

# **Tridem Drive Tractors: Research & Operational Experience**



**Forest Engineering Research  
Institute of Canada - Vancouver, BC**

# **FERIC's Tridem Research**

- **Started in 1990**
- **Initially undertaken to address mobility challenges**
- **Steering / vehicle dynamics**
- **20+ reports**
- **Configurations with tridem drive now approved - BC(8) Alberta(9)**







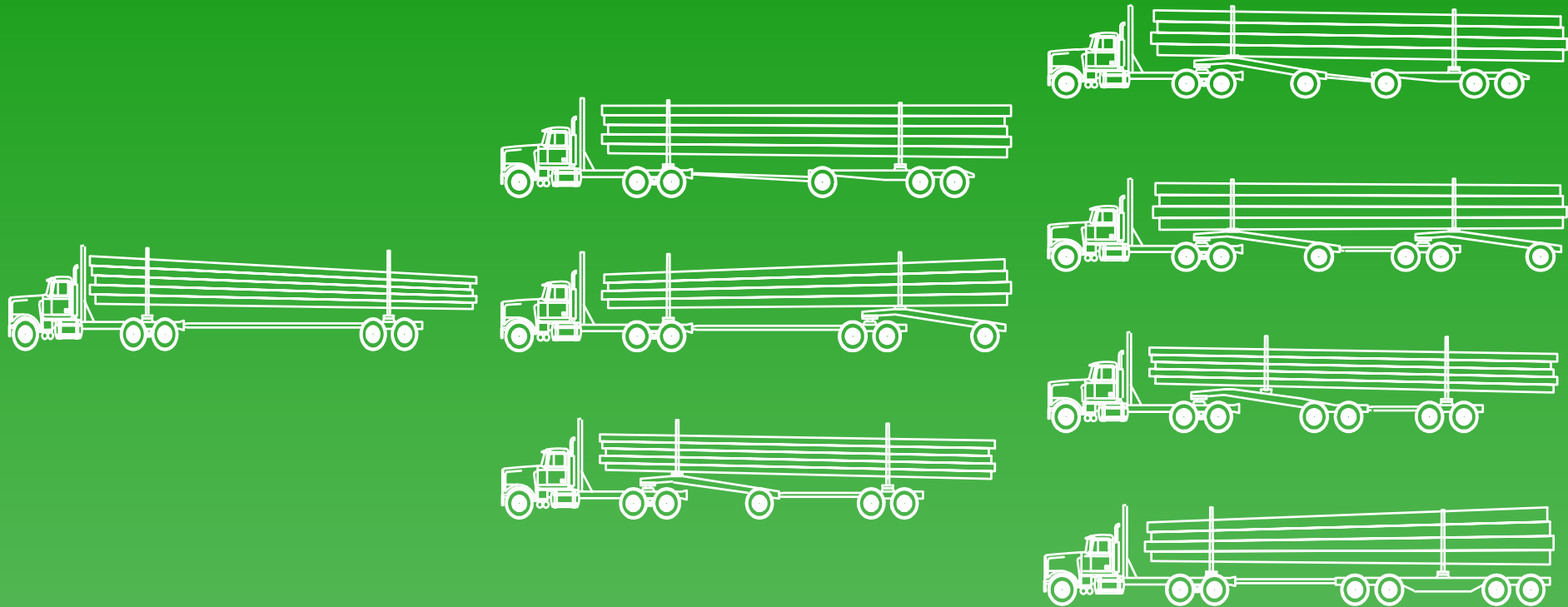








# *Evolution of Western Canadian Log Truck Configurations*



**1960s**



**1980s**



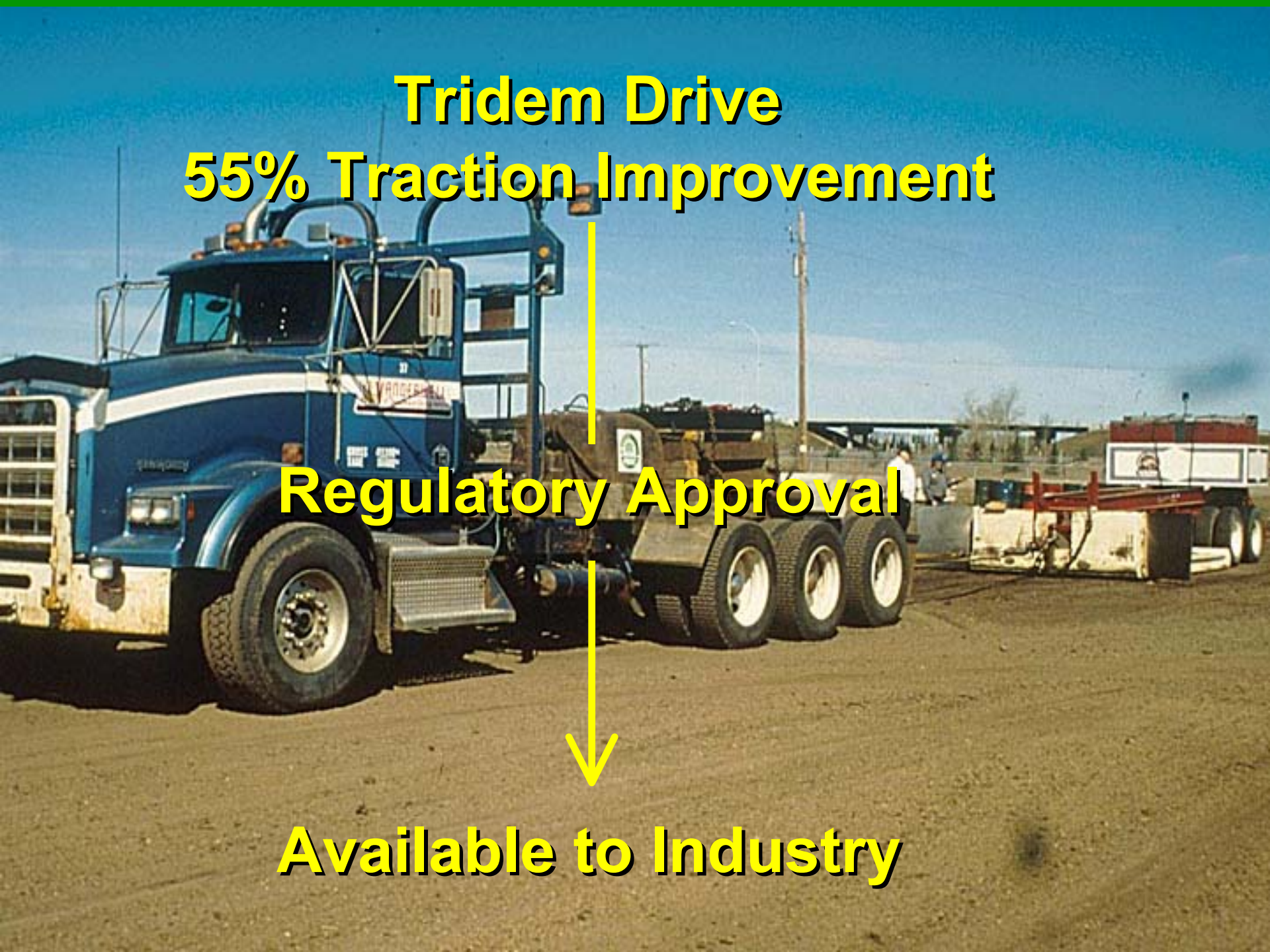




**Tridem Drive  
55% Traction Improvement**

**Regulatory Approval**

**Available to Industry**







**Preliminary Steering  
Testing: Alberta**



# Development of Steering Performance Measure: Lateral Friction Utilization (LFU)



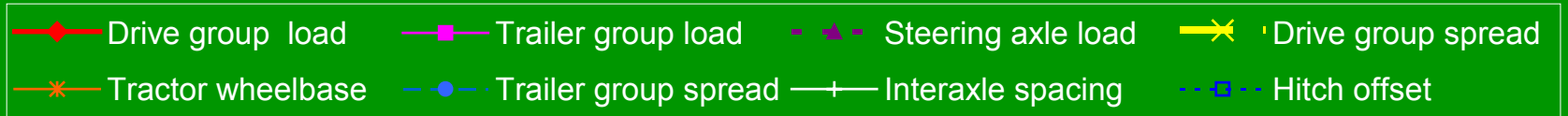
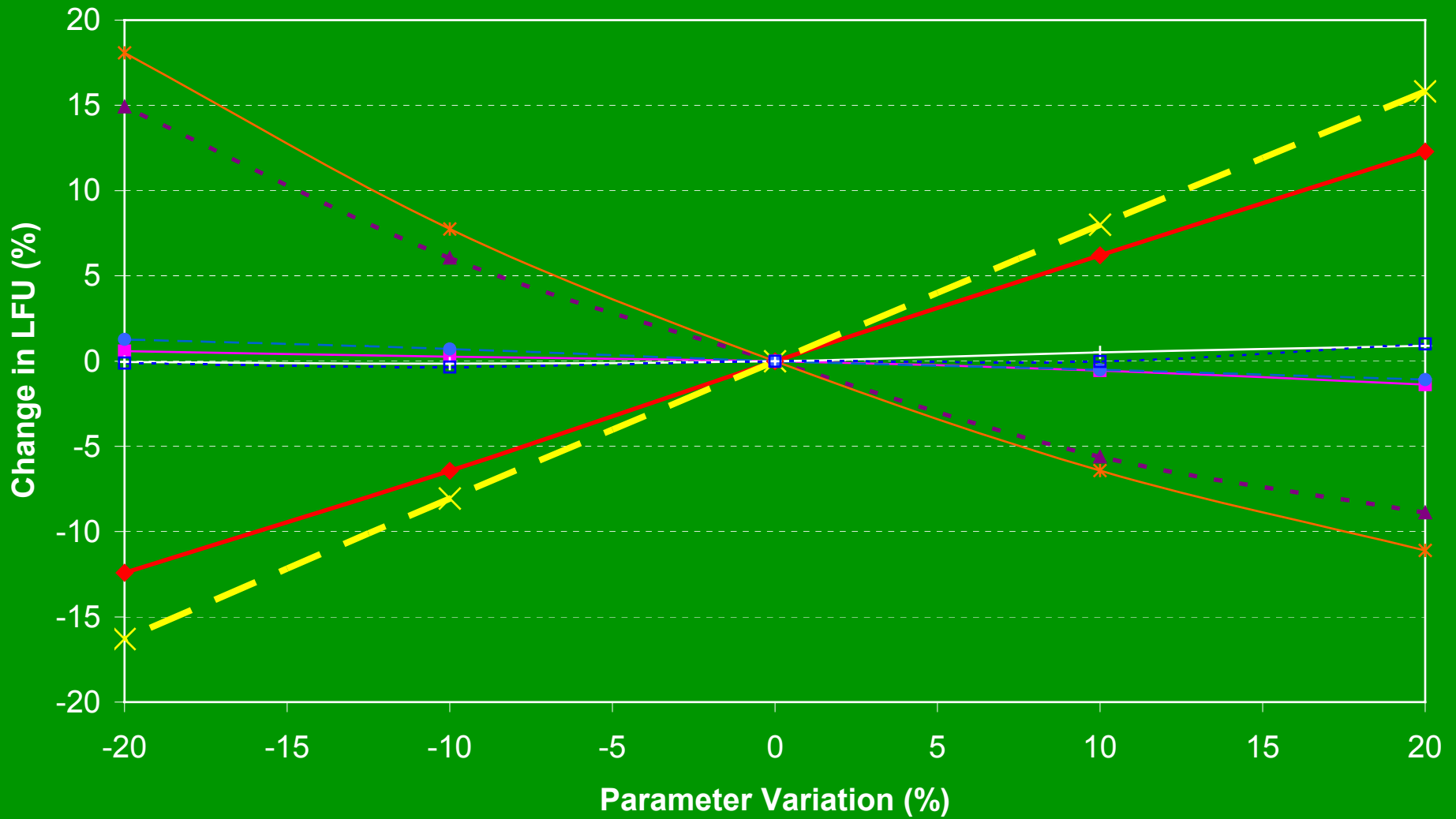
# Lateral Friction Utilization

$$\frac{\text{Side Force at Steering Tires}}{\text{Vertical Load on Steering Tires}} \times \frac{1}{\text{coef of adhesion}} \leq 0.8$$

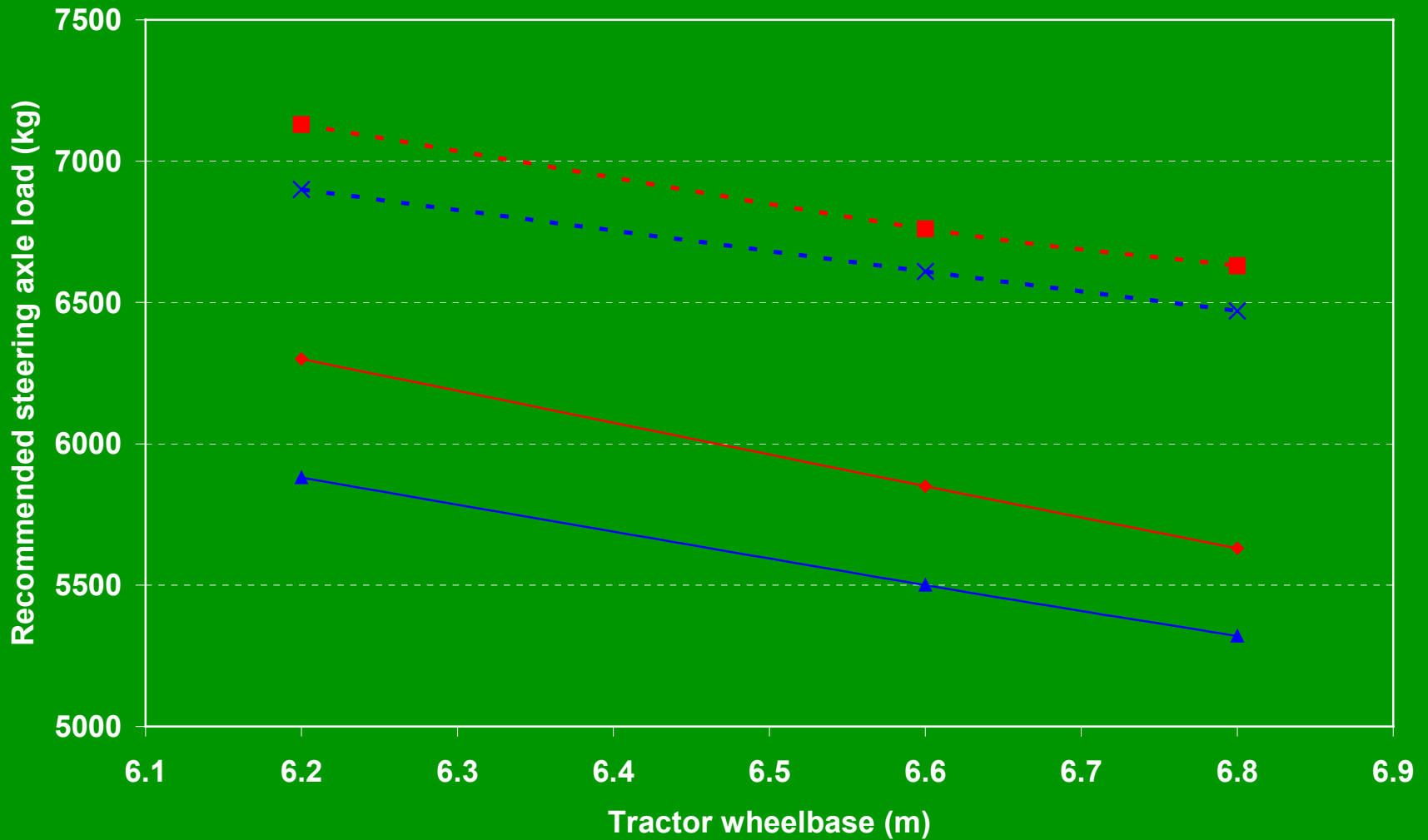


# Sensitivity Analysis

## Tridem tractor / tridem pole trailer



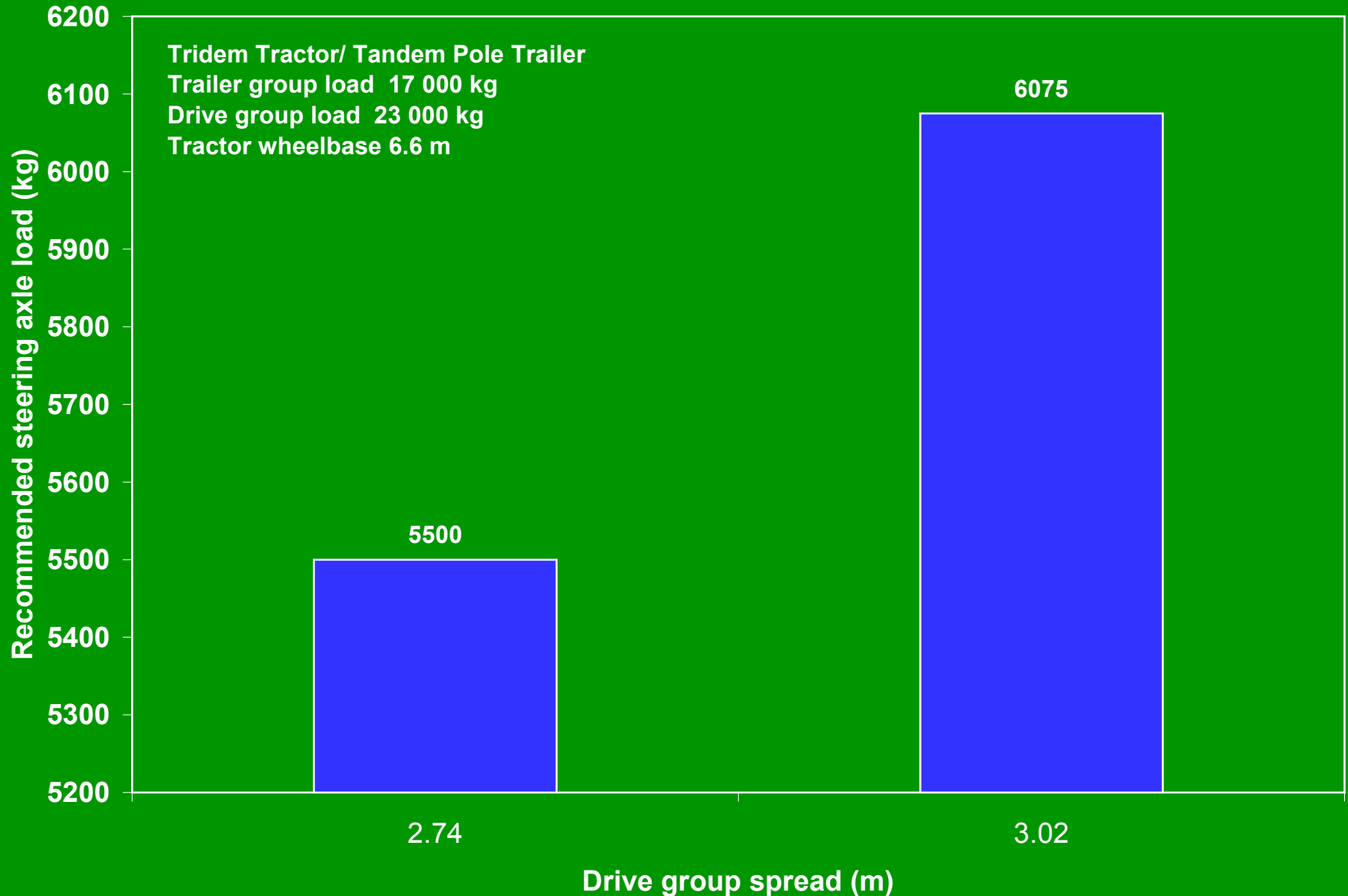
# Influence of tractor wheelbase on steering axle load



BC - Pole trailers BC - Semi-trailers Alberta - Pole trailers Alberta - Semi-trailers



# Influence of drive group spread on steering axle load



# Lateral friction utilization of selected configurations





# Steering tests conducted by B.C. Gov't







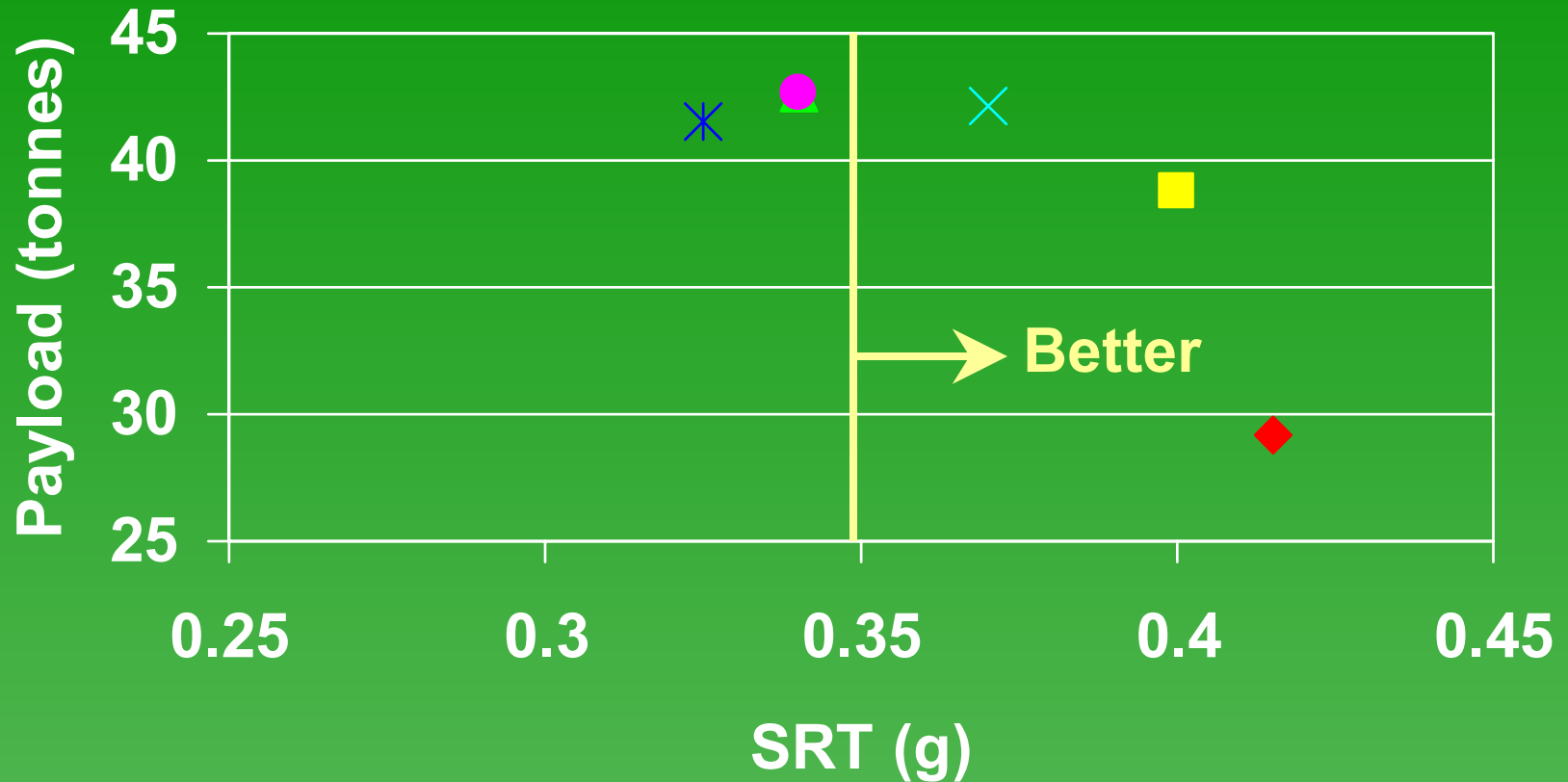
# Vehicle Dynamic Analyses







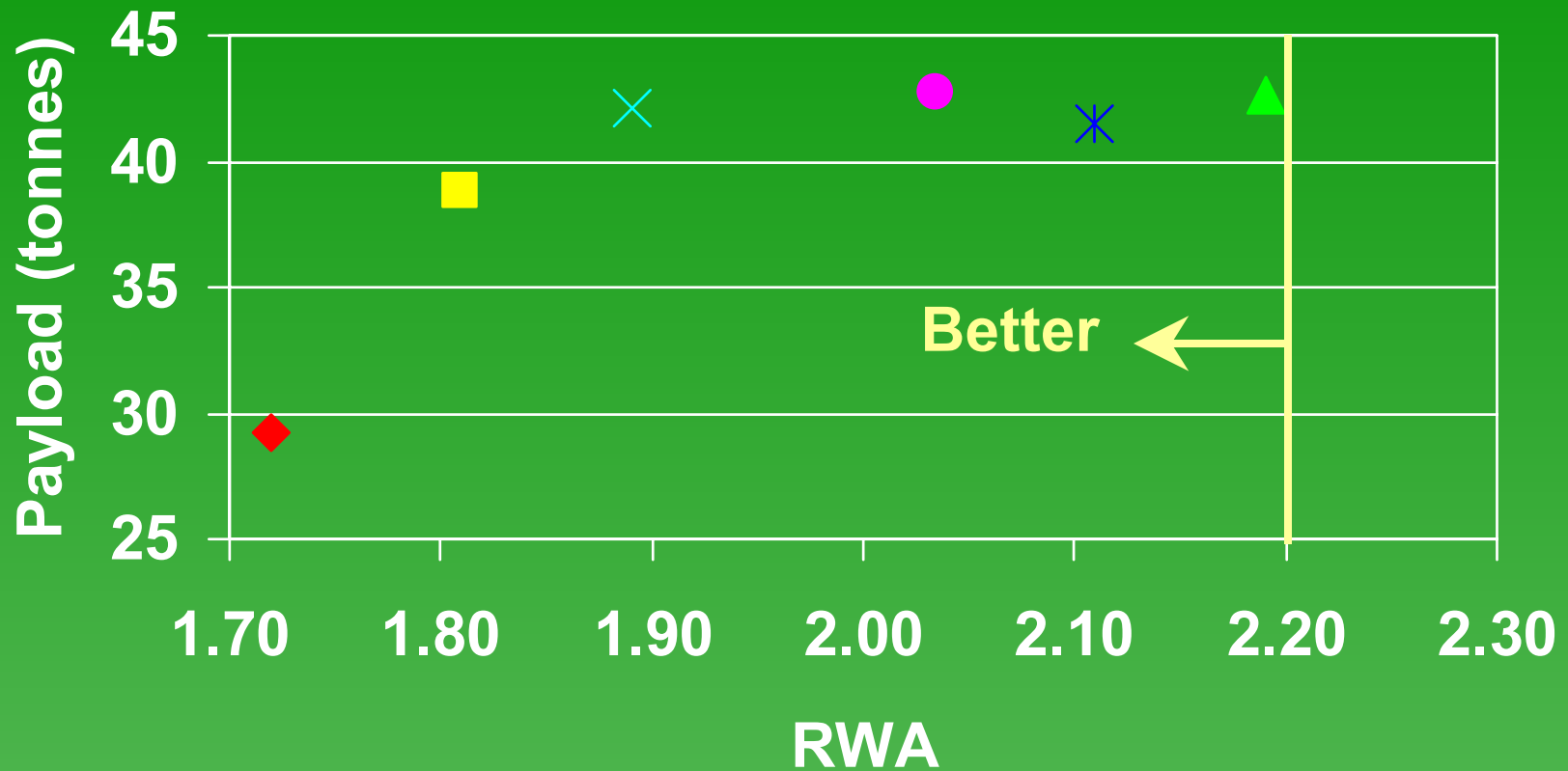
# Static Rollover Threshold



◆ 5 Axle ■ TRI/TRI ▲ TAJ × QUAD \* DDOG ● TA/JP/TR



# Rearward Amplification



◆ 5 Axle ■ TRI/TRI ▲ TAJ × QUAD \* DDOG ● TA/JP/TR



# Load Transfer Ratio



◆ 5 Axle ■ TRI/TRI ▲ TAJ × QUAD × DDOG ● TA/JP/TR



**B-Train trials begin in Alberta: 1995 / 96**



# Use with pole trailers approved in Alberta - 1996





**Use with pole trailers approved  
in BC – October 1997**















**Verification of  
5<sup>th</sup> wheel  
offset limits**



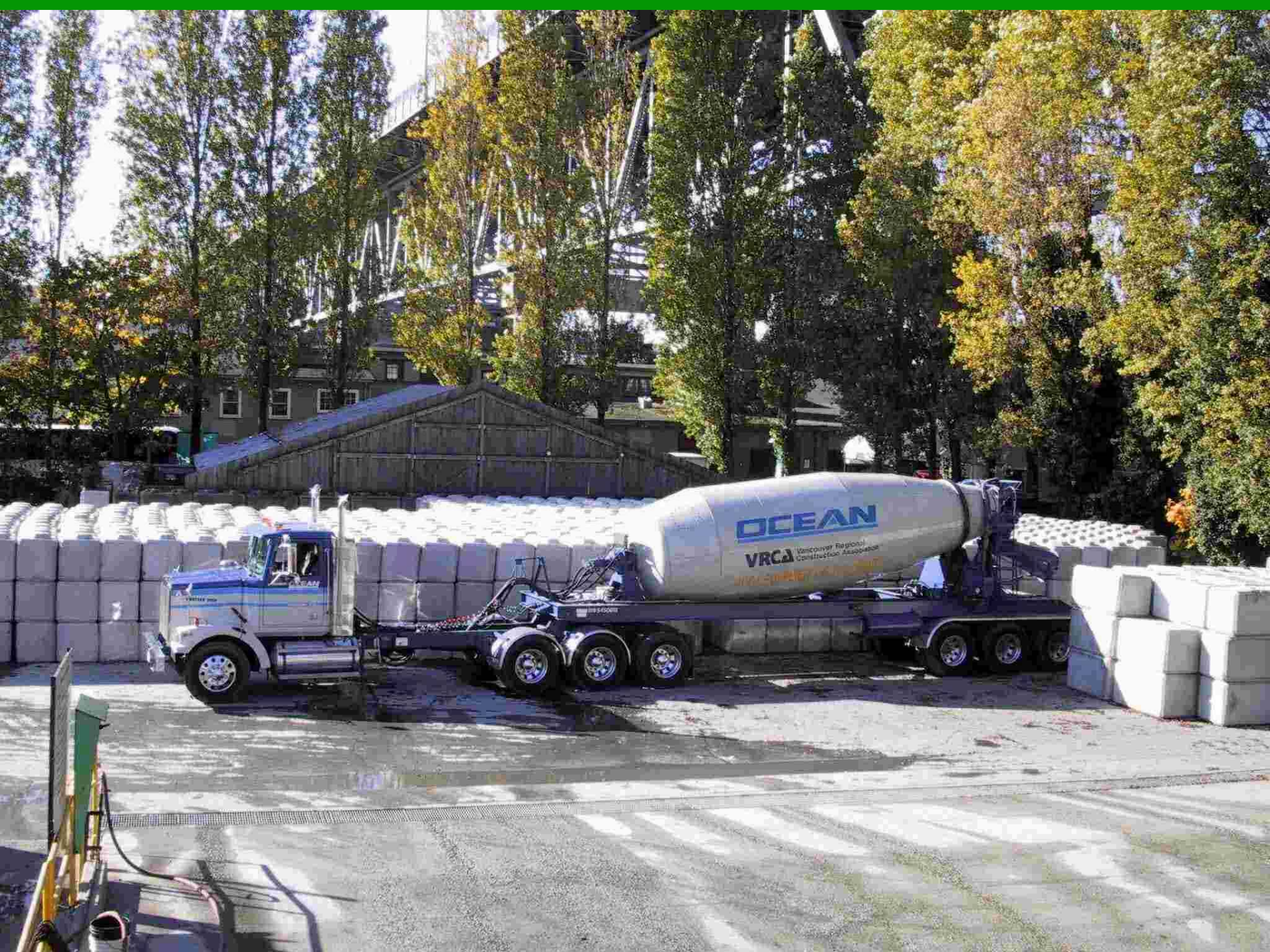






















*Pile*

*Base*

9174-06

*The*

*End*