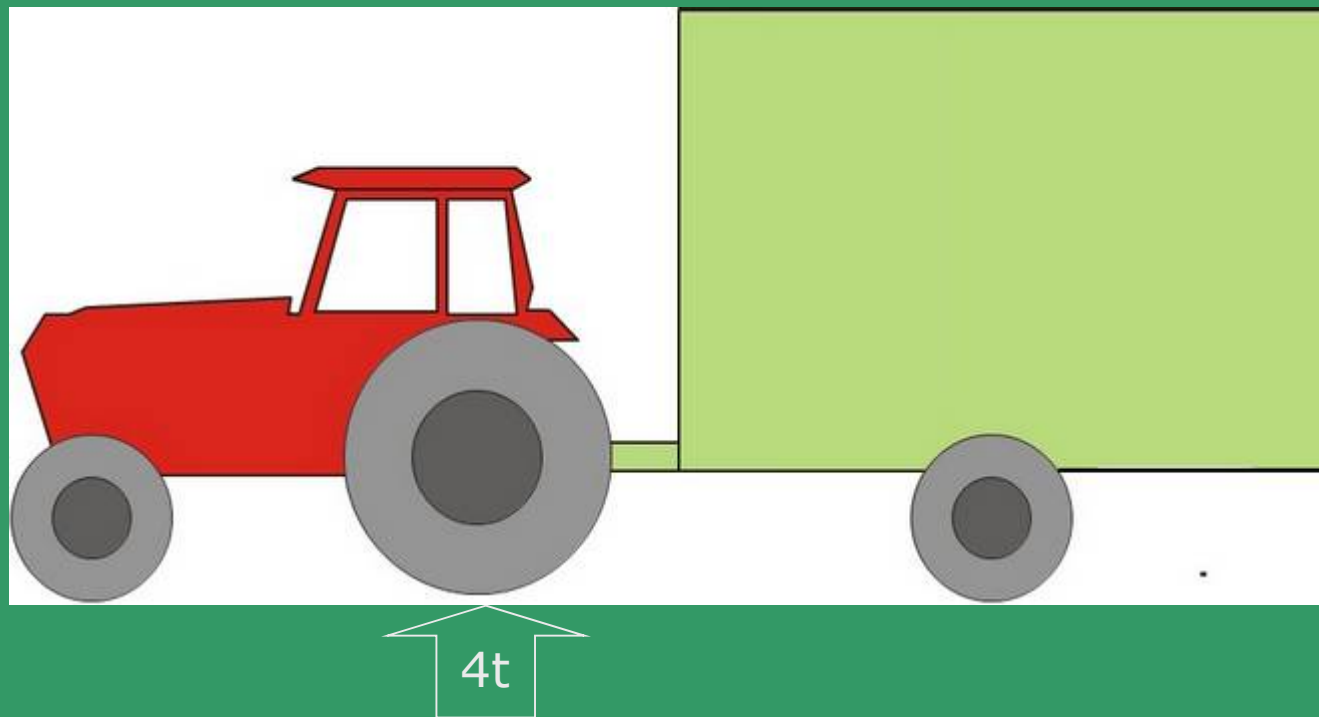
# Short Haul

- ◆ Agricultural Tractor
  - In field
  - Low speed
  - Low payload
  - Short distances
  - Few regulations
  - High cost c/t.km



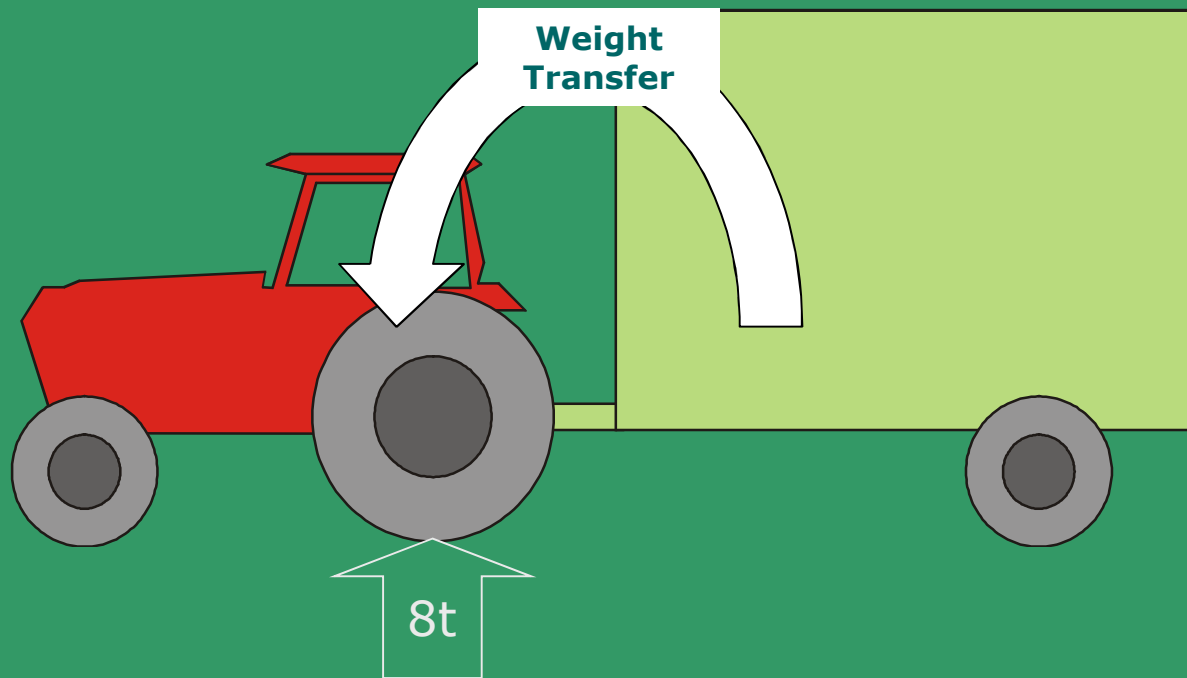
# Ag tractor - trailer

- ◆ Ag tractor-trailer had a traction limitation



# Weight transfer

- ◆ To increase traction and payload weight transfer hitches were designed



- ◆ Over the years many configurations have evolved, we refer to them as "Haulage Tractors"

# Short Haul

- ◆ Haulage Tractor
  - In Field and on road
  - Higher speed
  - High payload
  - Longer distance
  - Lower cost c/t.km



Unfortunately, this vehicle was **illegal!**

# Illegal Option

- ◆ Ag Tractor was **NOT** legal to carry loads
  - A complete misunderstanding
- ◆ An imposed load classified the Ag Tractor as a Truck Tractor
  - Not possible to meet the regulations
    - ◆ High speed brakes, power to mass etc
- ◆ Illegal vehicles developed
  - There were many years of legal battles

# Timber transport Short haul

## ◆ Options Available

- Agricultural Tractor
- Haulage tractor
- Truck Tractor





# “Haulage vehicle”



- ◆ They have stood the test of time, but operated outside the law
- ◆ They; “perform well”, fill a gap in the market and mostly operate short haul <15km
- ◆ In 2003 NDOT decided to create a category for this vehicle and develop some regulations for it

# Haulage Tractor

legalising process involved:

- ◆ Sugar
- ◆ Timber
- ◆ CSIR
- ◆ SANRAL
- ◆ NDoT plus Provinces
- ◆ Agri SA
- ◆ Road Freight Association (a real battle)
- ◆ Alta Swanepoel & Jack Webster
- ◆ Bell, Dezzi and ....

# Haulage Tractor

## legalising process

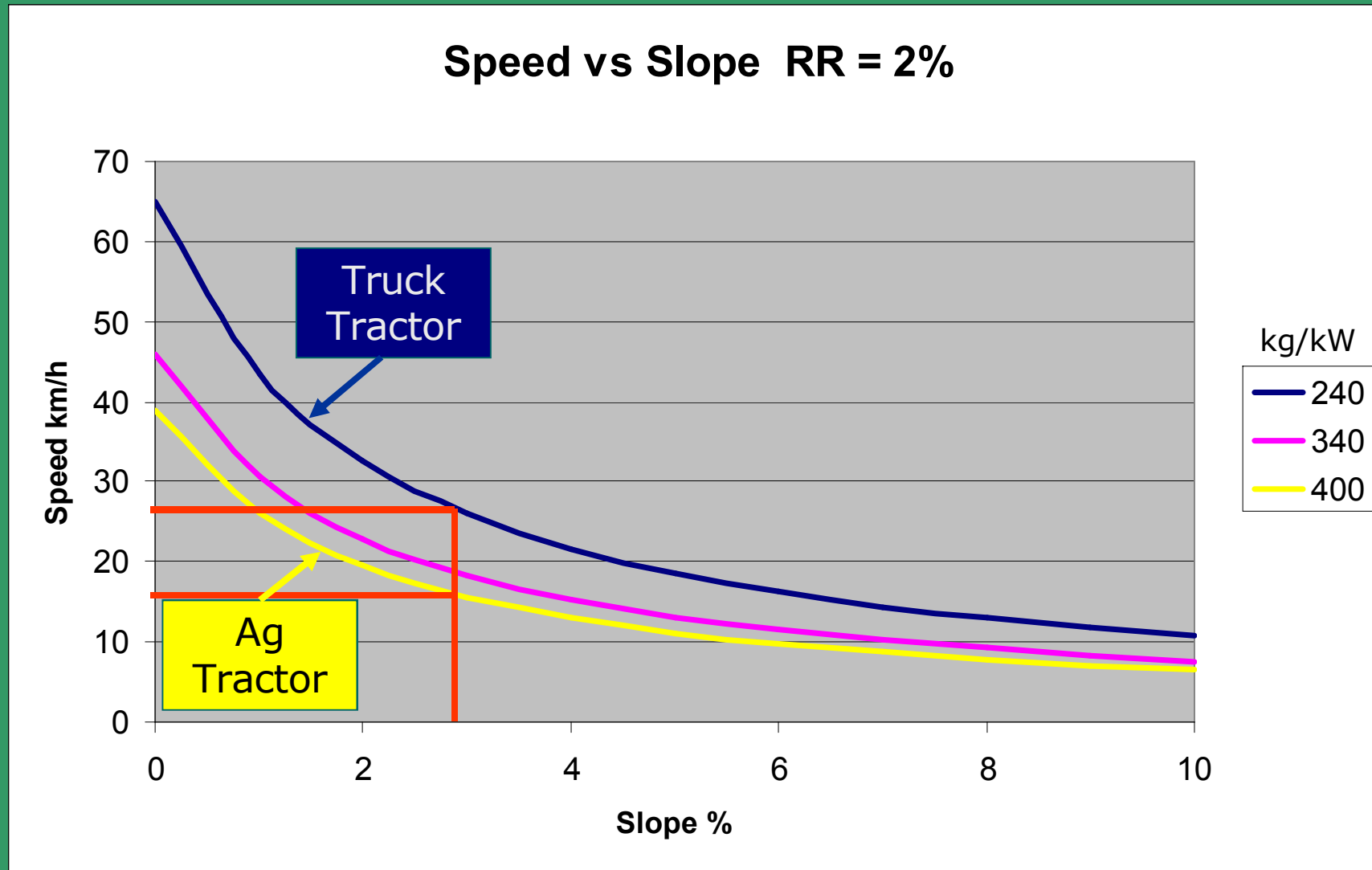
- ◆ No compromise, it must:
  - be safe
  - not damage the road
  - be economical (capital & operating)
- ◆ Need to set up specifications / regulations

# Vehicle Performance

Vehicle Parameters					
INPUTS			Road information		
Road Slope	1.5	%	Rolling Resistace	RR	
Engine Power	153	kW	Smooth tar	1.2	
RR Coefficient	4	%	Rough tar	2	
Coefficient of traction	0.8		Smooth gravel	3	
Transmission Eff.	85	%	Sand & Mud	10	
GCM	56000	kg	Traction	COT	
Drive axle load	8000	kg		Dry	Wet
Front axle load	2788	kg	Tar new & sharp	0.8	0.5
OUTPUTS			Tar travelled	0.6	0.5
Resistance to motion & Traction			Trafic polished	0.6	0.45
Rolling resistance	22.0	kN	Excess tar	0.5	0.3
Grade resistance <small>(Whole rig)</small>	8.2	kN	Indices		
Total resistance	30.2	kN	Power to Weight ratio	367	kg/kW
			Axle Mass Factor	14.3	
Traction	62.8	kN	Vehicle speed <small>(Max)</small>	15.5	km/h
Excess traction	32.6	kN	% Mass of Tractor on Front Axle	25.8	%
Load On Drive Axle	8.00	tons	Gross vehicle Weight	56	tons

# Decisions

- ◆ Mass : Power ratio (400kg/kW)



# Decisions



- ◆ Traction tests in Mpumalanga and Gerotek
  - Drive axles must carry at least 16.6% of the GCM
  - GCM 6 times the drive axle load

# Decisions



- ◆ Brakes < 40km/h
- ◆ Stability < 40km/h
- ◆ Not permitted on freeways

# Decisions

- ◆ Tractor combination with GCM  $> 24t$  will be classified as a **Haulage Tractor**
- ◆ Drivers Licence, EC and (PDP)
- ◆ Vehicle Licence, same as truck tractor
- ◆ Slow moving Vehicle,  $< 40\text{km/h}$  (governed)
- ◆ Brakes, SABS 1447 spec, pneumatic from tractor brake
- ◆ Annual COF
- ◆ Existing axle loads and bridge formulae

# Decisions

- ◆ Front axle must carry at least 20% of the mass of the tractor axles (history shows that this is safe)
- ◆ GCM could be 6 times the drive axle load
  - GCM
    - ◆ 2WD 48 000kg
    - ◆ 4WD 56 000kg

# New legislation

- ◆ Haulage tractor regulations
  - Drivers license
- ◆ Public Roads
- ◆ Haulage tractor association
- ◆ The way forward
  - New legislation
    - ◆ Drivers licence
  - Public Roads
  - Drive axle loads

# The Haulage Tractor

