HARMONIZATION OF VWD REGULATIONS IN CANADA: THE NATIONAL MOU

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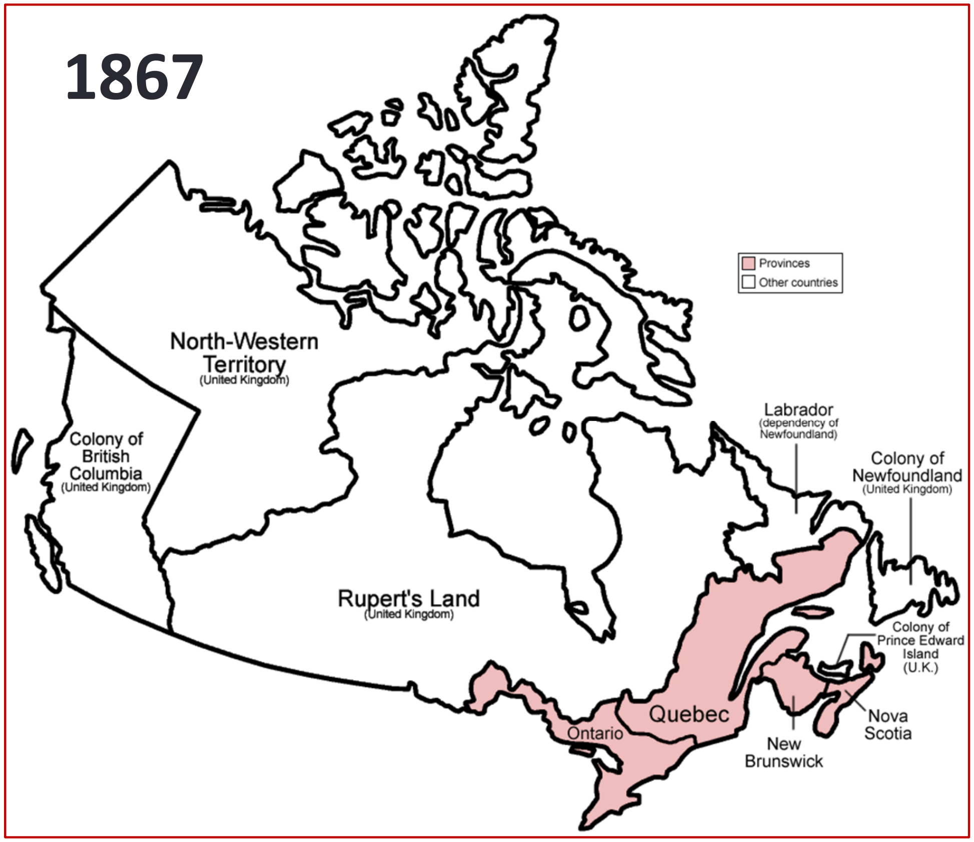
Topics

- Highway Transportation in Canada
- Growth of Long-Distance Trucking
- Regulatory Harmonization and Research
- The 1988 MOU on Vehicle Weights and Dimensions



- Canada created – 4 provinces
- Population 3.5 million
- No. of Tim Hortons - 0

- 10 provinces and 3 territories
- Population 37 million
- No. of Tim Hortons – 3,200

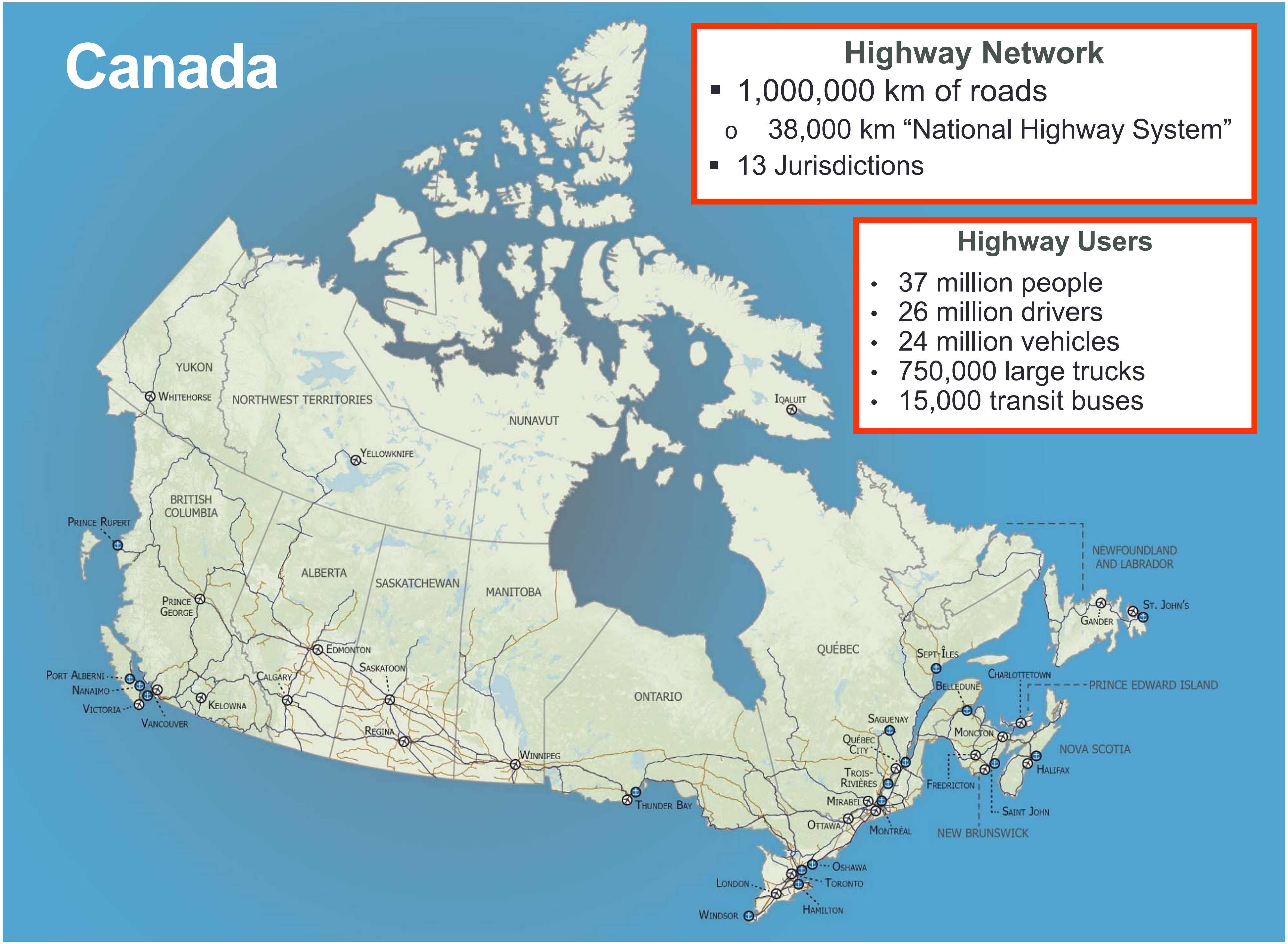
Canada

Highway Network

- 1,000,000 km of roads
  - 38,000 km “National Highway System”
- 13 Jurisdictions

Highway Users

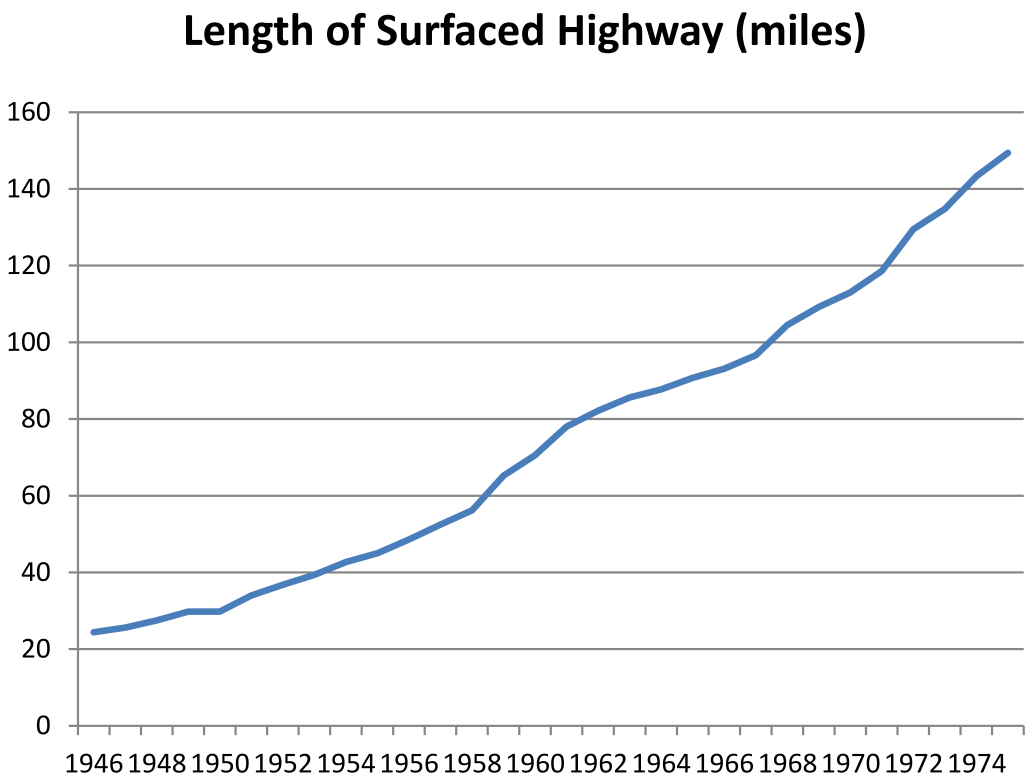
- 37 million people
- 26 million drivers
- 24 million vehicles
- 750,000 large trucks
- 15,000 transit buses



Highway Transportation In Canada

- Highways fall under provincial and territorial jurisdiction in Canada:
  - 10 Provinces and 3 Territories are responsible for construction, maintenance and regulation of highways
  - Close collaboration between provinces and territories on highway engineering standards and guidelines, driver and vehicle regulations
- No federal truck size and weight regulations or “bridge formula”

Growth of The Highway System



Length of Surfaced Highways:
1946: 24,400 miles
1975: 149,400 miles
Change: + 500%

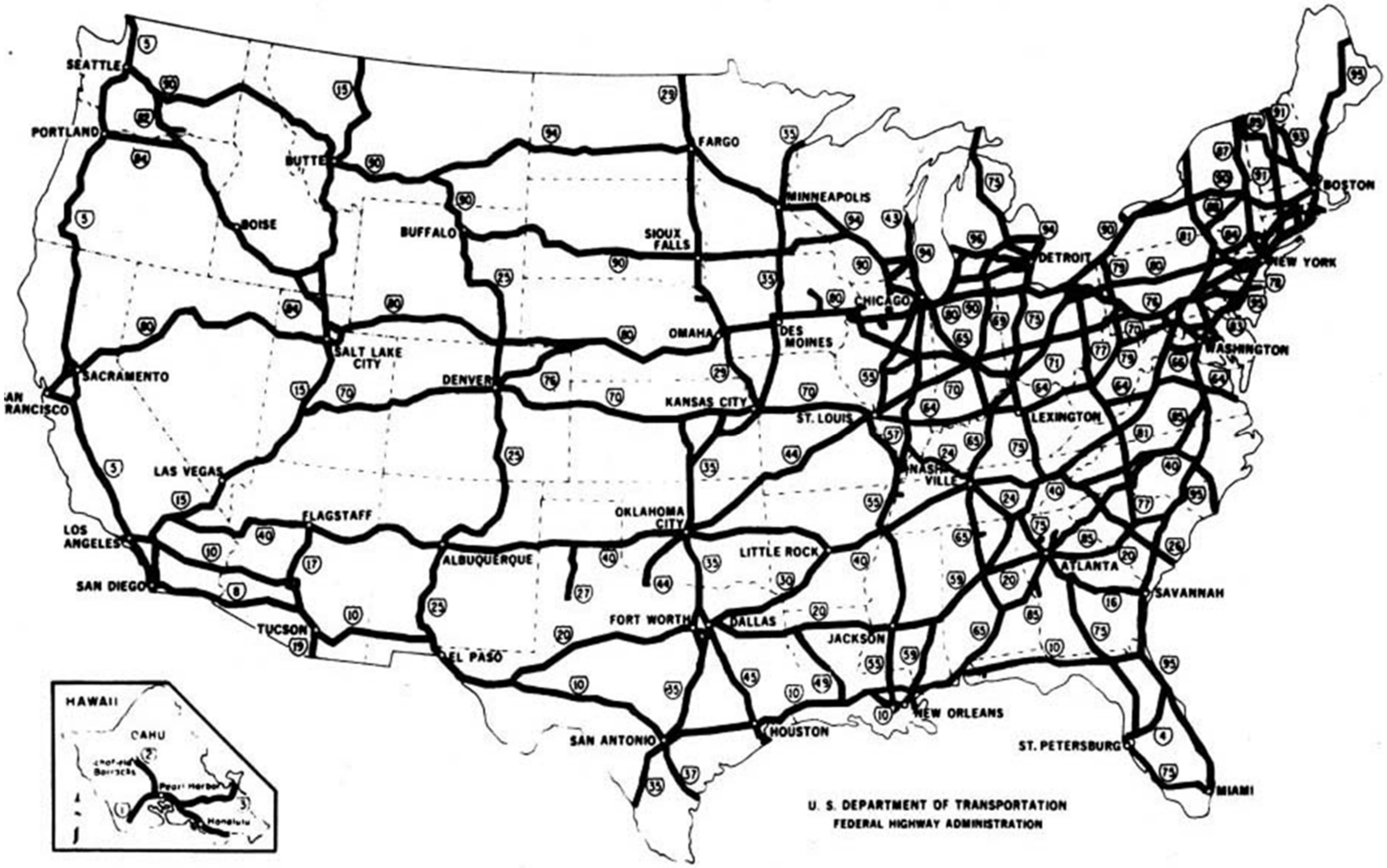
Milestones: First Road Trip Across Canada by Road 1946

Milestones: TransCanada Highway

TRANS CANADA

8000 km
Began in 1950
Completed in 1971

Milestones: US Interstate Highway System



- Length ~ 68,800 km (43,000 miles)
- Began in 1956; ongoing federal funding program
- Common engineering standards (access controlled freeways)

Canadian Contributions

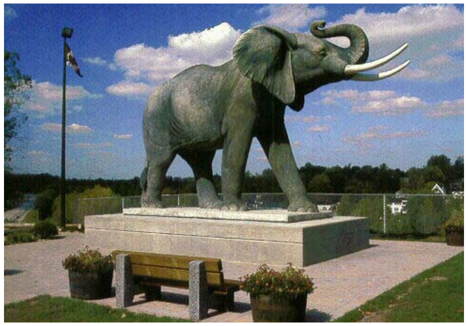
1920:

- Manitoba invented highway numbering
- replaced coloured bands on poles

1930:

- Ontario developed dotted white lines down the centre of the road
- adopted throughout North America by 1933

Impact of Highways – Roadside “Big Things”



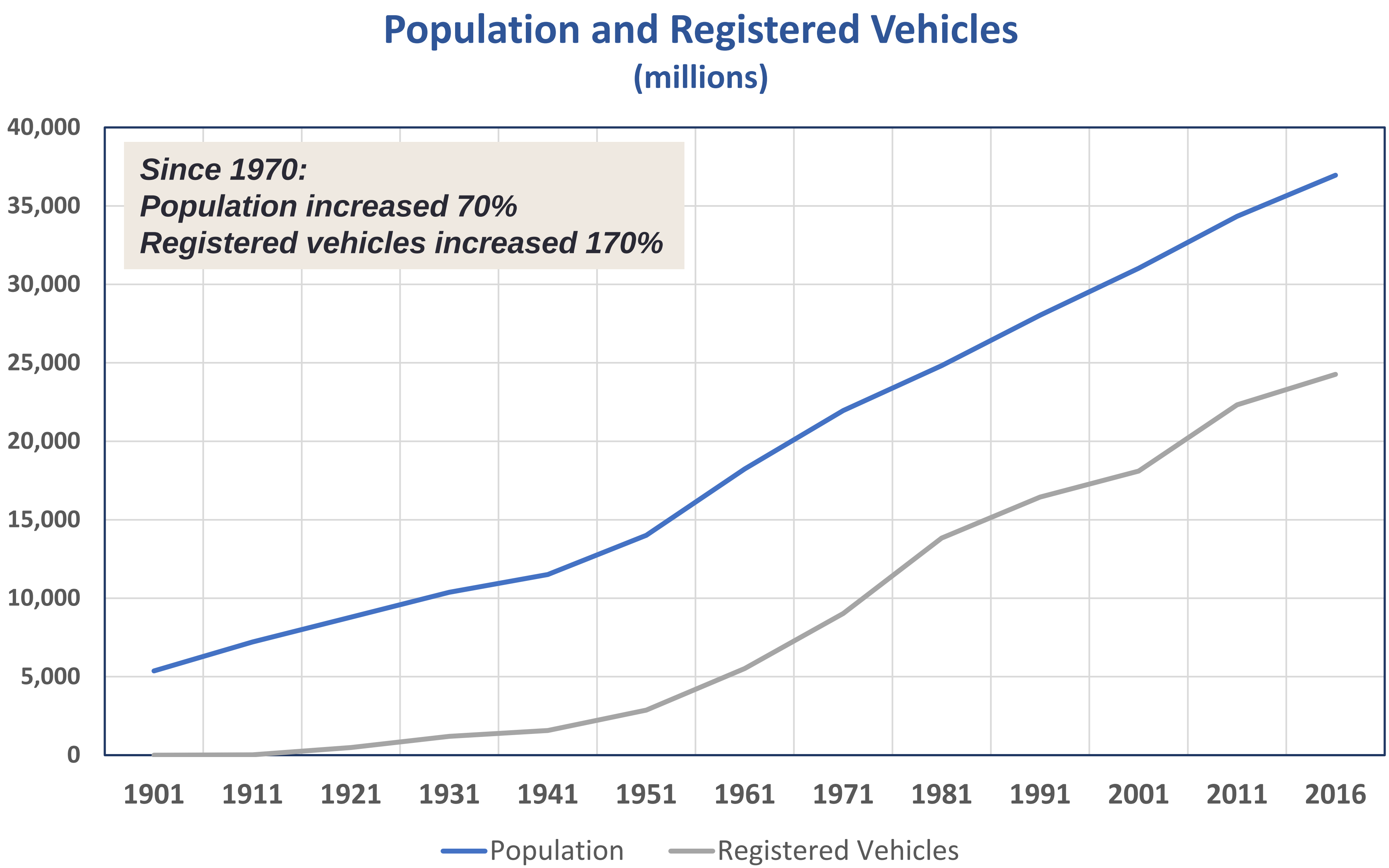









Canadians and Driving



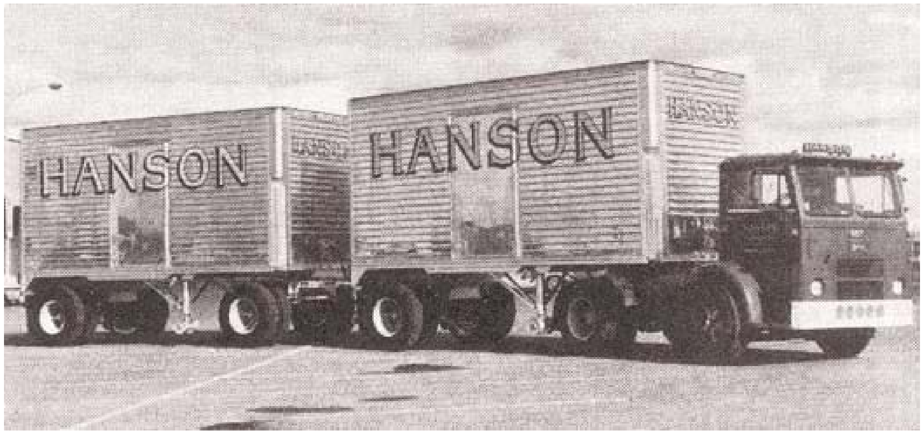
Vehicle Weights and Dimensions
Regulations in the 1960's

Canadian and US regulations were very similar

- Overall length 65 ft.
- 45 ft. semitrailer
- 74,000 lb. weight limit
- Limited use of double trailer combinations

Harmonization of size and weight regulations was not a priority concern

- Limited long-distance trucking; rail dominated long haul
- Gaps in road network across Canada



Key Events: Ontario Bridge Formula 1970

$$W_m = 10.0 + 3.0B_m - 0.0325B_m^2$$

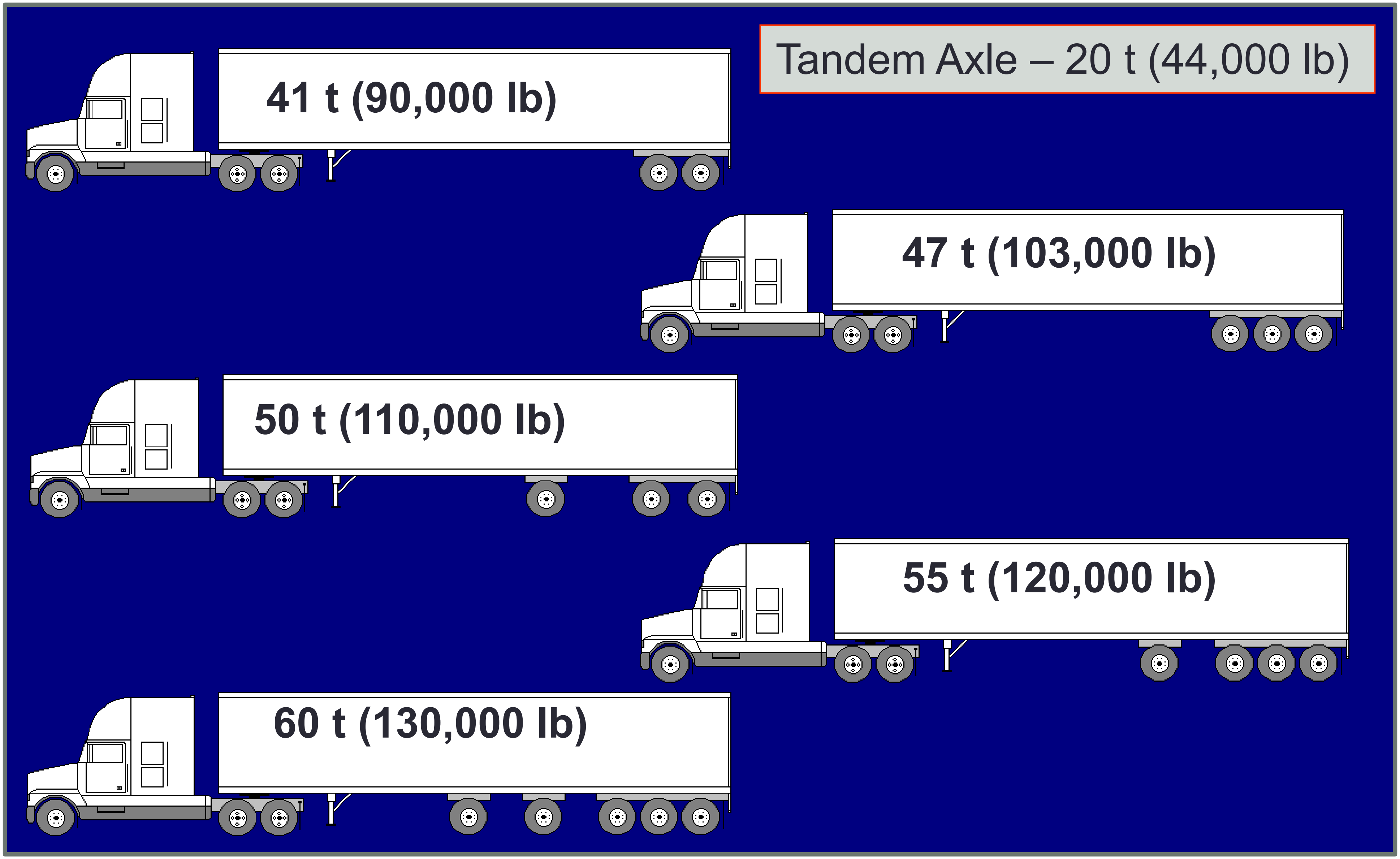
Single biggest influence on evolution of truck design in Canada

- Intended to improve the effectiveness of truck axle spacing weight limit controls on bridges, but:
- Allowed freedom to change number and locations of axles on trucks ~ higher payloads
- Increased Gross Vehicle Weight limit to 140,000 lb. (63,305 kg)
- Introduced use of “lift” axles

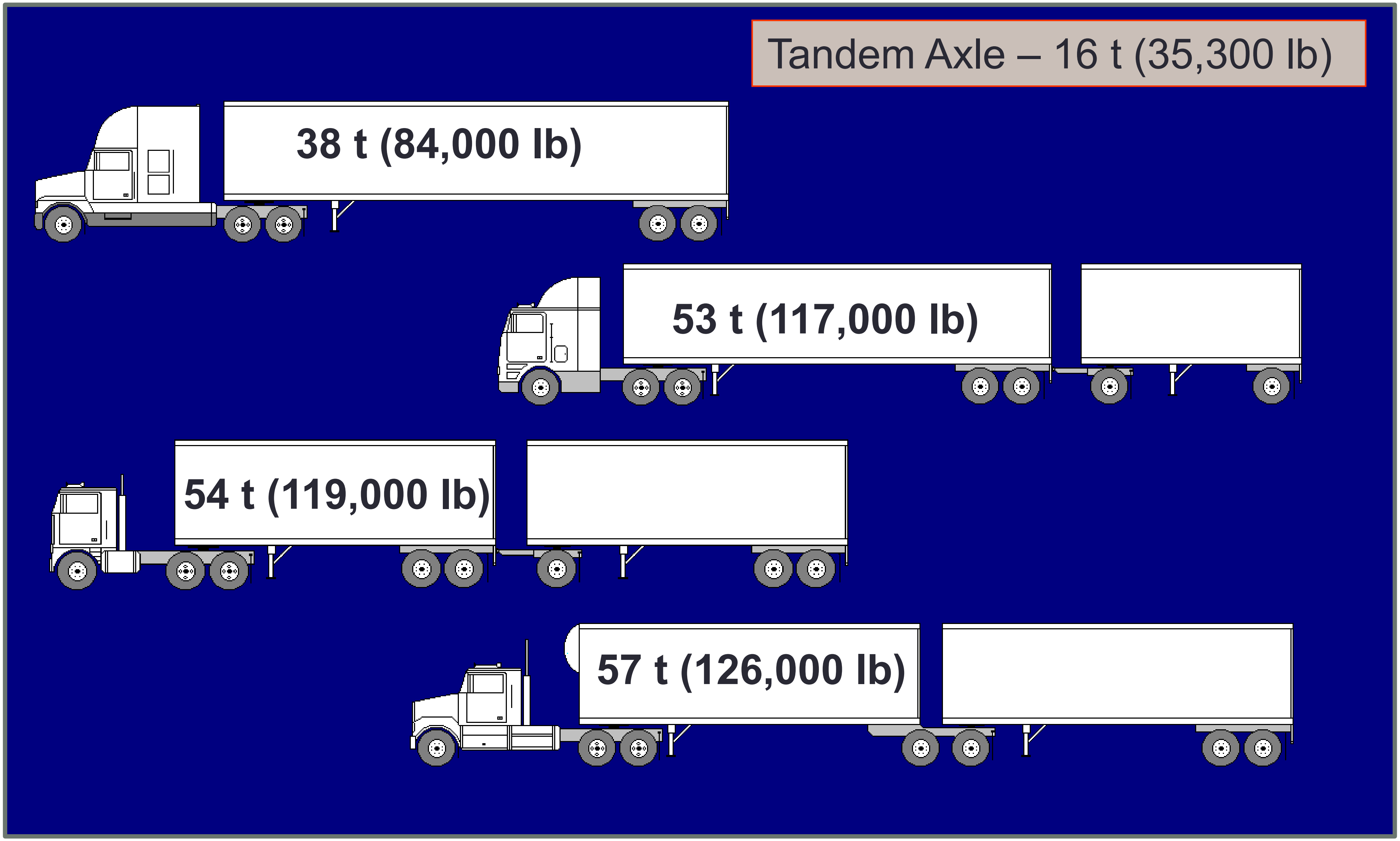
Consequences:

- Major productivity gains with trucks designed using new formula

Evolution of Interprovincial Barriers: Eastern Canada – New "Bridge Formula"



Evolution of Interprovincial Barriers: Western Canada - Longer Vehicles



Vehicle Weights and Dimensions in Canada
Mid 1970's - Regulatory Harmonization Progress

Vehicle Weights and Dimensions Committee formed by the Roads and Transportation Association of Canada (RTAC) to rationalize truck configurations, weights and dimensions across Canada

Issues:

- ***Strength and capacity of pavements***
  - Highway strengthening programs undertaken in Prairies and Atlantic Canada with federal funding assistance
- ***Live load capacity of bridges***
  - National study undertaken
  - Concluded that, in spite of use of different design codes (eg AASHTO, CSA), bridge capacity across Canada was similar and adequate for commonly used heavy trucks
  - Bridges identified for strengthening or replacement; work undertaken with federal funding assistance

New Concern: Impacts of VWD Regulations on Vehicle Safety

Regulation Change:
Overall Length Limit Increased

Outcome:
Short Pup Trailers Built to Take Advantage of Extra Length ~ increased rollovers

The RTAC/CCMTA Vehicle Weights and Dimensions Study 1981-1986

- Joint RTAC/CCMTA Committee formed to identify the obstacles to regulatory harmonization and design a research program to address them
  - Largest, cooperative research program ever undertaken in this area
    - $3 million study shared by provinces/territories (50%), the federal government (25%) and the trucking industry (25%)
  - Research areas:
    - The impacts of changes in the weights and dimensions of truck combinations on vehicle stability and control, and
    - The impact of different axle configurations and weights on pavement designs used in Canada
- High expectations: industry funding brought expectation that research would result in harmonized rules

The RTAC/CCMTA Vehicle Weights and Dimensions Study 1981-1986

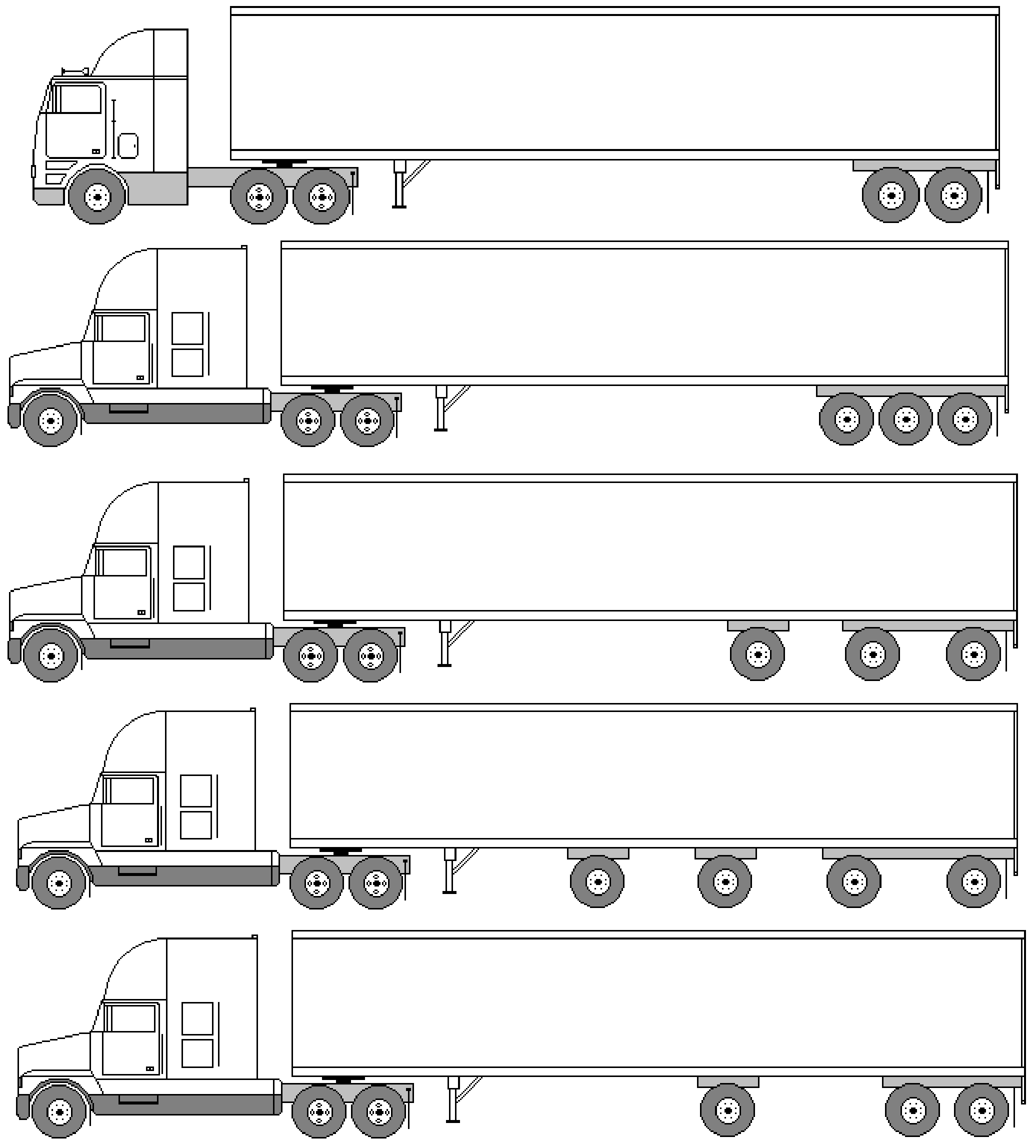
Vehicle Stability and Control Research

- University of Michigan Transportation Research Institute (UMTRI) conducted computer simulation of vehicle performance and on track testing

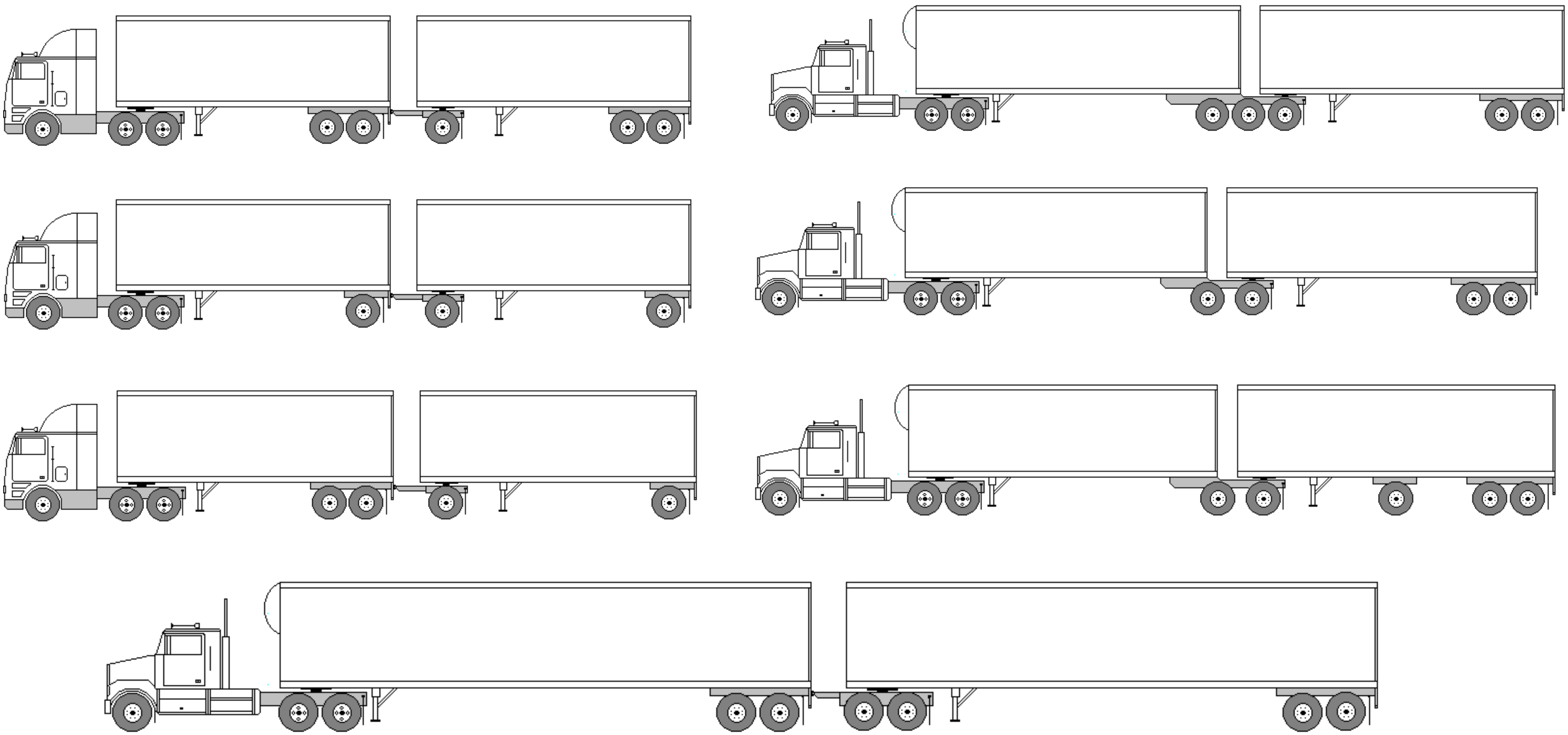
- Ontario Ministry of Transportation undertook track testing of vehicle performance
  - Used facilities in London ON and the Transport Canada Test Centre in Blainville QC

- Centre de Recherche Industrielle du Quebec (CRIQ) designed and build a Tilt Table and conduct research on rollover stability

Research: Tractor Semitrailer Configurations

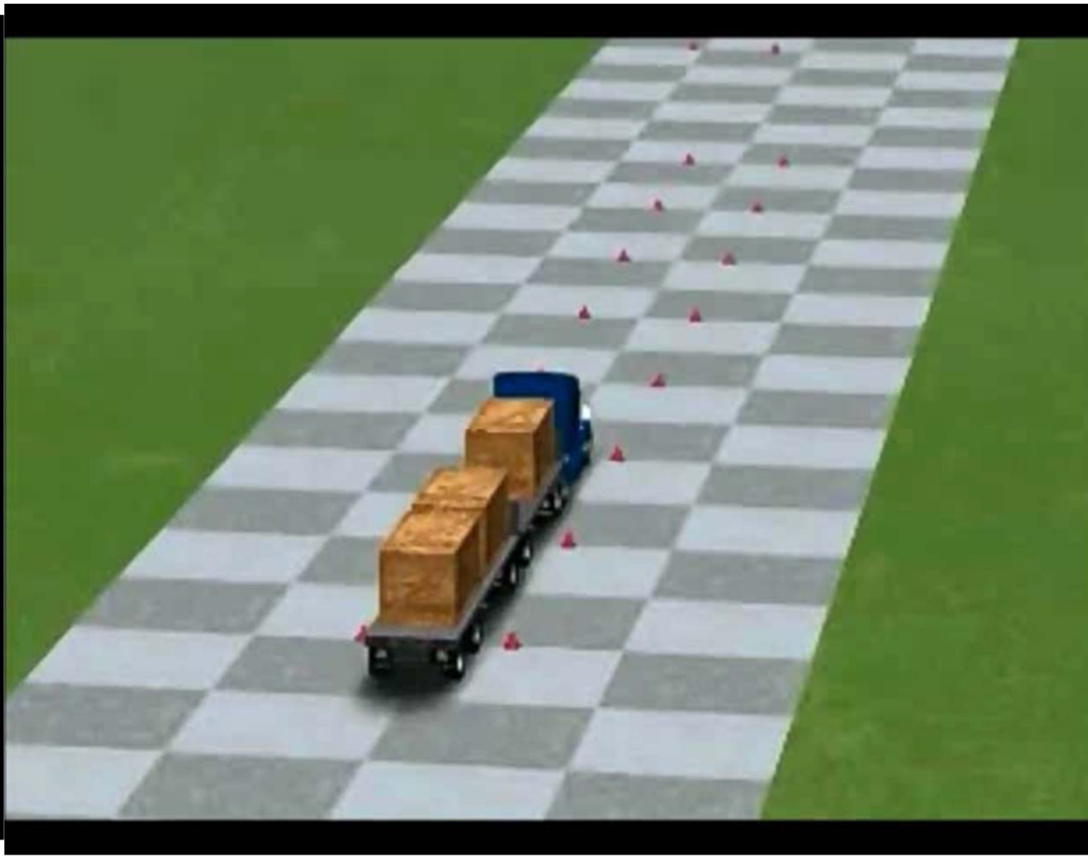


Research: Double Trailer Combinations



Vehicle Stability and Control Research

Track Testing



Computer Simulation

Vehicle Stability and Control Research

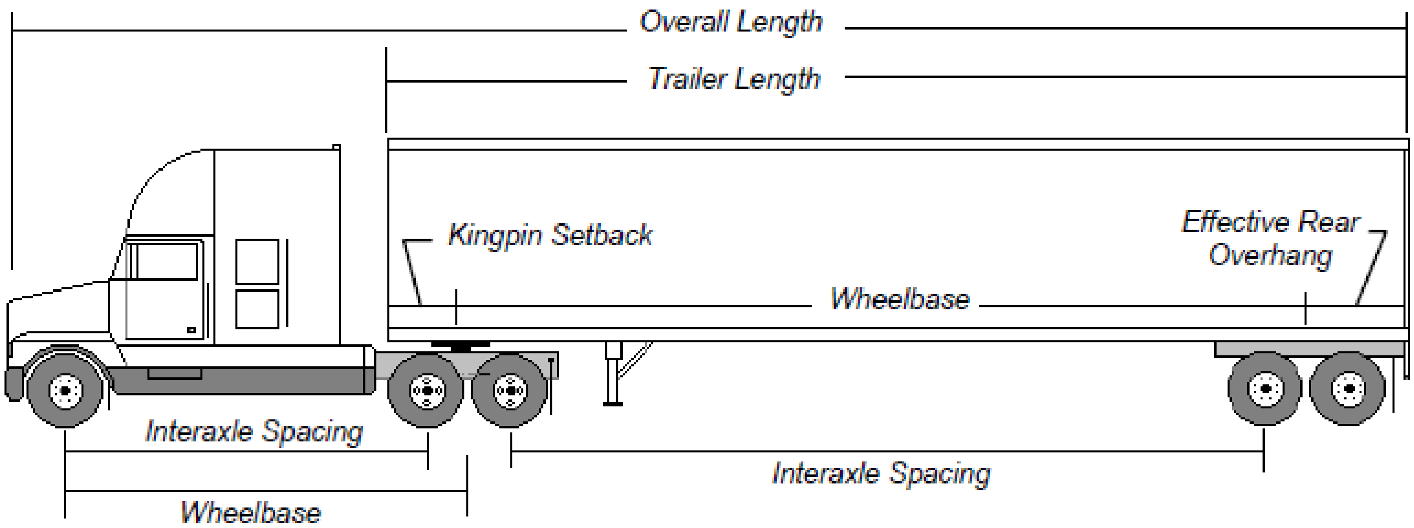
Tilt Table Testing
(Stability)

Turning Performance (Offtracking)

Influences of Configuration Properties on Safety Related Performance

	Low Speed Offtracking	High Speed Offtracking	Braking Efficiency	Steady Turn Rollover	Obstacle Evasion
Increasing no. of articulation points	↑	↓			↓
Longer wheelbase	↓	↑	↑		↑
Longer hitch offset	↑	↓			↓
Increasing no of axles	↑	↓	↓	↑	↓
Increasing axle spreads	↑	↓			↓
Increasing axle loads		↓		↓	↓

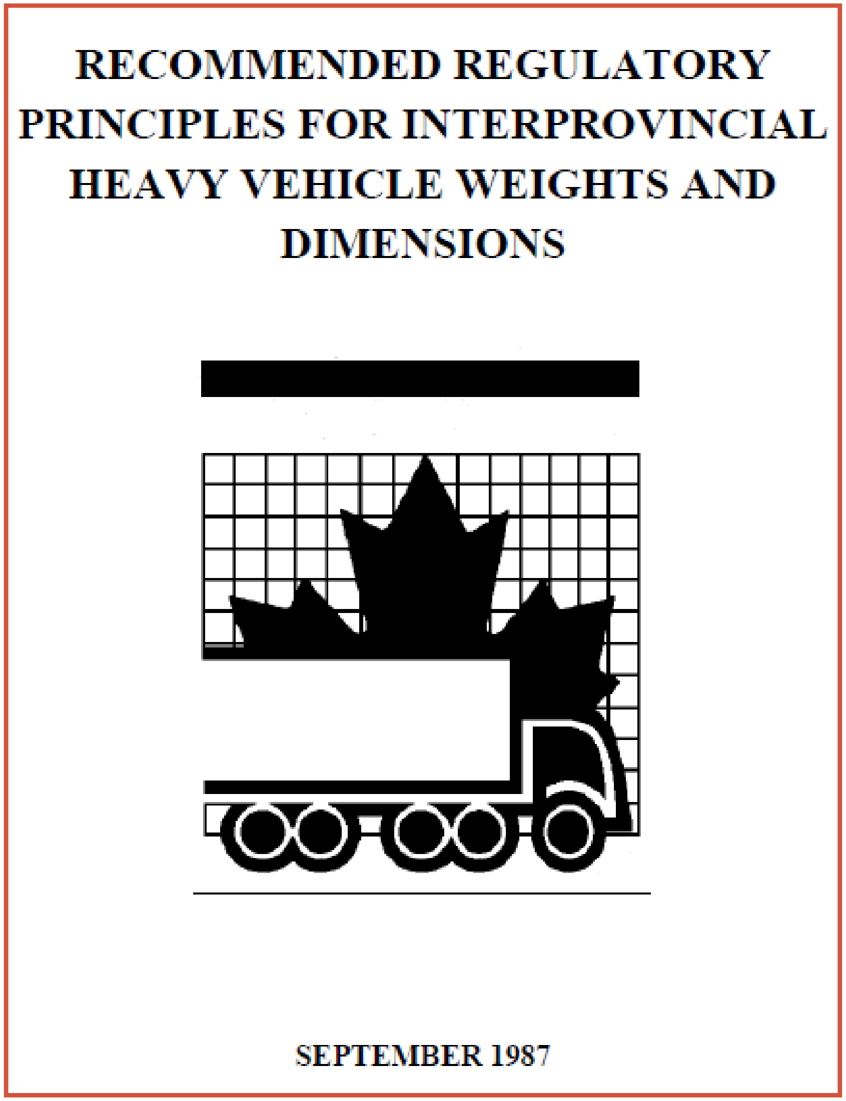
Weight and Dimensions Limits: Everything Affects Something



- ***Overall Length***
  - The overall length has implications for traffic operations and for passing on two lane roads
- ***Tractor Wheelbase***
  - affects stability and offtracking: longer tractors are more stable, but require greater space to turn
- ***Trailer Wheelbase***
  - affects stability and offtracking: longer trailers are more stable, but require greater space to turn
- ***Kingpin Setback***
  - affects the amount of swing out of front corner of trailer when turning: a large kingpin setback can result in front corner of trailer going into adjacent lane of traffic when turning on to highway
- ***Effective Rear Overhang***
  - affects the amount of swing out of the rear corners of the trailer: amount of swing out is related to ratio of effective rear overhang to trailer wheelbase

National VWD Standards: Performance Criteria

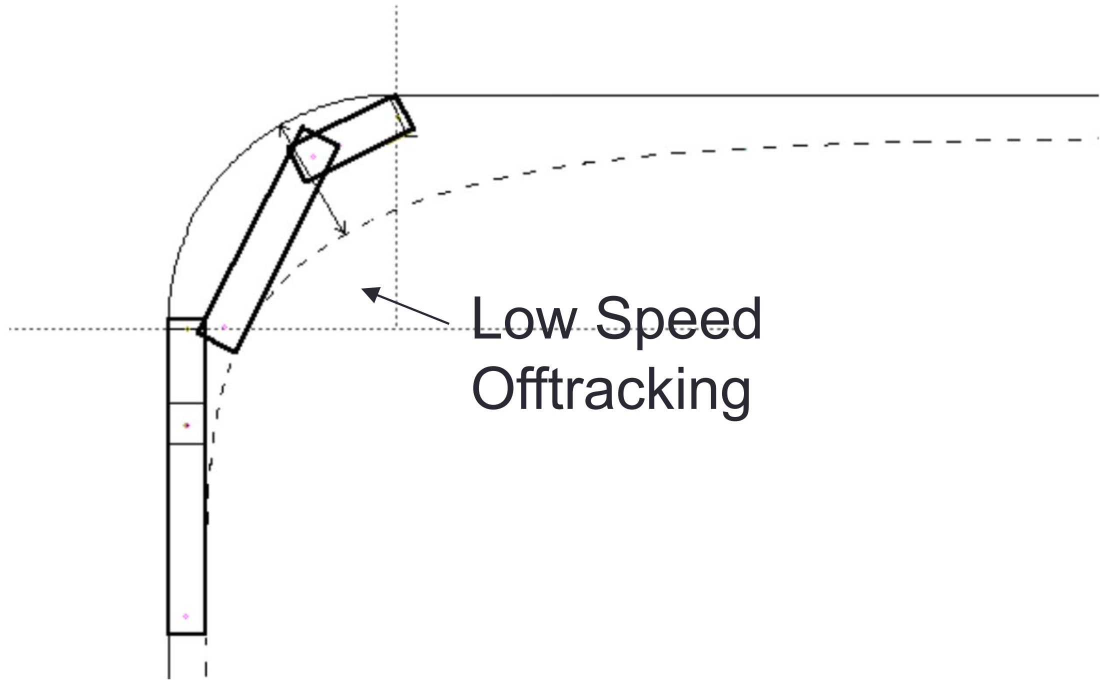
- Static Rollover Threshold
- Load Transfer Ratio
- Low Speed Offtracking
- High Speed Offtracking
- Transient High Speed Offtracking
- Friction Demand in a Tight Turn
- Rear Swingout
- Front Swingout



RECOMMENDED REGULATORY PRINCIPLES FOR INTERPROVINCIAL HEAVY VEHICLE WEIGHTS AND DIMENSIONS

SEPTEMBER 1987

Performance Criteria Example – Low Speed Offtracking



Performance Target:

When a vehicle negotiates a 90˚ turn with an outside radius of 14 m, the maximum extent of lateral excursion of the last axle of the vehicle, relative to the path followed by the tractor steering axle, should not exceed 5.6 m.

Consequence:

Controls and limits placed on wheelbases of tractors (max 6.2 m) and trailers (max 12.5 m), limit on sum of trailer wheelbases on B Train Doubles

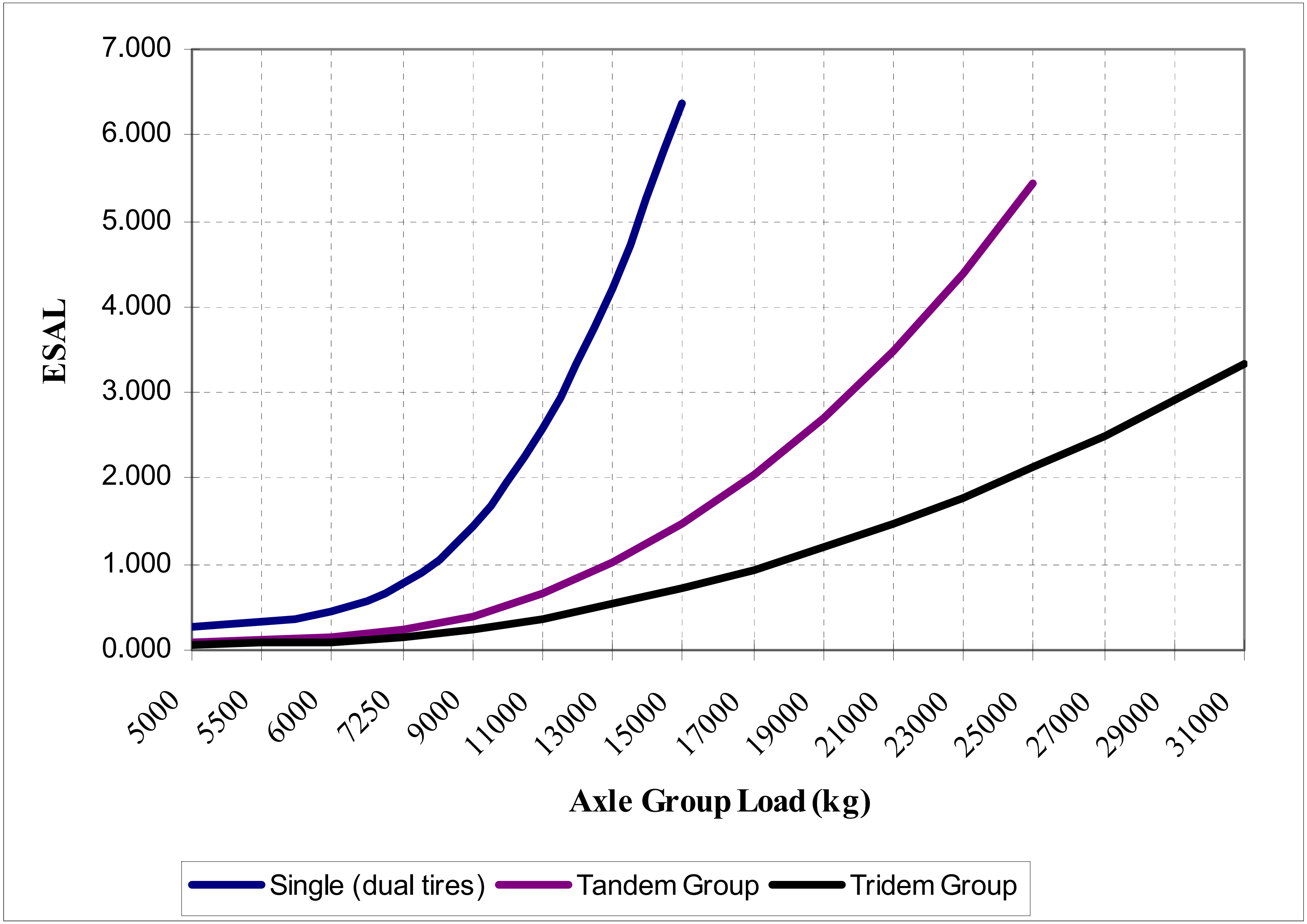
The RTAC/CCMTA Vehicle Weights and Dimensions Study 1981-1986

Pavement Research

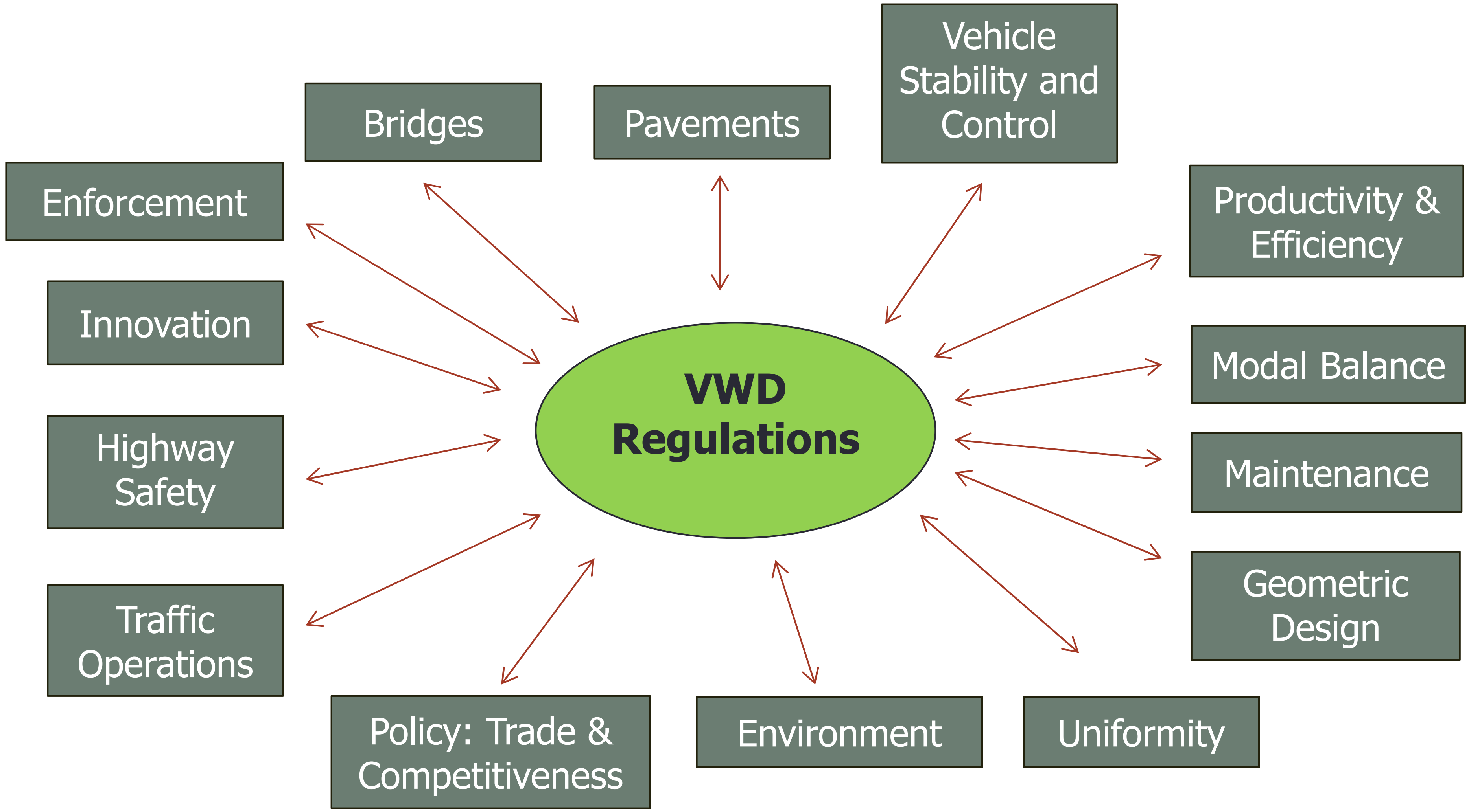
- Thirteen test sites selected on the primary highway system at locations across Canada
- A special trailer designed and built to allow testing of the impacts of single, tandem and tridem axle configurations at each site
- Alberta Research Council retained to instrument each site and collect and analyze test data
- National Research Council retained to test effect of different suspension design on dynamic loads on pavements

Pavement Instrumentation

Pavement Test Results (ESAL's)



VWD Policy - A Complex, Delicate Balance



MOU Development - Guiding Principles

- Weight and dimension policies should not unnecessarily impede efficiency, innovation and technological advancement
- Safety of the highway system cannot not be compromised
- Weight and dimensions policies should be supported by sound rationale
- Impacts of potential changes in weight and dimensions policies must be well understood

National Standards for Weights and Dimensions

National Agreement (MOU) established in 1988

- Provinces and territories not obliged to adopt limits;
  - agree to allow vehicles which meet the MOU standards to operate within the jurisdiction

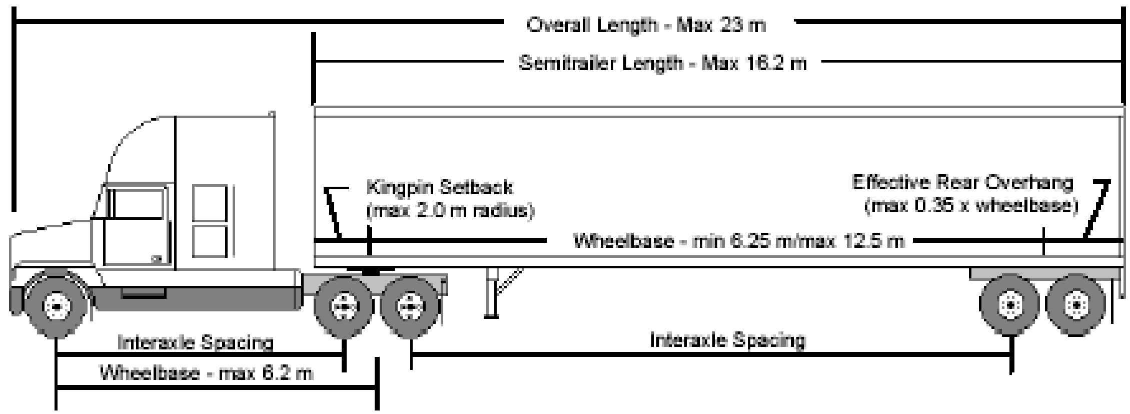
Heavy Truck Weight and Dimension Limits for Interprovincial Operations in Canada

Resulting From
The Federal-Provincial-Territorial Memorandum of Understanding on Interprovincial Weights and Dimensions

Summary Information

January 2019

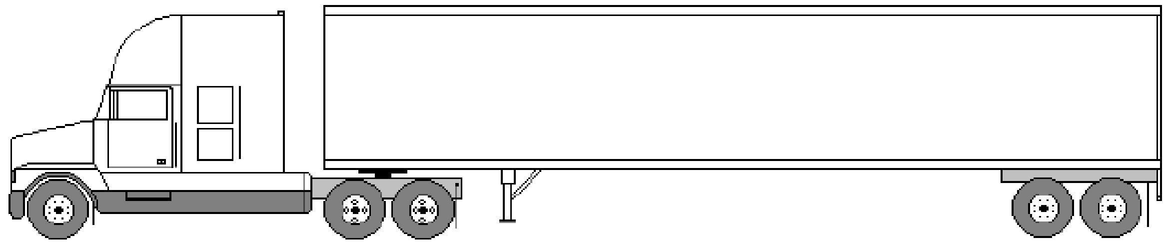
Category 1: Tractor Semitrailer
Part 1 - Dimension Limits



DIMENSION	LIMIT
Overall Length	Maximum 23 m
Overall Width	Maximum 2.6 m
Overall Height	Maximum 4.15 m
Tractor:	
Wheelbase	Maximum 6.2 m
Tandem Axle Spread	Minimum 1.2 m/Maximum 1.85 m
Semitrailer	
Length	Maximum 16.2 m
Wheelbase	
Single, Tandem or Tridem Axle Group	Minimum 6.25 m/Maximum 12.5 m
Kingpin Setback	Maximum 2.0 m radius
Effective Rear Overhang	Maximum 35% of wheelbase
Tandem Axle Spread	Minimum 1.2 m/Maximum 1.85 m
Tridem Axle Spread	Minimum 2.4 m/Maximum 3.7 m
Track Width	Minimum 2.5 m/Maximum 2.6 m
Interaxle Spacings	
Single Axle to Single, Tandem or Tridem Axle	Minimum 3.0 m
Tandem Axle to Tandem Axle	Minimum 5.0 m
Tandem Axle to Tridem Axle	Minimum 5.5 m

Category 1: Tractor Semitrailer

Part 2 - Weight Limits



Max 5500 kg

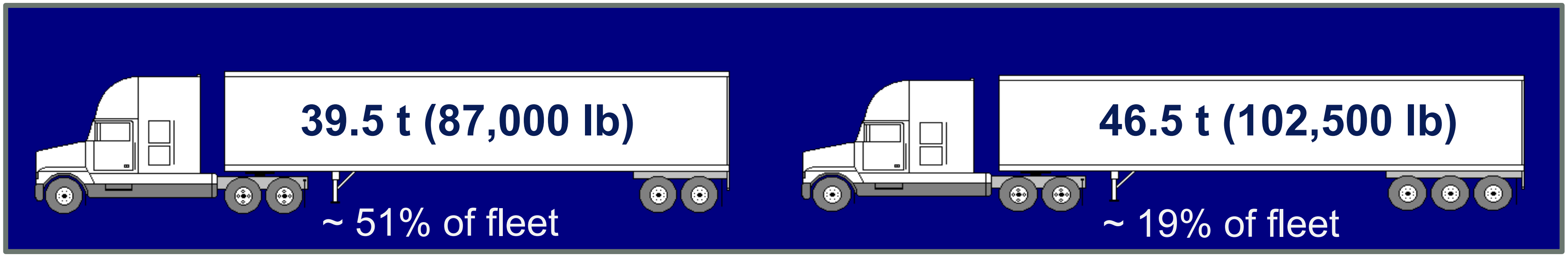
Single Axle - Max 9100 kg
Tandem Axle - Max 17 000 kg

Single Axle - Max 9100 kg
Tandem Axle - Max 17 000 kg
Tridem Axle - Spread:
2.4 m to < 3.0 m - Max 21 000 kg
3.0 m to < 3.6 m - Max 23 000 kg
3.6 m to 3.7 m - Max 24 000 kg

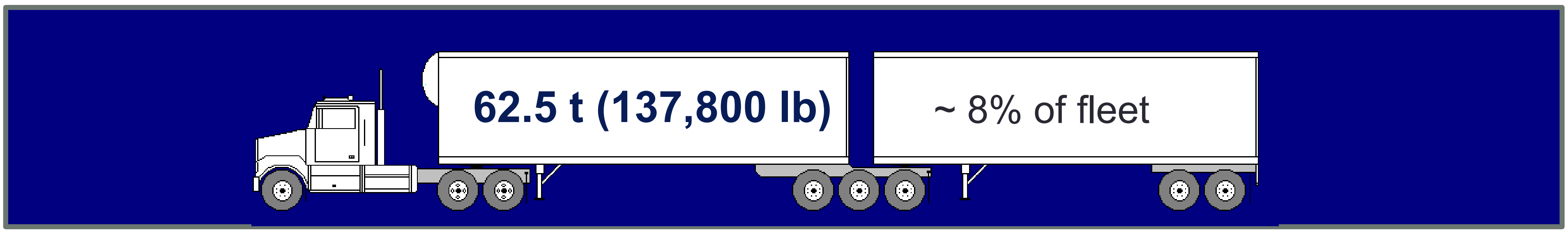
WEIGHT[2]	LIMIT
Axle Weights[2]:	
Steering Axle	Maximum 5500 kg
Single Axle (dual tires)	Maximum 9100 kg
Tandem Axle:	
Axle Spread 1.2 m - 1.85 m	Maximum 17 000 kg
Tridem Axle:	
Axle Spread 2.4 m - less than 3.0 m	Maximum 21 000 kg
Axle Spread 3.0 m - less than 3.6 m	Maximum 23 000 kg
Axle Spread 3.6 m - 3.7 m	Maximum 24 000 kg
Gross Vehicle Weight Limits[2]	
Three Axles	Maximum 23 700 kg
Four Axles	Maximum 31 600 kg
Five Axles	Maximum 39 500 kg
Six Axles - with 2.4 to < 3.0 m spread tridem	Maximum 43 500 kg
with 3.0 m to < 3.6 m spread tridem	Maximum 45 500 kg
with 3.6 to 3.7 m spread tridem	Maximum 46 500 kg

National Standards:
Common Configurations

Tractor Semitrailer



B Train Double



Vehicle Weights and Dimensions Issues - National Level Stewardship

Council of Ministers Responsible for Transportation and Highway Safety

Council of Deputy Ministers

Task Force on Vehicle Weights & Dimensions Policy

Studies of Impacts of National Harmonization

- improved efficiency/productivity of highway freight system estimated at $3.85 billion in cost savings (1988 – 2002)
- most trucking cost savings passed on to shippers (rate reductions)
- no increase in pavement or bridge costs
- reduced truck traffic exposure by 135 million vehicle-kilometers

MOU & National Standards - Reflection

- Has served as a sound foundation for harmonization of policies in Canada since 1988
  - Basis for discussion with stakeholders
  - Collaboration between governments
- Establishing performance criteria has been beneficial
  - Basis for evaluating potential changes
- Significant improvement in basis for weight and dimension policies:
  - The objective of each regulatory control is better understood

Regulatory Harmonization - Reflection

- Vehicle weights and dimensions regulations are not uniform across Canada
  - Differences continue to be cited as barriers to trade and impediments to productivity
- Pressure for changes in weight and dimensions policies is usually incremental
  - Difficult to establish and maintain discreet limit
- Harmonization of policies is a moving target; objectives conflicting
  - National vs regional
  - Multiple jurisdictions, widely varying conditions, changing economies and trade patterns.