Decarbonatization Strategies for Developing Countries by Smarter use of Limited and Vulnerably Road Infrastructure

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Why deploy HCT and Intelligent Access in Fast Growing and Developing Countries?

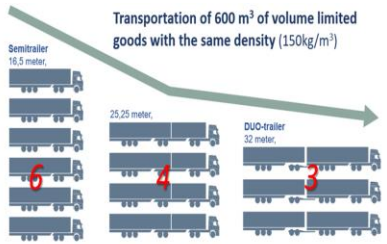
HCT – High Capacity Transports – means allowing access for vehicles larger than the ones with general access on dedicated roads. So far, HCT has been implemented in some high-income countries and generated considerable benefits. 15-50% for individual vehicle swaps and a potential of 8-15% for all road freight until 2030.

The Benefits for Developing Countries are much larger than for High Income Countries Since:

- More vulnerable and congested roads. OECD predicts Road freight to increase 5 times in Africa and 3 times in Asia until 2050, but road investments will not increase at the same rate.
- Smaller average truck size
- Lower technical standard
- Inefficient and often corrupt law enforcement
- Much lower regulatory compliance
- Considerably higher accident rates

Benefits of HCT

Challenges	HCT contribution
Climate, Emissions	Less energy/tonkm -> less CO2
Traffic, Space	Fewer trips -> less traffic
Accidents	Less traffic (vehiclekm) Stricter truck standard Better rule compliance
Road -ware Bridge life	More axels, No overloads -> Lower axel loads
Productiv., Cost	Less drivers, trucks, energy



Load/vehicle:	100 m³	150 m³	200 m³
Diesel :	3,5ml/m³km	3 ml/m³km	2,5ml/m³km
CO_2 :	(100%)	(85%)	(73%)
Road use:	499 m	368 m	296 m
Vehicle & drivers:	6	4	3

An operator can take more load only if s/he accepts

- Stricter vehicle specifications, e.g. PBS – Performance Based Standards
- Only drive on HCT approved road networks, with stronger bridges and longer turning lanes
- Means for compliance assurance
- Legal framework, including stricter enforcement

Call to form a Consortium at this Workshop

- **Purpose**: to adapt HCT to these contexts, perform a few pilots, and develop a package for policy makers - like the one in *High Capacity Transport: Towards Efficient, Safe and Sustainable Road Freight,* ITF/OECD, 2019.
- **Potential participants**: Post-Covid green recovery plans in China, India and South Africa, World Bank, IMF, Aid organizations, ITF/OECD, Auto industry, the EU project AEROFLEX, CEDR and its equivalents and Researchers.

HCT Access Schemes

A. New Road class for specific HCT vehides
B. Permanent permit: PBS certified. E.g. ore transport on dedicated roads
C. Temporal restricted permit: Specific vehicles on specified roads. E.g. construction site, forest harvesting, research purpose
D. Situation specific permit or restriction: Dynamically adapt to the specific conditions. E.g. frozen road body, environment zone (shift from diesel to electricity), road works
E. Permit for one specific trip: E.g. non-dividable goods, mobile cranes

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Why Intelligent Access?

All HCT reforms and access schemes have so far mandated some means for compliance assurance to avoid accidents and road damages.

1. Self-regulation & certification of operators, e.g. RTMS for PBS permits in South Africa
2. Roadside control with sanctions
3. Driver support & warning, e.g. geofencing
4. Report position & weight without IDs only for statistical purposes, e.g. RIM in Australia and VELUB in Estonia
5. Report position & weight with IDs for high risk operators, e.g. TMA in Australia
6. Report position & weight with IDs for 100% audit with sanctions, e.g. IAP in Australia
7. The vehicle is stopped when access rules are violated, e.g. entering a vulnerable bridge

- #2 is the most common one but very labour intensive, expensive and easy to bribe
- #3-7 are considered Intelligent or Smart Access

Combining an HCT Access with Compliance Assurance

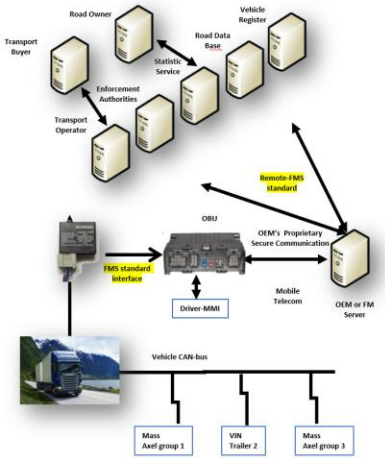
- PBS (B) permits in South Africa requires RTMS (#1)
- Temporal permit (C) for more loads of earth when building the subway under Sydney requires RIM (#4). Same will be tested in Sweden.
- Stopping a vehicle (#7) entering a pedestrian zone (E) was demonstrated in Stockholm as a policy response to the terrorist attack killing five 2017. Such active speed control is now used for busses to allow them to drive with reduced speed over a vulnerable bridge in Gothenburg.

Typical HCT Vehicles and CO2 savings

Urban Construction
42 ton GW
50% less CO2

Long Haul
80 ton GW
30% less CO2

Proposed Telematics Setup



In Sweden, an Intelligent Access System, was developed but not yet mandated. It uses already installed fleet management systems. The on-board computer registers GPS position, axele loads, and ID of the prime mower and all vehicle modules, which is reported to a telematics service provider.

Data must be stored for one year and available inspections by the police in a similar way as tacho-graph data are checked. Data also available for driver, operator, transport buyer, and road owner. Two FMS standard interfaces developed by ACEA are used. Since the telematic systems are already in place in all vehides sold the last 7 years, the extra cost is less than 20 € per month. Older vehides can be retrofitted with a "dong".