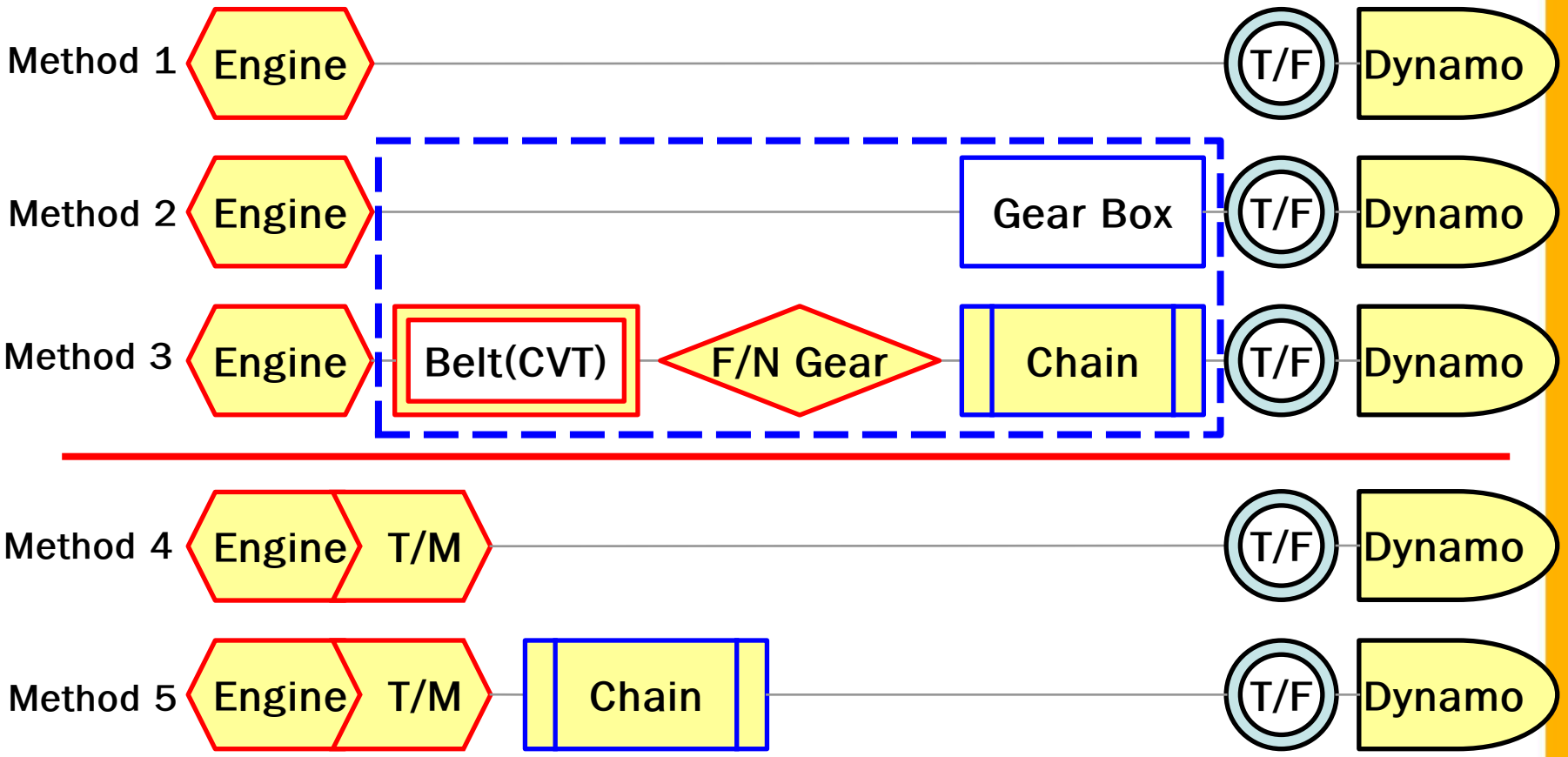
The Progress of the Research Program on the Max. Power with Gear Box(Belt /Chain)

2018. 10.

Korea Transportation Safety Authority
(Korea Automobile Testing & Research Institute)

➢ Type of Measurement on Max. Power

◆Classification of Measurement on Max. Power in Korea



➢ Comparisons on testing method of KMVSS & Reg. EU No. 134/2014

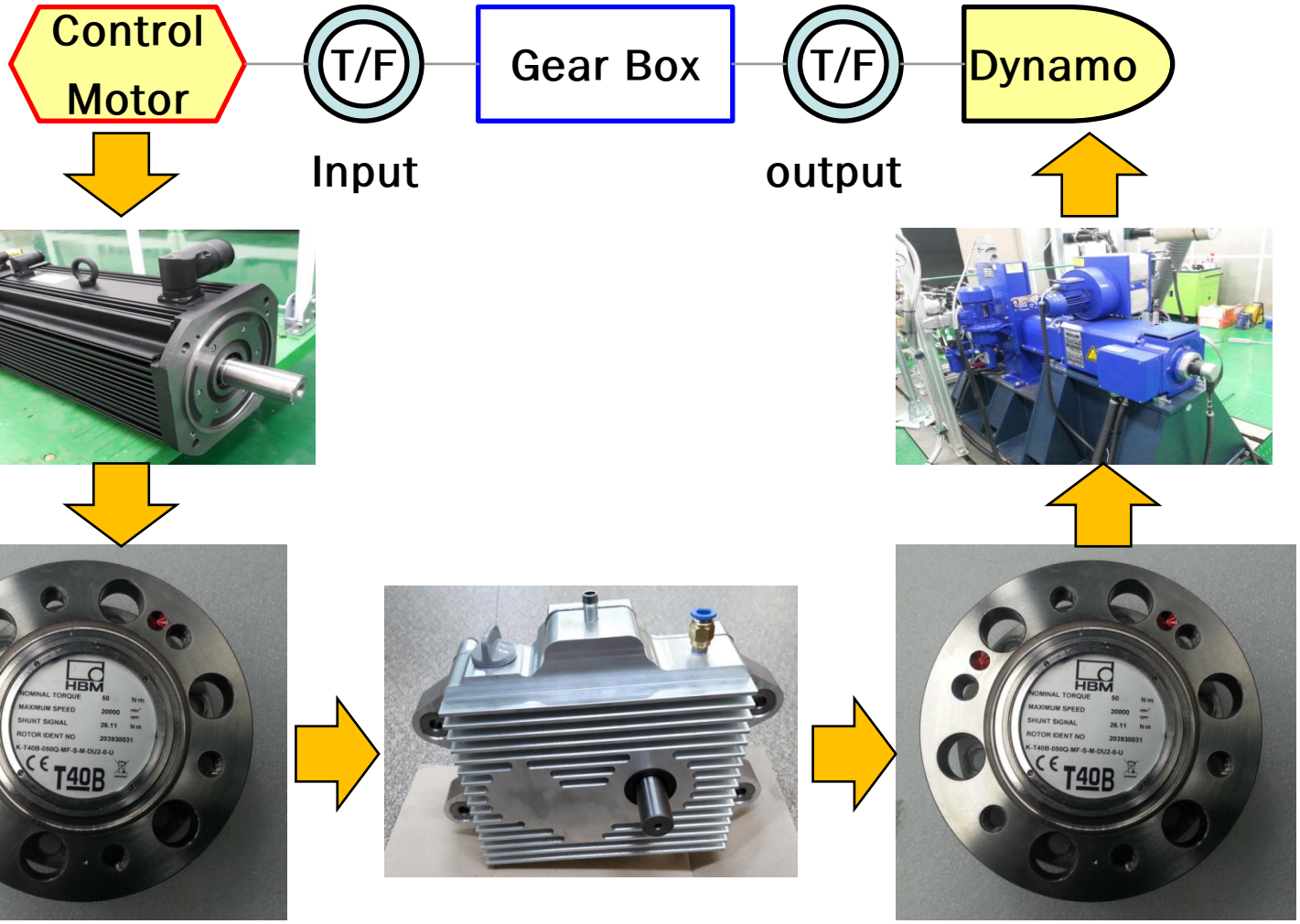
◆ Test Procedure of Net Power in Korea Reg.

- ✓ Measurement at the end of the crankshaft in principle
- ✓ Taking into **account <u>the actual efficiency</u> of the transmission(or gearbox)** where the net power can only be measured with them fitted to the propulsion.

◆ comparisons on Efficiency of each components

Type		Efficiency (EU Reg. 134)	Efficiency (ISO 4106)
Gear Wheel	Spur gear	0.98	0.98
	Helical gear	0.97	**0.98**
	bevel gear	0.96	**0.98**
Chain	Roller	0.95	0.95
	silent	0.98	0.98
Belt	Cogged	0.95	0.95
	Vee	0.94	0.94
Hydraulic coupling or convertor	Hydraulic coupling	0.92	0.92
	Hydraulic convertor	0.92	0.92

➢ The Measure System on Power Loss of the Gear Box in KATRI



➢ Comparisons on Accuracy of the measurements of Max. Power

항 목		Korea Reg.	EU Reg. 134/2014	UN R.85	ISO 4106	ISO 1585
Torque Measuring System	Generally	±1% of the full-scale reading.	±1% of torque measured	±1% of measured torque	±1% in the range of scale values required for the test	within ±1% in the range of scale values required for the test.
	less than 50%	±2% of the full-scale reading.	±2% for the measurements	±2% of measured torque	±2% for measurements	-
Rotational speed		±1% of the full-scale reading.	±1% of the full-scale reading.	±0.5%	±0.5%	±0.5%
Fuel consumption		±1% overall for the apparatus used.	±1% overall for the apparatus used.	1%	±1%	±1%
Temperature		±2℃	-			±2K
Engine inlet air temperature		±1℃	±1K	±1K	±1K	-
Fuel temperature		-	-	±2K	±1K	±2K
Barometric pressure		±0.525mmHg{±70Pa}	±70Pa	±100Pa	±70Pa	±100Pa
Back pressure in exhaust system		±0.188mmHg{±25Pa}	±25Pa (exhaust pressure)	±200Pa (pressure in exhaust duct)	±25Pa	±200Pa
Pressure in intake-duct		±0.188mmHg{±25Pa}	±25Pa (drop in intake air)	±50Pa (pressure in intake-duct)	-	±50Pa(Depression) ±2% for the measurements (Absolute pressure)
Test room humidity		-	-	-	±5% relative accuracy(2)	-

➢ Kind of Power Loss in the Gear Box

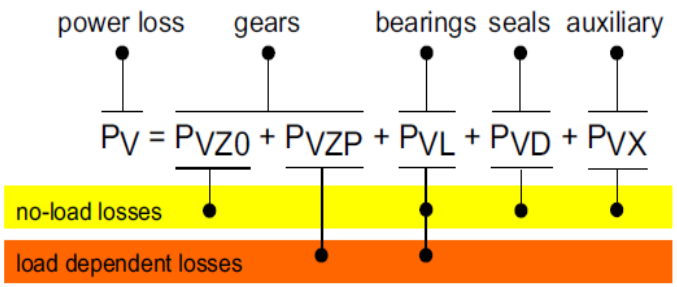
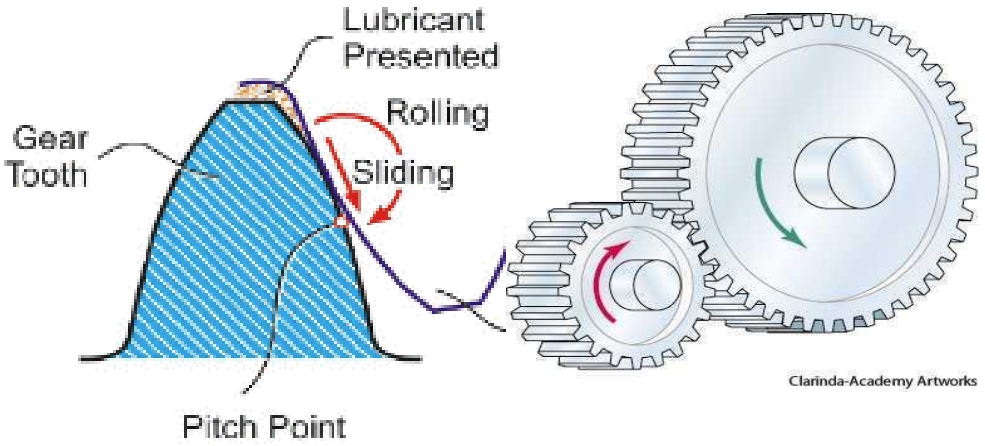


Fig. 1. Power loss contributions [3].



1) Sourced by Gearbox power loss, Tribology International(2015) , etc
2) Sourced by Churning losses and efficiency in gearboxes, KTH Industrial Engineering and Management(2014), etc