COMPLIANCE OF WEIGHTS AND DIMENSIONS AND DIRECT ENFORCEMENT BY WIM

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IMPACTS OF WEIGHTS AND DIMENSIONS ON HIGHWAYS

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- Dimensions of commercial vehicles may affect:
  - road safety (width and length)
  - bridges (height), parking lots (length), toll gates (width, height)
  - maneuverability (width and length)
- Weights of commercial vehicles may affect:
  - unfair competition, tolling and taxes
  - road safety: stability, maneuverability, risk in case of collision
  - infrastructure (see next slide)

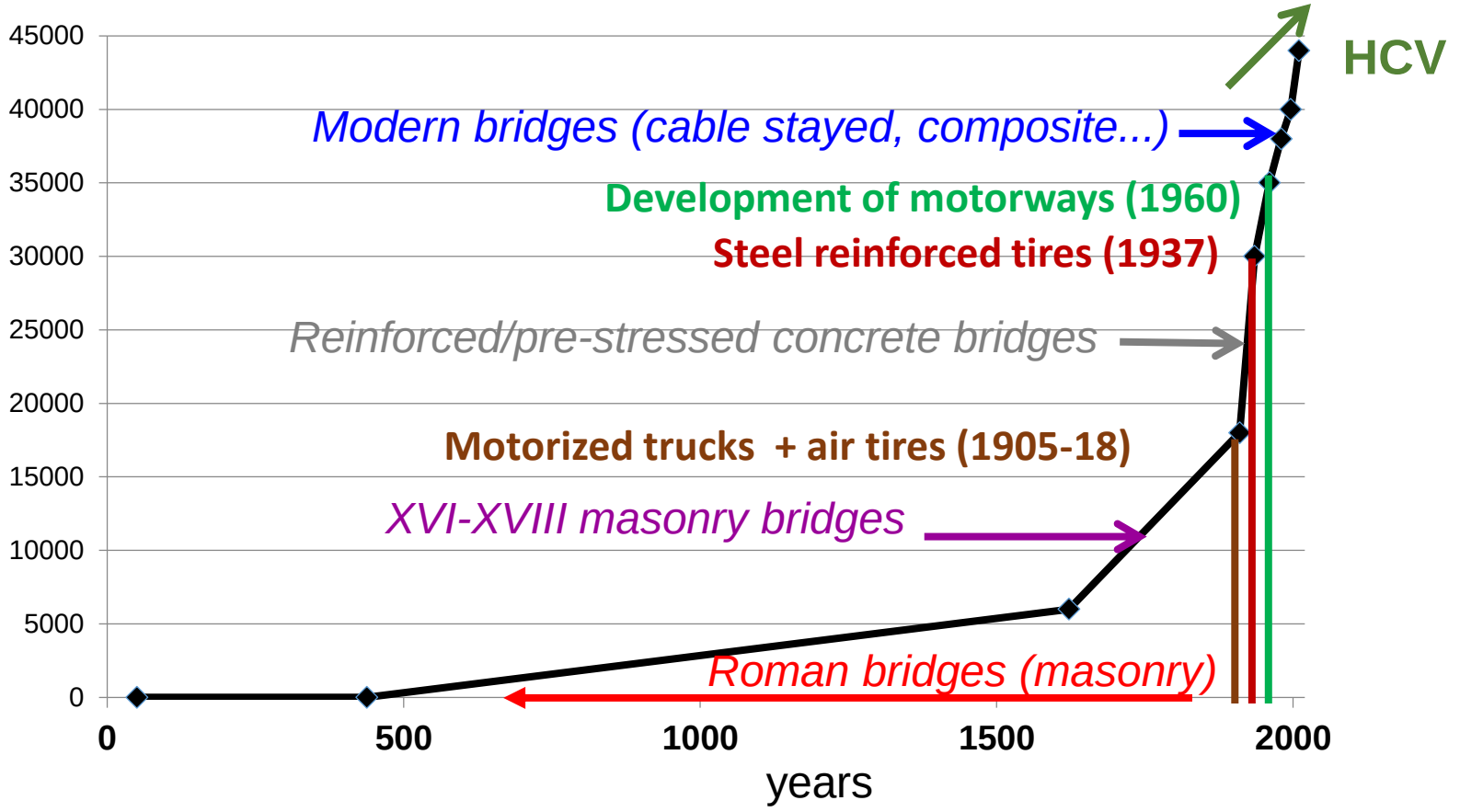
IMPACT OF HEAVY VEHICLES WEIGHTS ON INFRASTRUCTURE

- Mechanical impacts (loads) on road infrastructure are due to heavy good vehicles (HGVs)
- Axle loads govern impacts on pavement (cracking, rutting)
- Wheel, axle, group of axle loads and gross vehicle weight (GVW) govern impacts on bridges (local, semi-local, global) GVW govern load effects on medium/long span bridges
- Infrastructure is designed for longer terms than HGVs:
  - pavements: 15 to 25 years
  - bridges: 50 to >100 years

HGVs: 10-15 yrs

TREND OF WEIGHT LIMITS AND BRIDGE TYPES

1920-2010



HIGH CAPACITY TRUCKS AND ABNORMAL LOADS

- High capacity vehicles (HCVs):
  - above the current legal limits, e.g. >40-44 t in the EU (60 to 75 t)
  > 16.50 or 18.75 m (25.25 to 33 m)
  - for more productivity, less CO2 and congestion
- Abnormal/Indivisible loads:
  - cranes, farmer devices, heavy industrial transport
  - permanent permits (up to 75 or 120 t)
  - special permits, accomp/no accomp

WEIGH-IN-MOTION (WIM)

- WIM technologies
  - road sensors: piezos strips and bars
  - road sensors: bending plates
  - bridge WIM
  - on-board WIM

- Current performances, use and applications
  - accuracy (COST323): C(15) to B+(7), i.e. 7 to 15% for GVW (95%), 10 to 20% for axles
  - infrastructure assessment, traffic monitoring
  - pre-selection of overloads (video WIM) and company profiling (NL, FR)
  - in France: 29 sites on motorways and highways, also implemented in the NL, HU, BE….

DIRECT ENFORCEMENT BY WIM (1)

- Definition and Objective :
  - automated enforcement by WIM and camera (as for speed)
  - to avoid static weighing, to save staff, to keep traffic running, and to increase the efficiency of the checks
- Challenge and Issues
  - requires a metrological type approval (i.e. 100% of measurements in the tolerances)
  - static tolerances (5% on GVW) cannot be increased to keep the weights as they are
  - vehicle dynamics and pavement surface ⇒ weighing uncertainties

DIRECT ENFORCEMENT BY WIM (2)

- Experiences
  - 1999 & 2011: Taiwan, with 30% and then 10% tolerances, stopped after 2-3 yrs (no more infringement!)
  - Czech Republic: first country to legalize direct enforcement by WIM (2011), and to implement it (2015), but type approval ≠ OIML
- On-going research
  - National project in France, committed by the Ministry of Transport, led by IFSTTAR, with Cerema (2014-20)
  - Phase 1 completed in 2017, feasibility of using existing systems, partnership with Kapsch and Sterela
  - tolerance 5% on GVW, sorting of the overloaded measurement before enforcement
  - Phase 2 (2018-20): type approval procedure and preliminay tests

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Thank you for your attention!

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