“Rolling it Together”

A Summary of Road Friendly Technologies and Low Impact Vehicles

Brian Spreen, President

TPC International

23 June, 2010

Seminar on Low Impact Vehicles and Tyre Pressure Control

Perth Racecourse

Perth, Perthshire, Scotland, UK

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TIREBOSS™

Tire Pressure Control

Total Tyre Pressure Control at your fingertips!

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TPC International Profile

- Edmonton, Alberta, Canada based company
- In business since 1996
- Principles involved with technology since 1990 with a combined experience in TPCS of over 35 years.
- TIREBOSS is 3rd Generation TPCS – introduced in 2001
- Support & Service are key strengths
- Supplying TPCS into Scotland since 2006

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Outline

- Summary of Variable Tyre Pressure (VTP) principles and primary benefits
- Tyre Company Views on TPCS
- TIREBOSS overview
- Demonstrated Results
- Going Forward – expanding the benefits
- Implementation strategies and available Cost Benefit Tools

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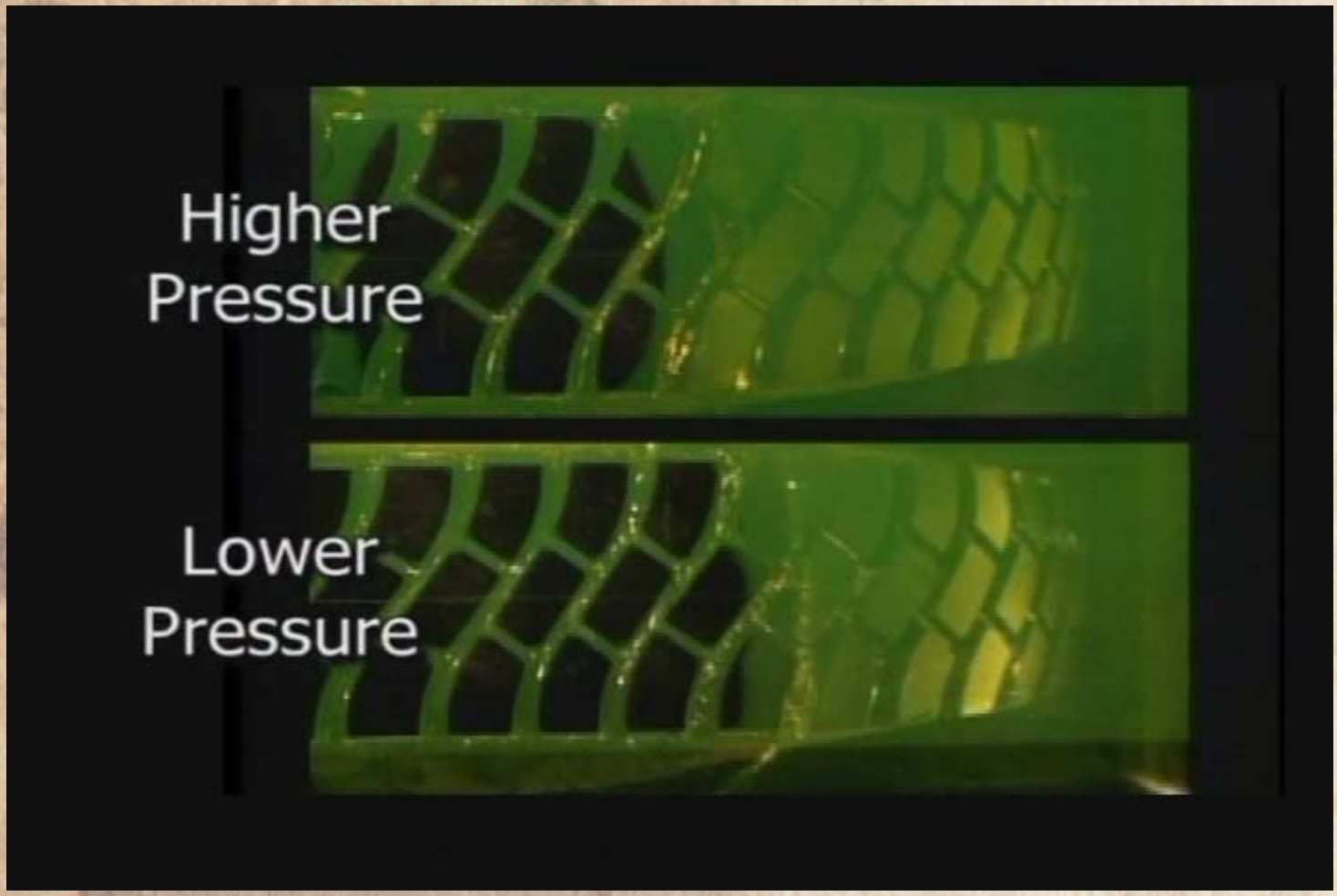
HOW IT WORKS



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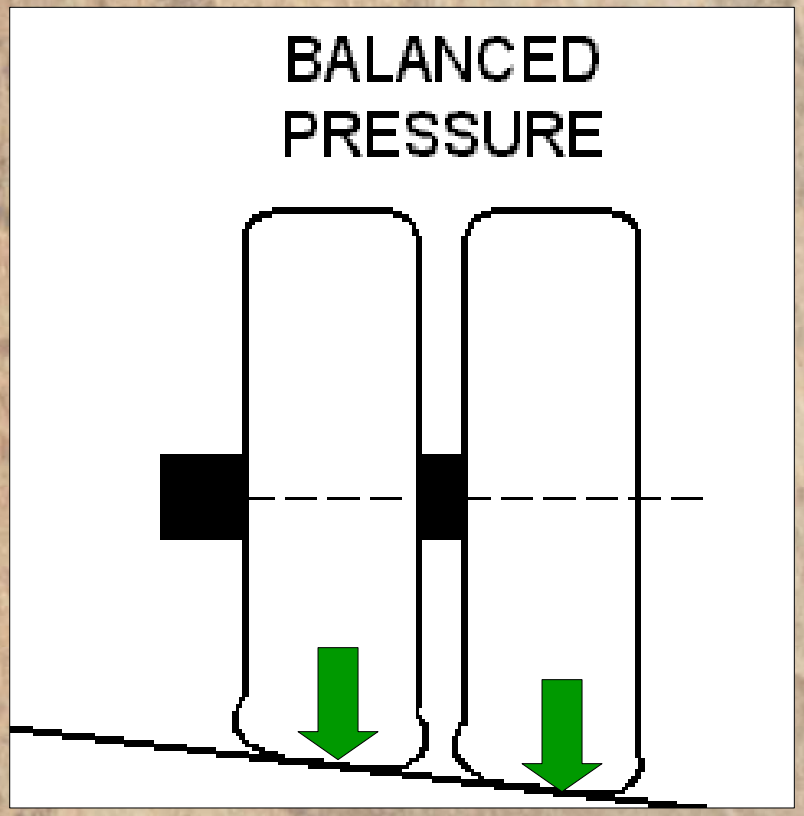
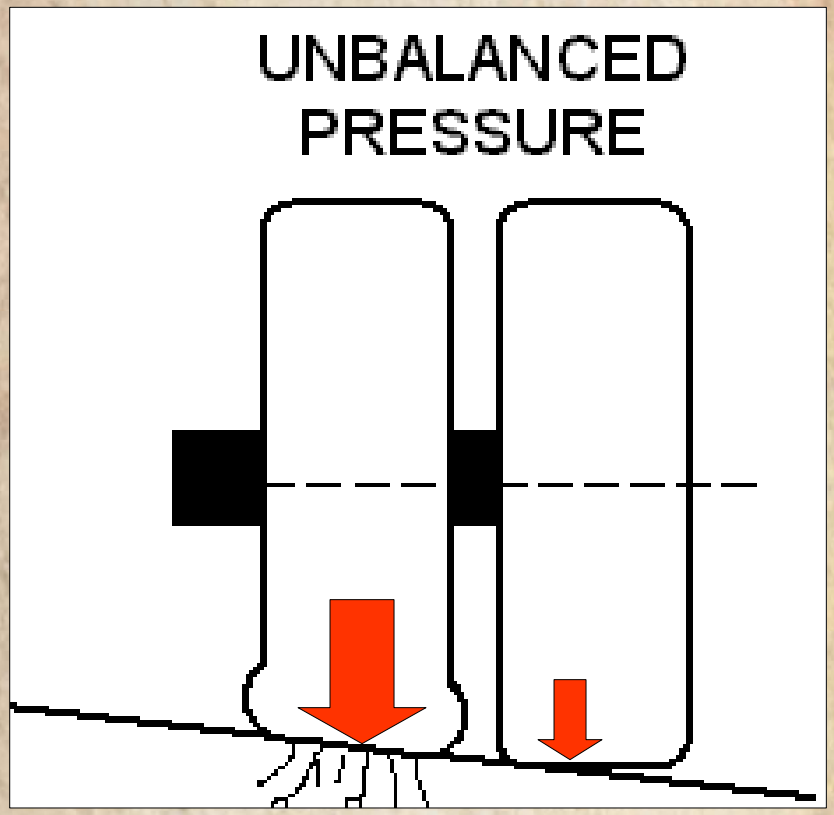
Balanced Tire Pressure



Equal loading



Unequal loading

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Tyres at high pressure
are
over-inflated when:
-the vehicle is empty,
or
- loaded at slow speeds.

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And???

This over-inflation is a major cause of road, tyre and vehicle damage.

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Benefits

Lowering the tyre pressure results in:

- Increased traction and mobility
- Superior performance in soft ground
- Reduction in assist vehicles
- Reduced soil compaction
- Smoother ride – less vibration
- Increased tyre life and ability to regroove
- Reduced vehicle maintenance costs

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What do Tyre Company's say about varying tyre pressures

- In support of TPCS systems that incorporate standard criteria for tyre inflations
- Tyres are designed to run warm
- TPCS systems must allow for normal heat build up
- Tyre pressures are matched to load & speed
- TPCS systems should have method for auto inflate if speed is exceeded for the selected pressure/load

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Approvals

MICHELIN®
BFGOODRICH.
UNIROYAL.

2540, BOUL. DANIEL-JOHNSON, LAVAL, QUÉ. H7T 2T9
TÉL.: (514) 978-4700 FAX: (514) 978-7600

February 23, 2000

RECEIVED

Mr. Norm Burns. Trucking Specialist
Operation Support Branch
Saskatchewan Highways & Transportation
1855 Victoria Ave. 9th Floor
Regina, Saskatchewan.
S4P 3V5

Dear Mr. Burns,

Further to our conversation of the 25th of January on the Saskatchewan Wheat Pool pilot project for grain transportation, we are pleased to confirm the inflation pressure requested in the new chart supplied to us by you in your note dated December 22nd 1999.

You will find below the table representing different PSI recommendation for the different settings in your application.

SELECTED SETTING	STEER AXLE	DRIVE AXLE	TRAILER AXLE	MAXIMUM SPEED	MAXIMUM TIME
Highway Loaded	100 psi	90 psi	85 psi	Normal Highway Speed	No Limit
Highway Unloaded	100 psi	45 psi	40 psi	Normal Highway Speed	No Limit
Off-Highway Loaded	100 psi	60 psi	50 psi	80 Kph.	No Limit
Off-Highway Unloaded	100 psi	30 psi	30 psi	80 Kph.	No Limit
2nd Function Local Access Road	100 psi	50 psi	40 psi	65 Kph.	No Limit
2nd Function Emergency Traction	100 psi	30 psi	40 psi	10 Kph.	5 Minutes

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What is TIREBOSS?

A computerized Tyre Pressure Control System that allows a driver to monitor and adjust tyre pressures to match his load and speed, while in motion.

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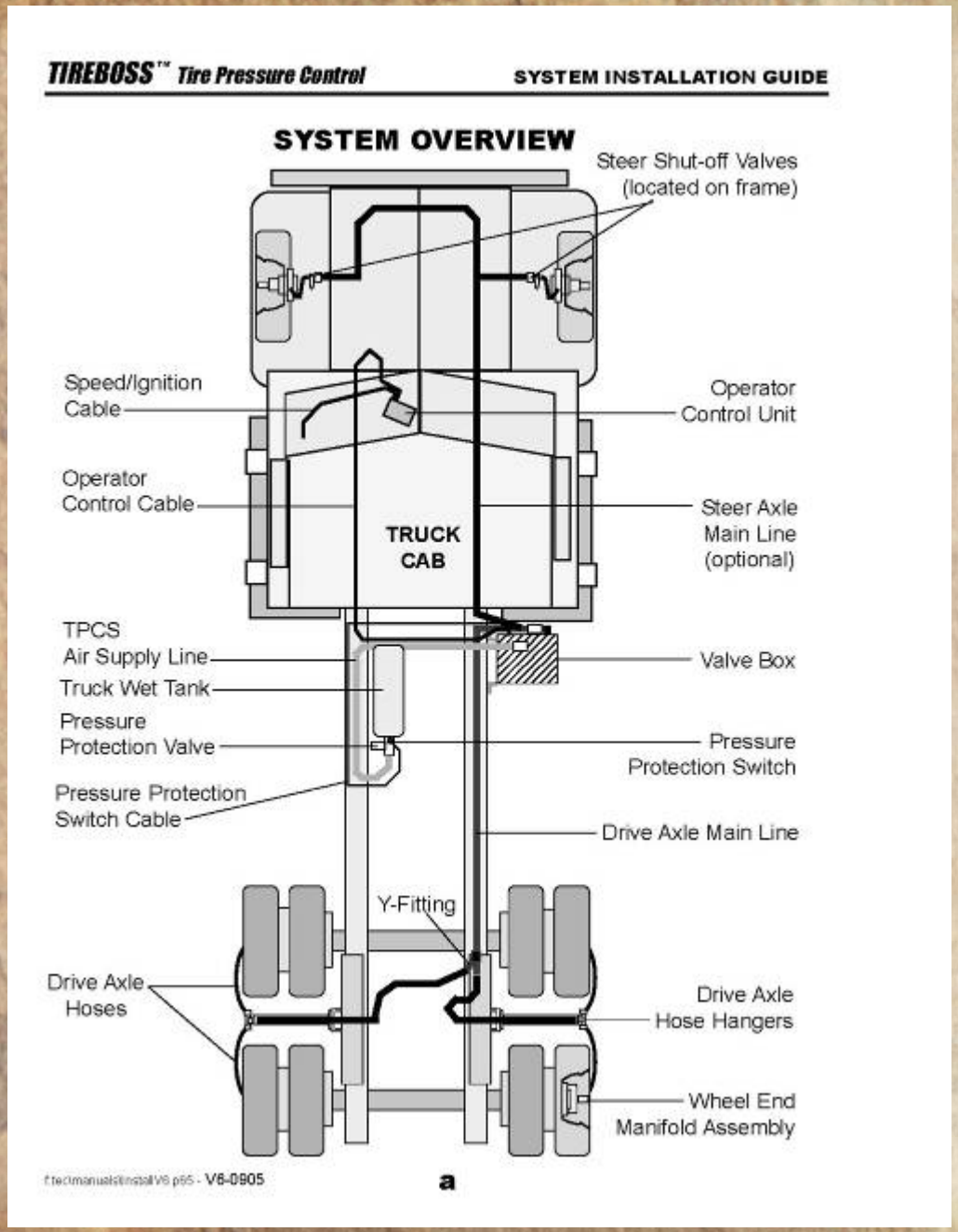

TIREBOSS Overview

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Controller

- The “brain” of the TIREBOSS system and its operator interface
- Displays visual & audible alerts
- Pre-programmed to match your specific application and configuration
- Provides operational warnings

Driver only makes simple selections and the control automatically does the rest

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Example Settings

Company: James Jones & Sons — *TIREBOSS™ Tyre Pressure Control*

SETTING #	SETTING DESCRIPTION	Steer PSI	Drive PSI	Trailer PSI	MAX Mph	MAX TIME
1	Highway Empty		65	65	none	NO LIMIT
2	Off-Highway Empty		60	60	50	NO LIMIT
3	Push Road Loaded		45	65	20	NO LIMIT
4	Secondary Loaded		65	85	30	NO LIMIT
5	Main Line Loaded		70	100	50	NO LIMIT
6	Highway Loaded		80	130	none	NO LIMIT
7	Emergency Traction		35	65	05	5 MIN
8	Tractor Only-Bobtail		50	130	none	NO LIMIT

6 x 2 & Trl with maxi tyres

APP-5

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Can set for simple operation

e.g. 2 Settings Only

Company:	Concrete Industry	*TIREBOSS* ™ *Tire Pressure Control*				
SETTING #	SETTING DESCRIPTION	Steer PSI	Drive PSI	Trailer PSI	MAX Mph	MAX TIME
1	Highway	100	95		none	NO LIMIT
2	On Site	60	30		10	NO LIMIT

Redimix 2

Can supply in other languages

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TIREBOSS Wet Tank & Priority System

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Valve Control Assembly

- All controls in one location
- Sealed box protects components
- Air supply to/from tyres at this one location
- Designed for extreme heat and cold

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Valve Control Assembly

- Reliable components
- Self-diagnostic
- Easily serviced
- Tyre fill ports on side
- Load sensing option
- Heaters come on automatically in cold temperatures

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Drive Axle Hardware is Practical & User Friendly

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External Hardware Proven Durable

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Severe Conditions

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Non Driven Steer Axle

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Trailer Axle

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Serviced by just about anyone!

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TIREBOSS Safety Features

- Vehicle air brake system always has priority with 2 stage protection system
- Speed monitoring is standard - auto inflate if speed exceeded for selected tyre pressure
- Loss of tyre pressure alerts driver immediately
- Allows normal heat build up in tires
- Tyre overheat alert
- Air flow restriction alert
- Load sensing option for air suspension vehicles

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TIREBOSS Features

- Retrofit system - adaptable to all vehicles and axle types
- Constant monitoring and control of tyre pressures - up to 130 psi
- Continuous inflation - fast build up times
- Interface capability with vehicle data loggers
- Easily transferred when vehicle replaced
- Several OEM’s offer preparation options for TIREBOSS systems

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New Wheel End Valves

- One WEV for each tyre
- Prevents total loss of tyre pressure
- Shut off taps included for easy servicing
- Will adapt to all existing wheel kits
- Currently in field trials

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Dual Tires with WEV

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Demonstrated Results

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Tyre LIFE DOCUMENTED

- **ON-HIGHWAY** application recorded 20% increase in tyre life. (Federated Co-op, Saskatchewan)
- **Moderate ON/OFF-HIGHWAY** application recorded 40% increase in tyre life. (FERIC Star Truck Project, Gaspse, Quebec)
- **Severe ON/OFF-HIGHWAY** application recorded a 100% increase in tyre life. (FERIC, Lumby BC)

The worse the conditions, the greater the benefit

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SST in US Logging
Weyerhaeuser – Louisiana

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Weyerhaeuser Goals to Achieve with SST

- Reduce mud tracking on paved roads
- Reduce rutting and improve roads
- Reduce weight – increased payload
- Optimize performance with TPCS

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Results with SST & TPCS

- Mud tracking reduced
- Reduced rutting and healing of roads
- Average mobility and traction – performed better than trucks w/o TPCS
- Trucks with twin tyres on drives and TPCS had better mobility and traction than SST with TPCS in this application
- Eventually switched back to twin tyres on drives with TPCS

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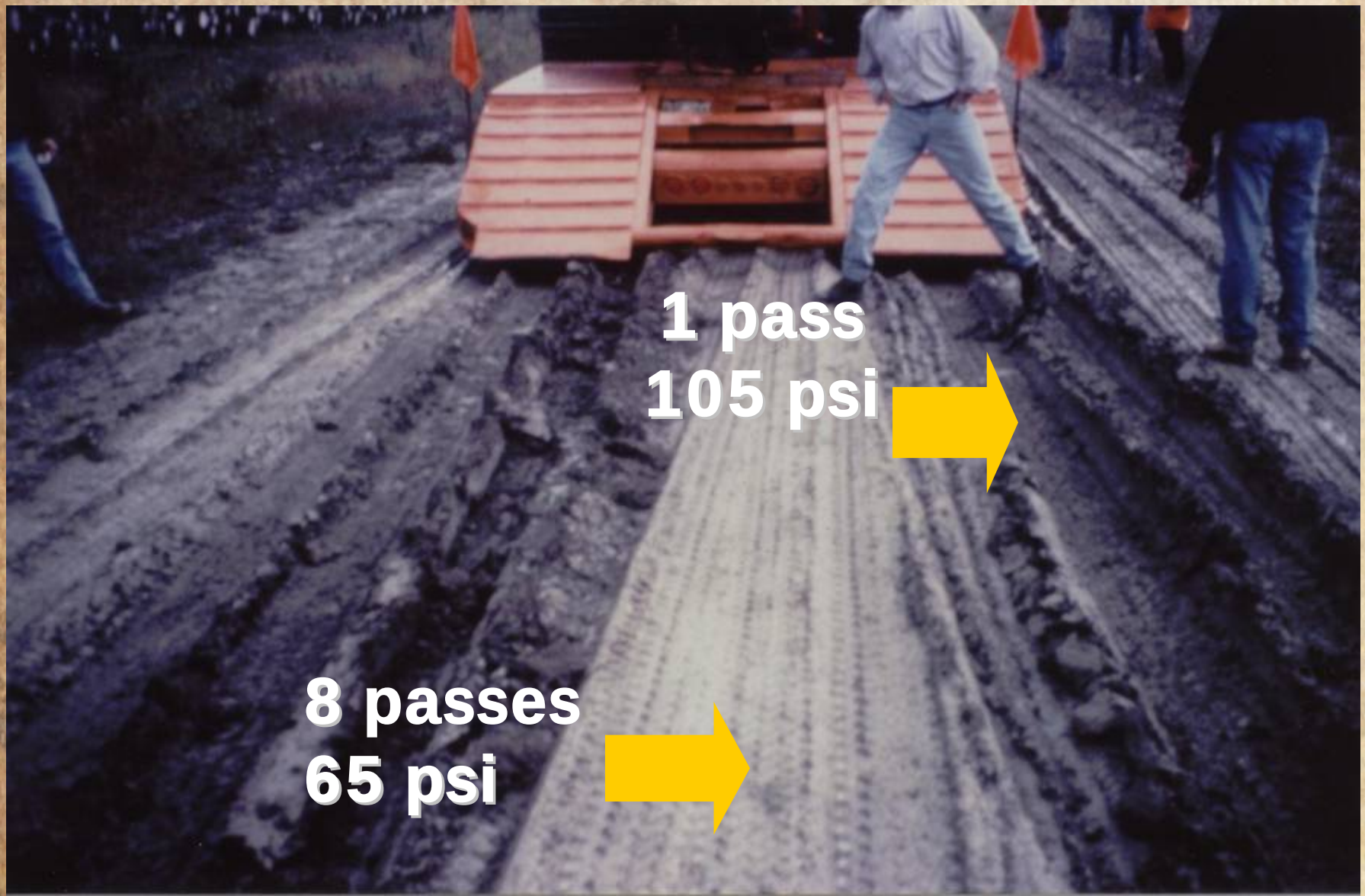
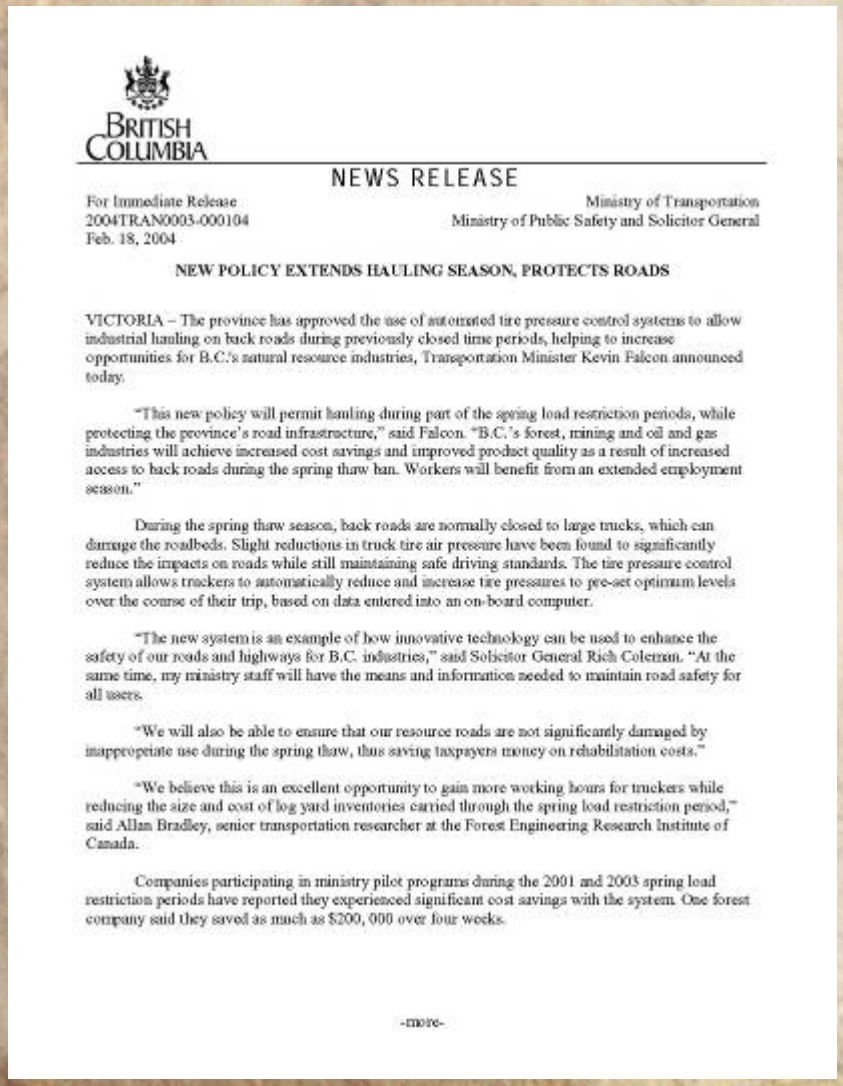
Demonstrated Results



BC Government Approval of use of TPCS on Banned Roads



BRITISH COLUMBIA

NEWS RELEASE

For Immediate Release
2004TRAN0003-000104
Feb. 18, 2004

Ministry of Transportation
Ministry of Public Safety and Solicitor General

NEW POLICY EXTENDS HAULING SEASON, PROTECTS ROADS

VICTORIA – The province has approved the use of automated tire pressure control systems to allow industrial hauling on back roads during previously closed time periods, helping to increase opportunities for B.C.'s natural resource industries, Transportation Minister Kevin Falcon announced today.

"This new policy will permit hauling during part of the spring load restriction periods, while protecting the province's road infrastructure," said Falcon. "B.C.'s forest, mining and oil and gas industries will achieve increased cost savings and improved product quality as a result of increased access to back roads during the spring thaw ban. Workers will benefit from an extended employment season."

During the spring thaw season, back roads are normally closed to large trucks, which can damage the roadbeds. Slight reductions in truck tire air pressure have been found to significantly reduce the impacts on roads while still maintaining safe driving standards. The tire pressure control system allows truckers to automatically reduce and increase tire pressures to pre-set optimum levels over the course of their trip, based on data entered into an on-board computer.

"The new system is an example of how innovative technology can be used to enhance the safety of our roads and highways for B.C. industries," said Solicitor General Rich Coleman. "At the same time, my ministry staff will have the means and information needed to maintain road safety for all users.

"We will also be able to ensure that our resource roads are not significantly damaged by inappropriate use during the spring thaw, thus saving taxpayers money on rehabilitation costs."

"We believe this is an excellent opportunity to gain more working hours for truckers while reducing the size and cost of log yard inventories carried through the spring load restriction period," said Allan Bradley, senior transportation researcher at the Forest Engineering Research Institute of Canada.

Companies participating in ministry pilot programs during the 2001 and 2003 spring load restriction periods have reported they experienced significant cost savings with the system. One forest company said they saved as much as $200, 000 over four weeks.

-more-

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Log Haul in BC Canada

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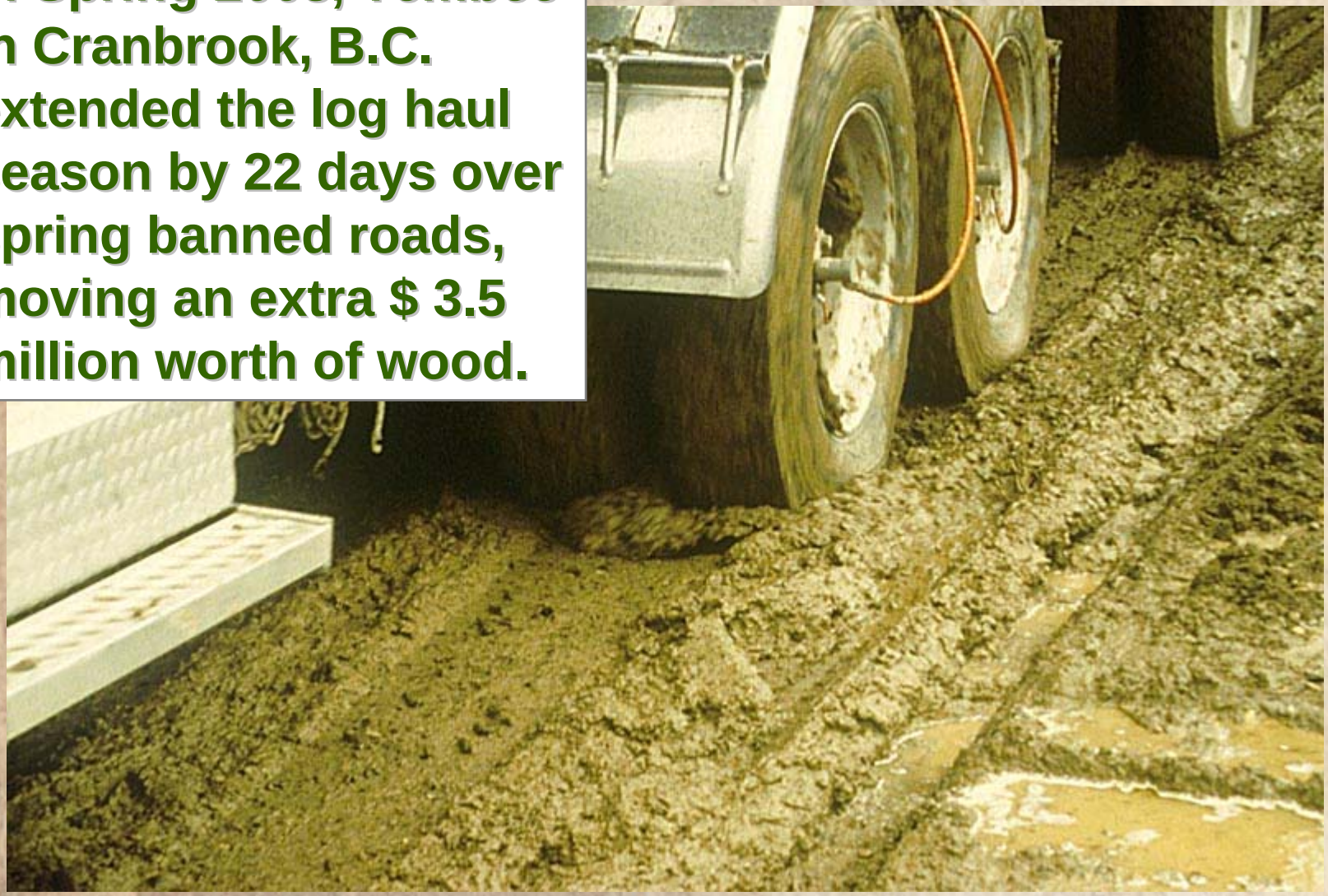
In Spring 2003, Tembec in Cranbrook, B.C. extended the log haul season by 22 days over spring banned roads, moving an extra $ 3.5 million worth of wood.



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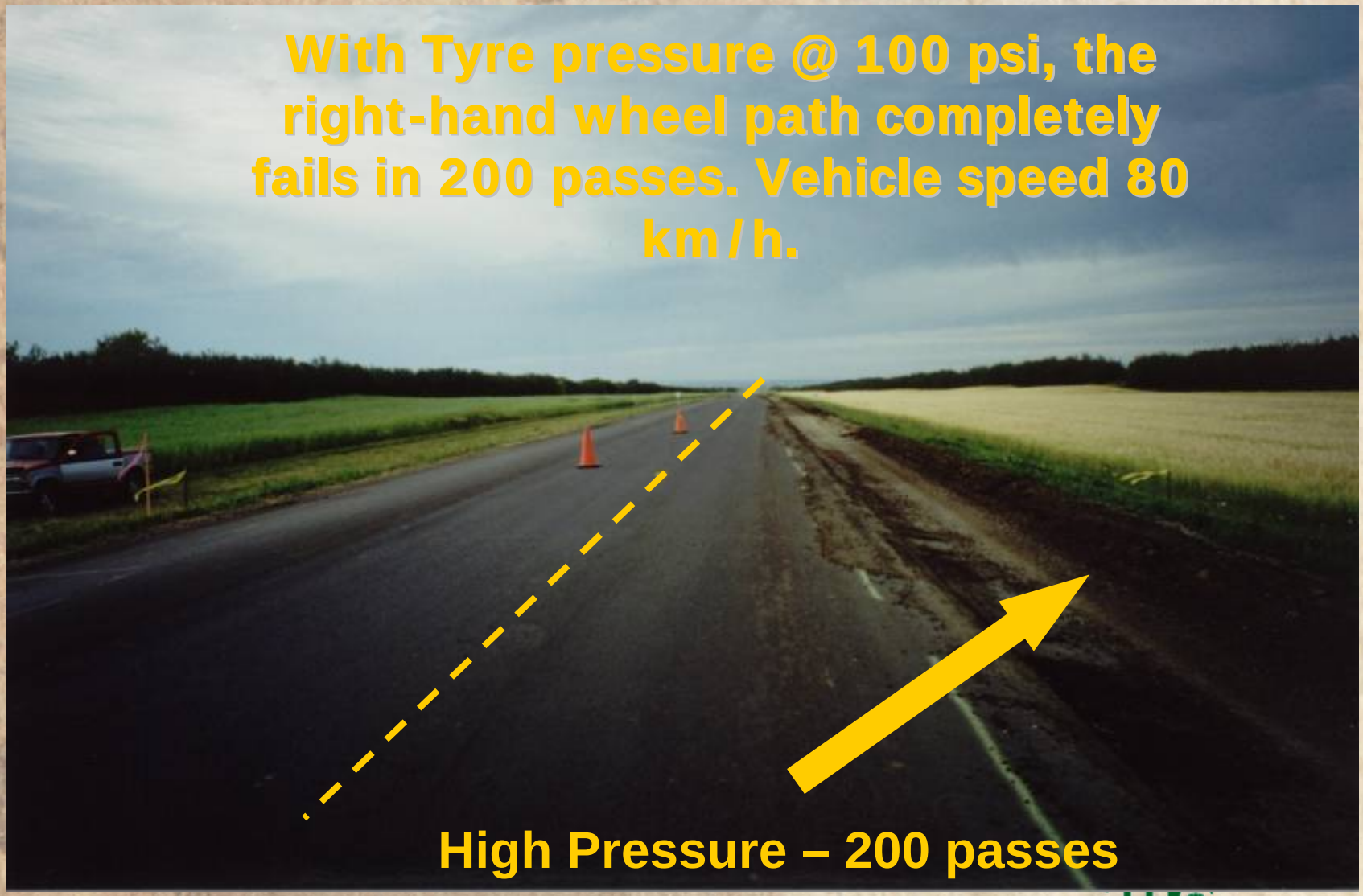
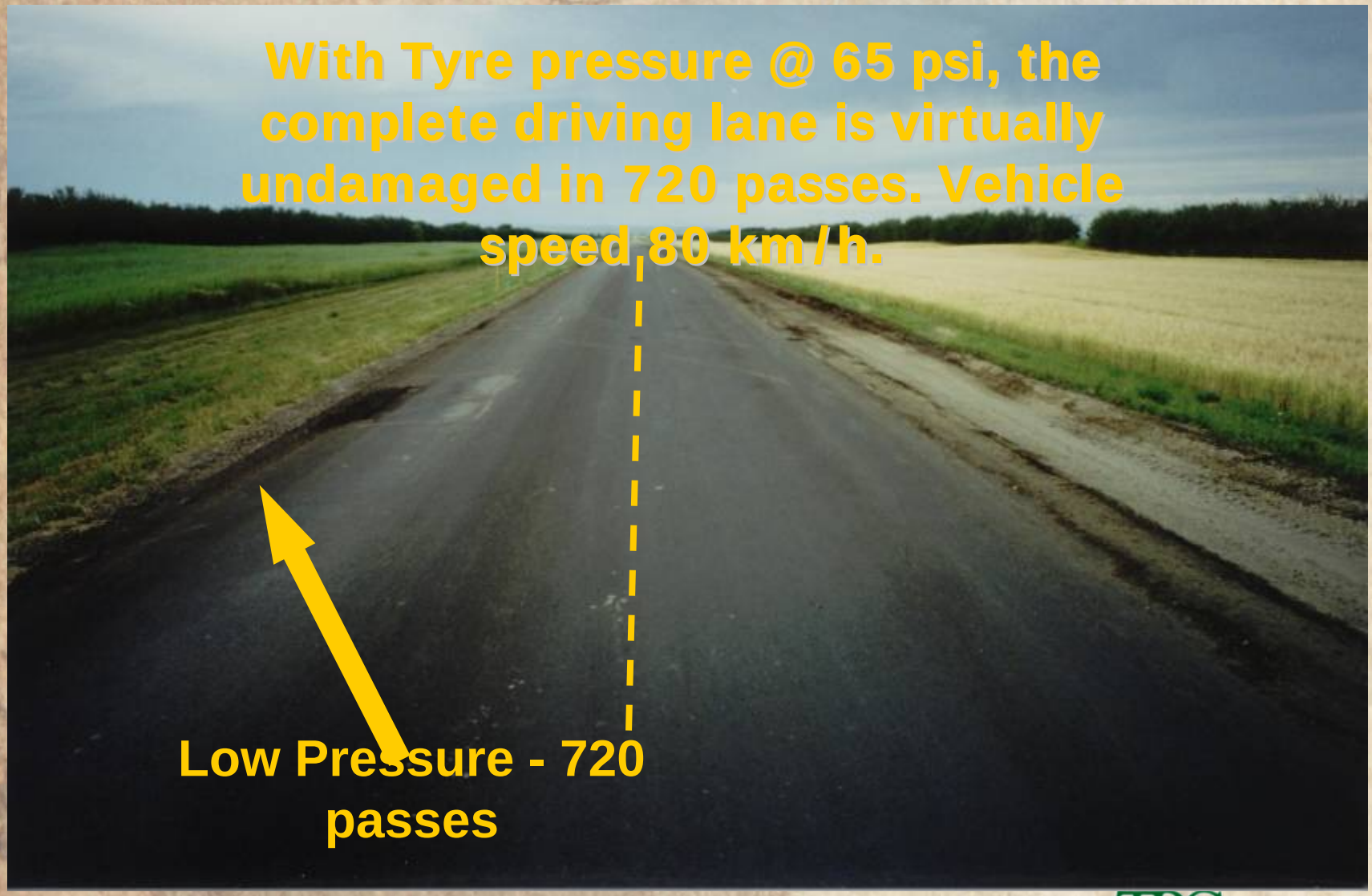
Demonstrated Results



Demonstrated Results



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Improved Ride

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GOING FORWARD

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Changing Vehicle Configurations

- **Various Changes can include:**
  - 6 x 2 (with lift axle) instead of 6 x 4
  - Less aggressive tyres – longer life
  - Lighter chassis and trailer components
  - Lower HP engines

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TPCS provides opportunities for vehicle changes

- Reduced weight – more payload
- Improved fuel economy
- Lower capital cost on truck components
- Lower maintenance costs – less damage to drive train components, fewer cracks and body related damage = longer vehicle life

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Swedish Experience with 6 x 2

- Kälarne (steer, drive, trailer system):

"Much better traction with 6 x 2 with TIREBOSS than a 6 x 4 without"

- Bjälverud (steer, drive, trailer system):

"More payload at the same time as better traction"

- Backan (rear drives only, on 6 x 2):

"Cheaper truck, more payload and very good traction. I am very satisfied"

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Going Forward in Sweden

- SCA forest company are now expanding the use of TPCS to other applications
- Requiring TPCS on equipment haulers, gravel trucks and other service vehicles
- Only TPCS vehicles are allowed on secondary forest roads
- New roads being built with less surface material

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Implementation Strategies are key to success

- All stakeholders can benefit:
  - vehicle owners/ contractors/ drivers
  - forestry companies
  - traveling public and road regulators
- It is important that all groups work together toward a positive implementation
- Strategies and tools have been created to assist with successful implementation

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Operational Savings Analysis Program

TIREBOSS Tire Pressure Control Systems - Operational Savings Analysis

TIREBOSS Savings Estimated For: ABC Logging
Date: March 15, 2006
Contact: Joe Trucker
Truck Configuration: 8 axle B-Train
Trucks to be Equipped with TIREBOSS: 1

TIREBOSS-related savings from increased truck use		Go to Increased Hours
Anticipated increase in annual operating hours per TIREBOSS-equipped truck		120 Hours
Increase in net annual revenue due to haul season extension	$	3,066

TIREBOSS-related fuel savings		Go to Fuel Savings
Total fuel savings per year for each of your TIREBOSS-equipped trucks	$	6,204

TIREBOSS-related savings from increased truck use		Go to Increased Hours
Anticipated increase in annual operating hours per TIREBOSS-equipped truck		120 Hours
Increase in net annual revenue due to haul season extension	$	3,066

For more information, please contact Tire Pressure Control International Ltd. Toll free 1-888-338-3587 website: www.TIREBOSS.com

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Operational Savings Analysis Program

Do Tire Pressure Control Systems (TPCS) make sense for your log hauling operation? Find out with the new tool for estimating economic benefits from TPCS

Brian Spreen, Tire Pressure Control International

1. Why this tool?

TPCS-related benefits are numerous and diverse. Truck owners considering investing in this technology need to estimate these benefits to make an informed decision.

2. Program components

- TIREBOSS TPCS cost estimate
- Tire related savings
- Traction related savings
- Fuel consumption savings
- Increased operating hours calculation
- Payback period calculation
- Internal Rate of Return calculation
- References for default values
- Savings summary

3. Program inputs

- General information about vehicle and hauling operations
- The program offers default % improvements with TPCS (based on published research) that may be used in lieu of specific data

4. Program outputs

- Estimated cost of TPCS
- Estimated annual benefit of operating TPCS
- Estimated investment payback period and internal rate of return
- Tool available in C$, US$, GBP and Euro

5. Sample results from an actual TPCS fleet in Canada

ABC Logging, is a Western Canadian logging company that operates a fleet of 8 axle B- train logging trucks.

Installed cost for 1 truck-trailer with TIREBOSS = **C$ 22,550**

Total annual vehicle operational savings = **C$ 14,476**

Payback Period = **1.6 years**

IRR on TPCS Investment = **31%**

Road Related Savings Program

Estimated road-related savings from utilising TPCS timber haulage trucks

(adapted from the USDA Forest Service Surfacing Thickness Program)

Prepared for UK Forest Industry

last update: 18-Oct-07

	defaults		user specified values	
Reduction in aggregate thickness with TPCS	25%			
Reduction in aggregate surfacing wear with TPCS	25%			
Reduction in grading frequency with TPCS	75%			
Other Savings				
Increase in haul rate for TPCS-equipped trucks	£ 30.00	per trip		per trip

Savings summary and details

Estimated savings in aggregate base course	£90,000
Estimated savings in road surfacing replacement	£32,400
Estimated savings in grading maintenance	£29,250
Estimated savings in hauling	-£36,000
Total savings with TPCS	**£115,650**

Many Diverse Applications

“Rolling it Together”

Special Congratulations to James Jones and Sons for being awarded the very prestigious “2010 Scottish Environmental Haulier of the Year” award

This award was mainly due to their investment inTPCS on their lorries

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Thanks for your attention