



# MICHELIN TRACK CONNECT



# MICHELIN TRACK CONNECT

**FIRST CONNECTED OFFER IN THE MARKET**

**SUPPORT OUR CONSUMERS DURING ALL THEIR DRIVING SESSIONS**



**DURING**



**BEFORE**

**AFTER**

# ***CEMA MONTAÑA CIRCUIT***



# CONSUMER CENTRICITY TO ANSWER REAL EXPECTATIONS

## ORIGIN

*"I could pay to rent the services on a tyre engineer when I go on track!"*



*"The accuracy of our manometer is not good. I note a huge gap between mine and the one of my team mate !"*

*"I check the temperature of my tires with a infrared thermometer. It's more for fun rather than for a real usage."*

*"I never know what's the right pressure when I go on track, I think I have to deflate my tires, right?"*



*"Difficult to know why, but I trully think that my car behaviour change during a track session..."*

*Hard to know during the run if tires are in the right (pressure) operating window*

*"I have to stop several times to check and adjust my pressure . It takes a lot of time and I'm not really confident"*

# **MICHELIN**

# **TRACK CONNECT**

## **BENEFITS:**

- **MORE DRIVING PLEASURE AND MORE SAFETY  
DUE TO TYRES MANAGEMENT DELEGATION**
- **MORE PERFORMANCE AND BETTER LAP TIME  
THANKS TO TYRE PRESSURE OPTIMIZATION**
- **MORE LAPS WITH THE SAME SET OF TYRES  
DUE TO BALANCE OPTIMIZATION**

**→ LET OUR CONSUMERS BECOME  
THE BEST DRIVER THEY CAN BE**

# ***LEVERAGING THE POWER OF DATA***

## ***INTERNAL BENEFITS***

- ***BETTER KNOWLEDGE OF  
REAL USAGES***

➔ ***SHARPEST TIRES' SPECIFICATIONS***

- ***CUSTOMER RELATIONSHIP  
MANAGEMENT:***

➔ ***NEW TOUCH POINTS ON MOST POPULAR TRACK***

- ***PRODUCT PLAN/SIZE LINE UP***

➔ ***MOST REQUESTED SIZES***

## ***CUSTOMER BENEFITS***

***SERVICES TAILOR MADE FOR EACH  
USER***

➔ ***PERSONAL COACHING***

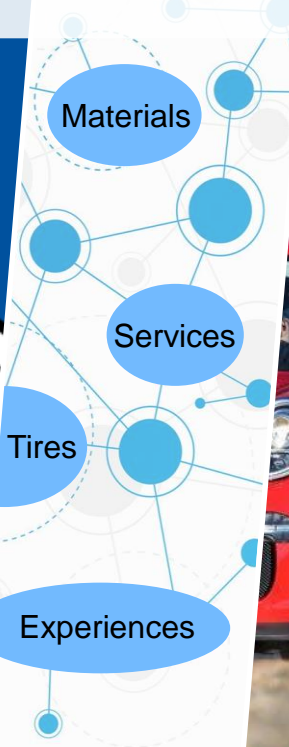


# THANK YOU!



Investor Day in Almeria – April 04, 2019

# Mining business: innovative products to respond customers' productivity need







# INNOVATIVE PRODUCTS DRIVE PRODUCTIVITY



# A long-standing commitment to innovation



Michelin creates the biggest tire for the biggest truck ever built : 59/80R63

**1999**



Launch of MICHELIN® XDR®2

**2011**



Launch of MICHELIN® XDR®3

**2016**



Launch of MICHELIN® XDR®3 EXTRA LOAD

**1995**

Michelin creates the first 63" tires, allowing a new category of truck



**2000**

MEMS: First TPMS for mining

Launch of MICHELIN® XDR®: more tire life



**2015**

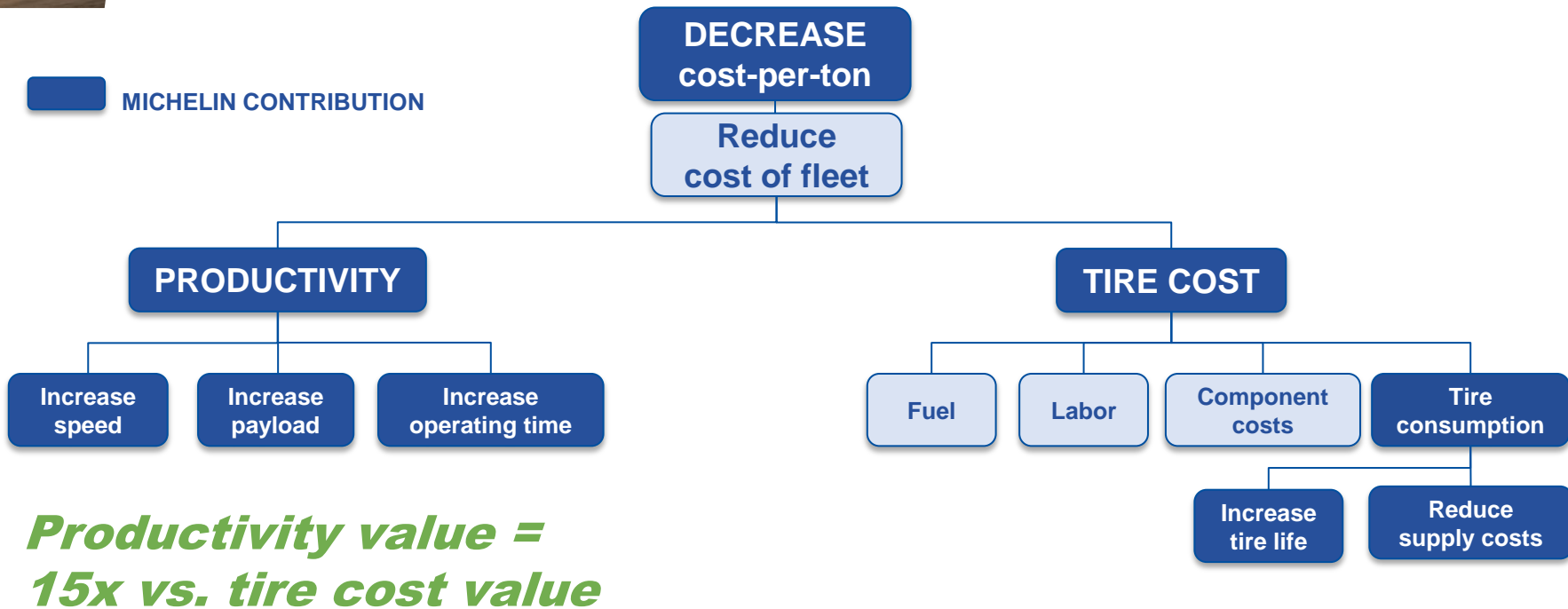
Launch of MICHELIN® XDR®250: the most productive E4 tire for RTD250st



**2018**



# Productivity is the strongest value driver



***Productivity value = 15x vs. tire cost value***



## MICHELIN® XDR®250 delivers on speed...



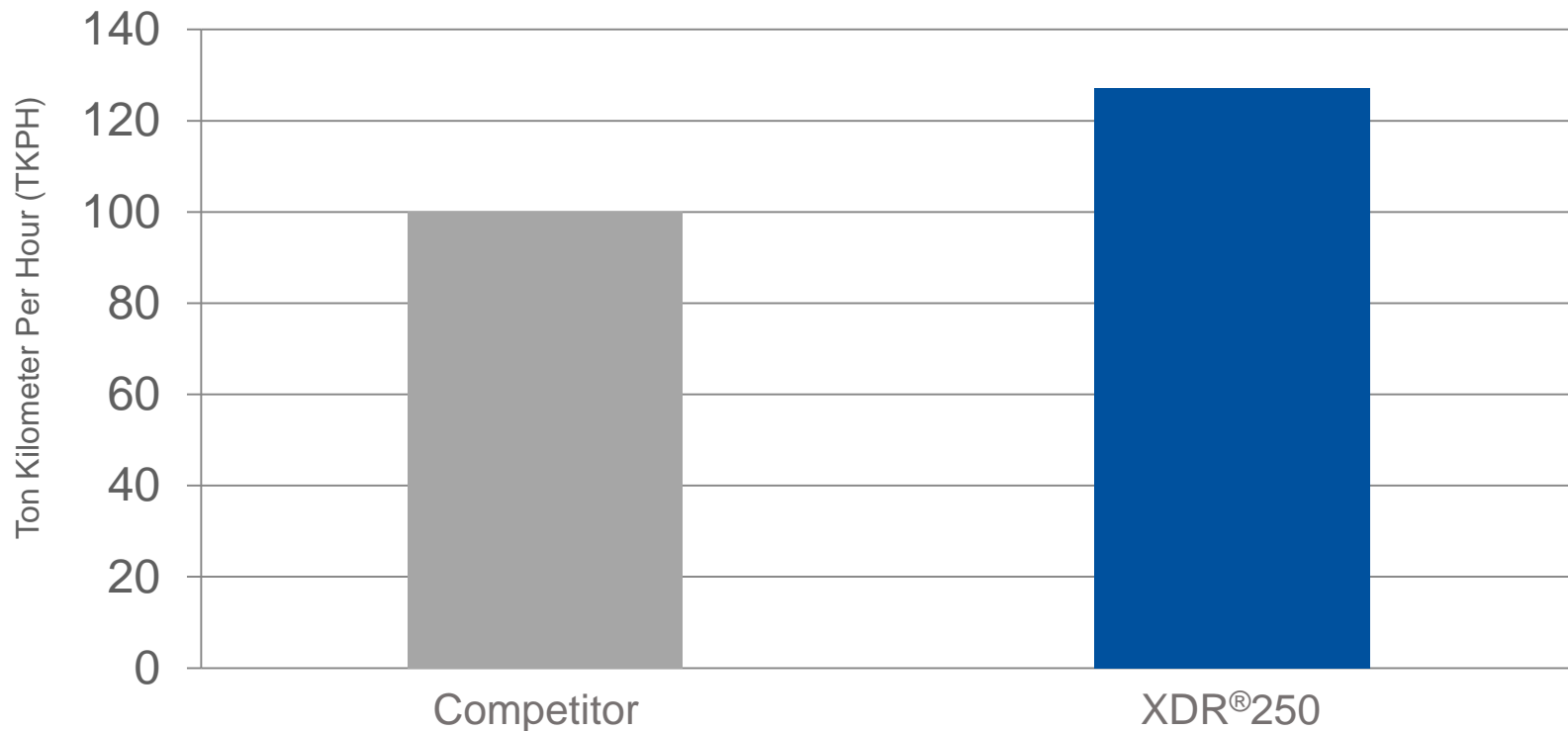
# 25% <sup>(1)</sup>

More productive with  
no trade-off on tire life

<sup>(1)</sup> Compared to BRIDGESTONE 46/90 R 57 VRDP and VRPS. Data gathered from 2012 BS databook.  
And compared to MICHELIN 40.00 R 57 XDR2



## ... And the most productive 57-Inch offer in the marketplace





# MICHELIN® XDR® 3 53/80R63 EXTRA LOAD delivers on payload...



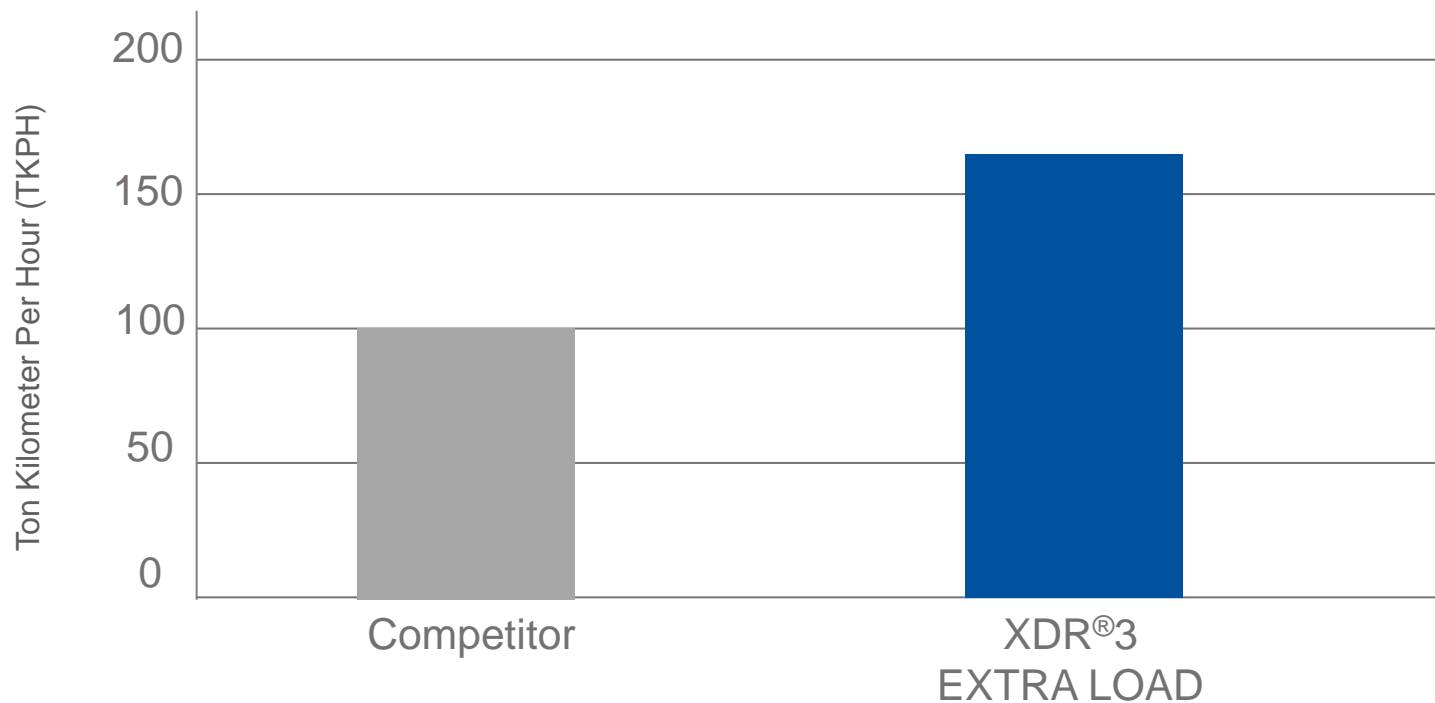
# 12.6%<sup>(1)</sup>

More load on the  
KOMATSU 930-E4

<sup>1</sup> Based on comparisons of maximum load capacity of the MICHELIN® XDR® 3 Extra Load to the MICHELIN® XDR® 3, size 53 80 R 63, as set forth in the 2018 Michelin Data Book, taking as a reference the technical data of the Komatsu 930-E4 truck. Actual results may vary, and may be impacted by many factors, to include road conditions, weather, environment, driving habits, tire size, equipment and maintenance.

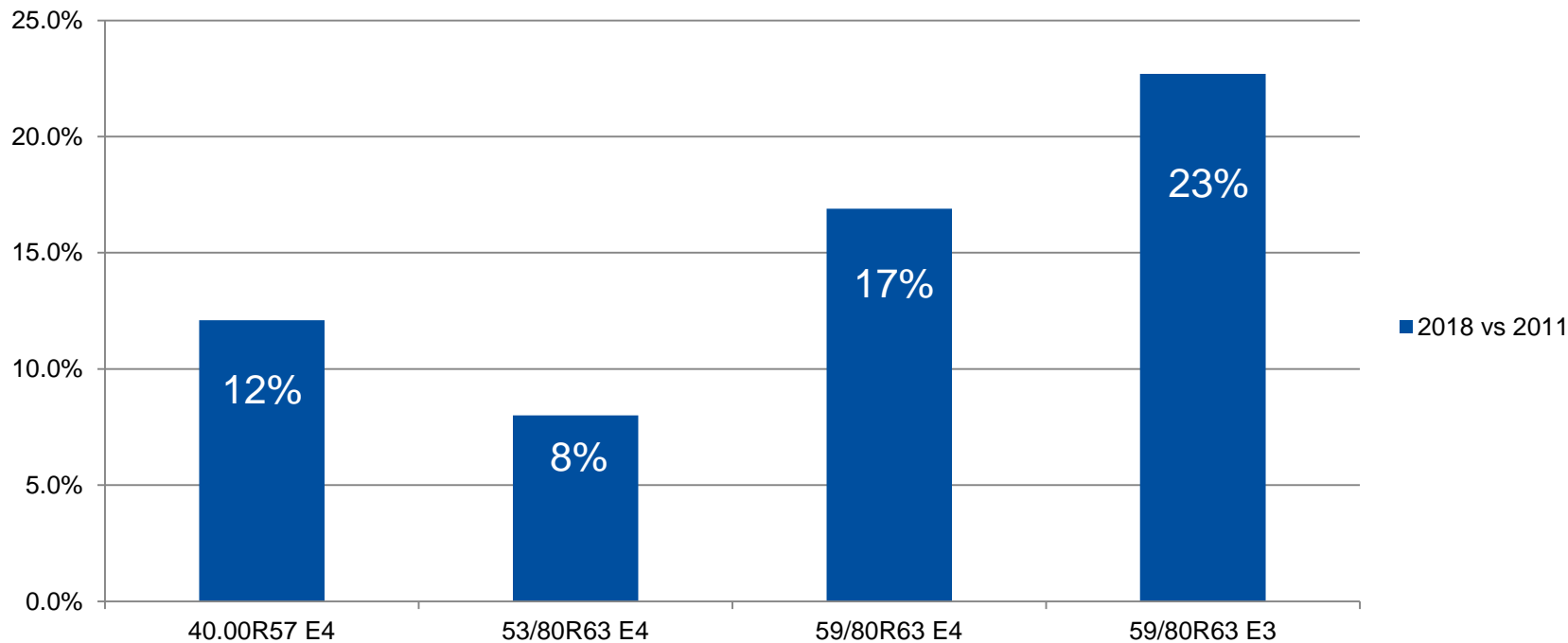


## ... And the most productive 63-Inch offer in the marketplace





## While improving tire life - 2018 vs 2011







# Tire productivity directly impacts our customers' bottom lines



EFFECTIVE UTILIZATION

**+30%**

**\$390M (USD)**



PAYLOAD

**+8%**

**\$100M (USD)**



SPEED

**+10%**

**\$120M (USD)**

ANNUAL VALUE FOR A MINE WITH 100 ULTRA CLASS TRUCKS

# Sharing the value



## Price evolution

MICHELIN® XDR® 250

**>10%** vs. XDR®2 40.00R57

## Price evolution

MICHELIN® XDR®3 EXTRA LOAD

**>10%** vs. predecessor





# Our investment in the MICHELIN® XDR®3 Family



More than  
**6 YEARS**  
of development  
testing in the Michelin  
R&D Center



More than  
**20** patents filed



More than  
**40 MATERIALS**



More than  
**25 ENGINEERS**  
worked on this project

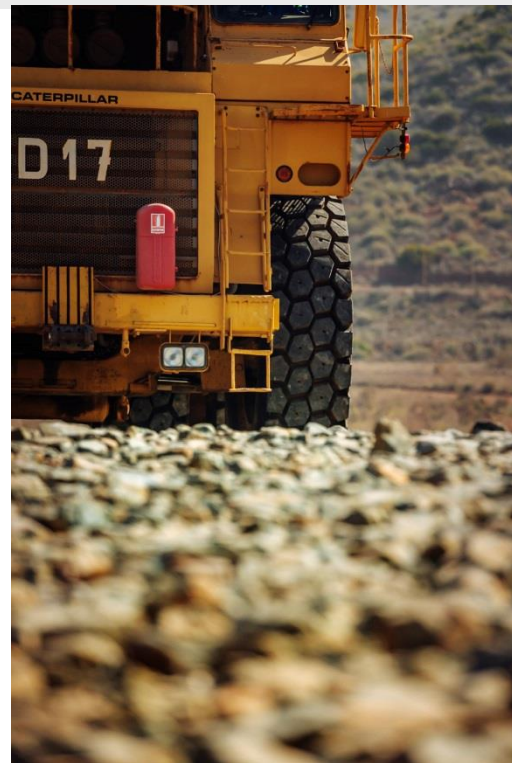


More than  
**25 MILLION KM** tested  
(625 times around the Earth)



## Why do we test tires?

- Sort innovative solutions to tighten the design loop
- Identify potential issues 10X faster than in the field
- Ensure safety of the tires before full application in the mines
- Validate performance claims to ensure faster go-to-market approach





# How do we test tires?

## On Track

- Real trucks and tires are critical
- Simulate real mine conditions (equipment, curves, slopes, rocks, etc.)



# One of the world's biggest mining trucks



STANDS **27 FEET**  
TALL

LIST PRICE  
**\$5,000,000** USD

CARRIES A **363-TON** LOAD  
(EQUIVALENT TO CARRYING  
72 ELEPHANTS)

TOP SPEED  
**65 KMPH**

**CATERPILLAR 797 IS EQUIPPED WITH  
MICHELIN 63" MINING TIRES**



**AND NOW FOR THE  
DEMO!**



Investor Day in Almeria – April 04, 2019

# Mining business: testing technologies and MEMS®4 demonstrations



Materials

Services

Tires

Experiences





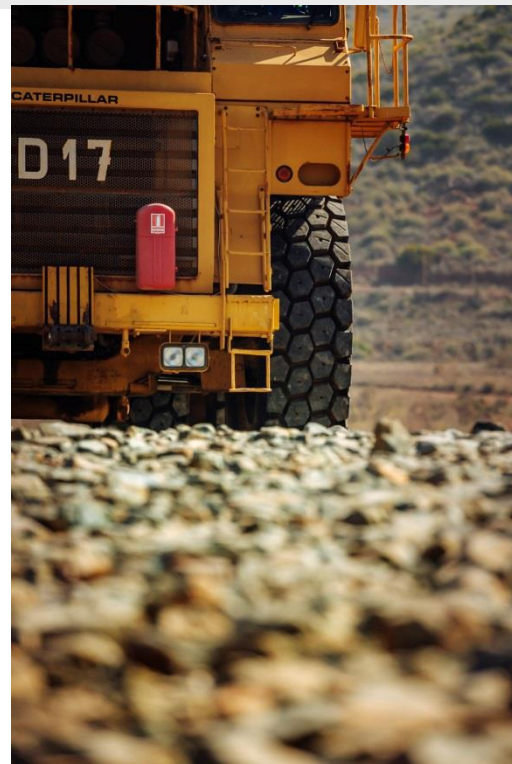


# TESTING TECHNOLOGY PRESENTATION



# Why do we test tires?

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## How do we test tires?

### By Machine

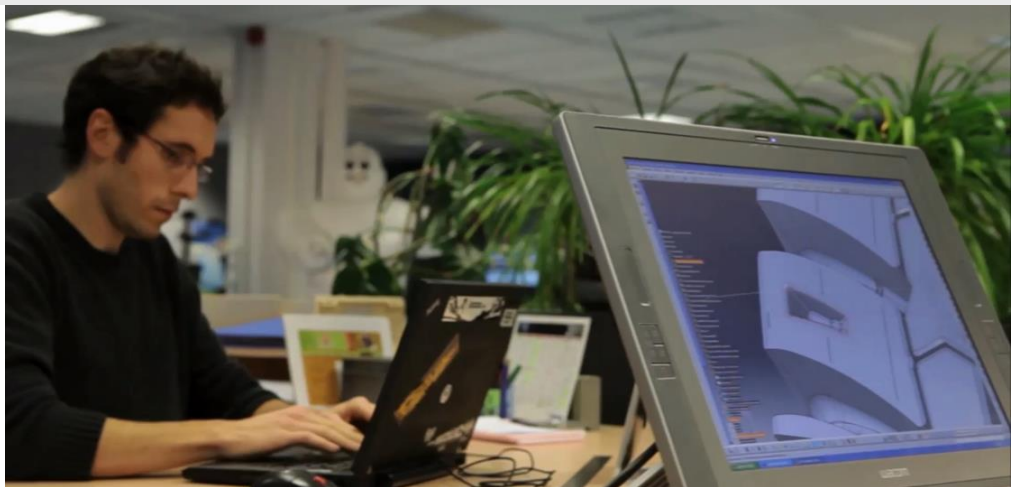
- Create the most aggressive conditions possible
- Exceeding limits of the vehicles





## Machine testing expands our research capabilities

- Test up to 63-inch tire
- Amplify bead/casing fatigue in a closed, controlled environment
- Focus on torque, endurance, tire life and thermal capacity – all critical to maximizing productivity of our customers
- Empowers us to be faster to the market





# TESTING TECHNOLOGY FILM AND DEMONSTRATION



# **MEMS®4, A COMPLETE MONITORING PLATFORM FOR TIRES AND SITE CONDITIONS**



# MEMS<sup>®</sup>4 benefits

LESS TIRE DAMAGES



REDUCED MAINTENANCE COSTS



**MEMS<sup>®</sup> KEY BENEFITS**

INCREASED TIRE LIFE



PRODUCTIVITY



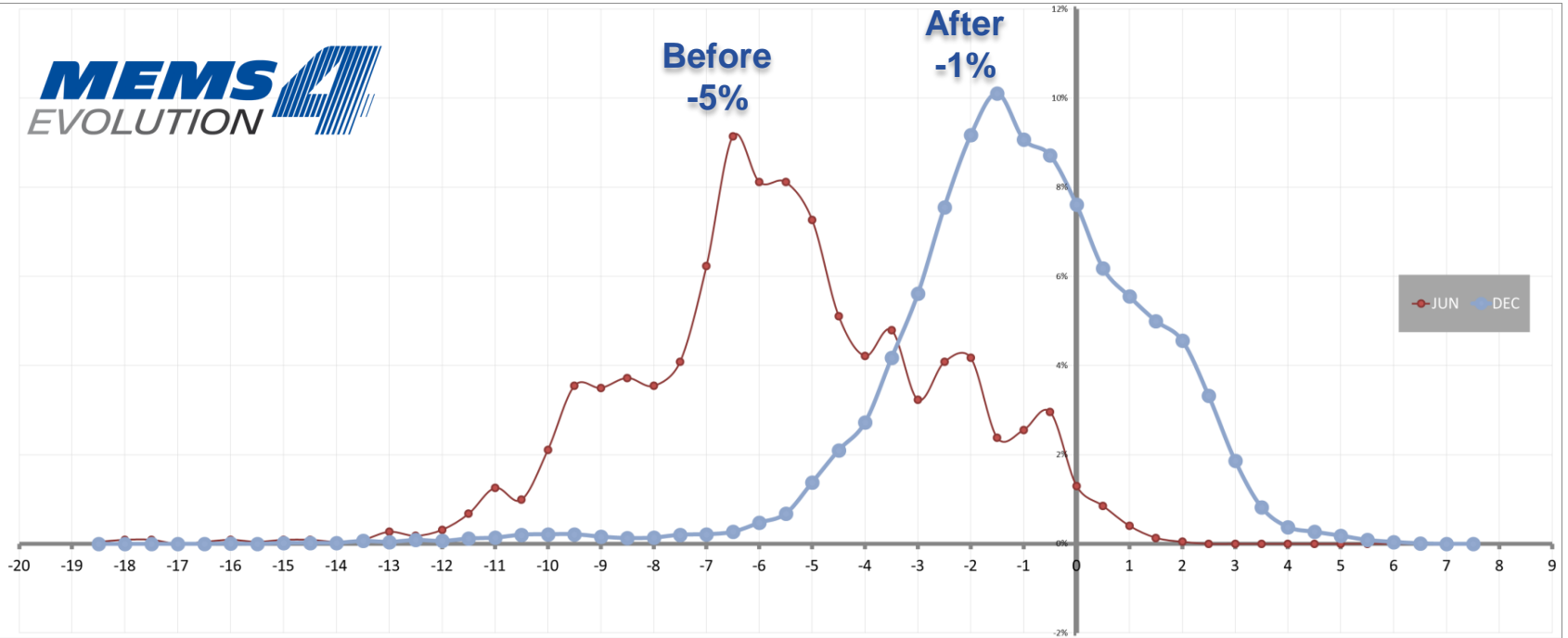


# Monitoring pressure improves tire life (ex. \$1.2M saved in mine with 121 trucks)

**MEMS**  
EVOLUTION

Before  
-5%

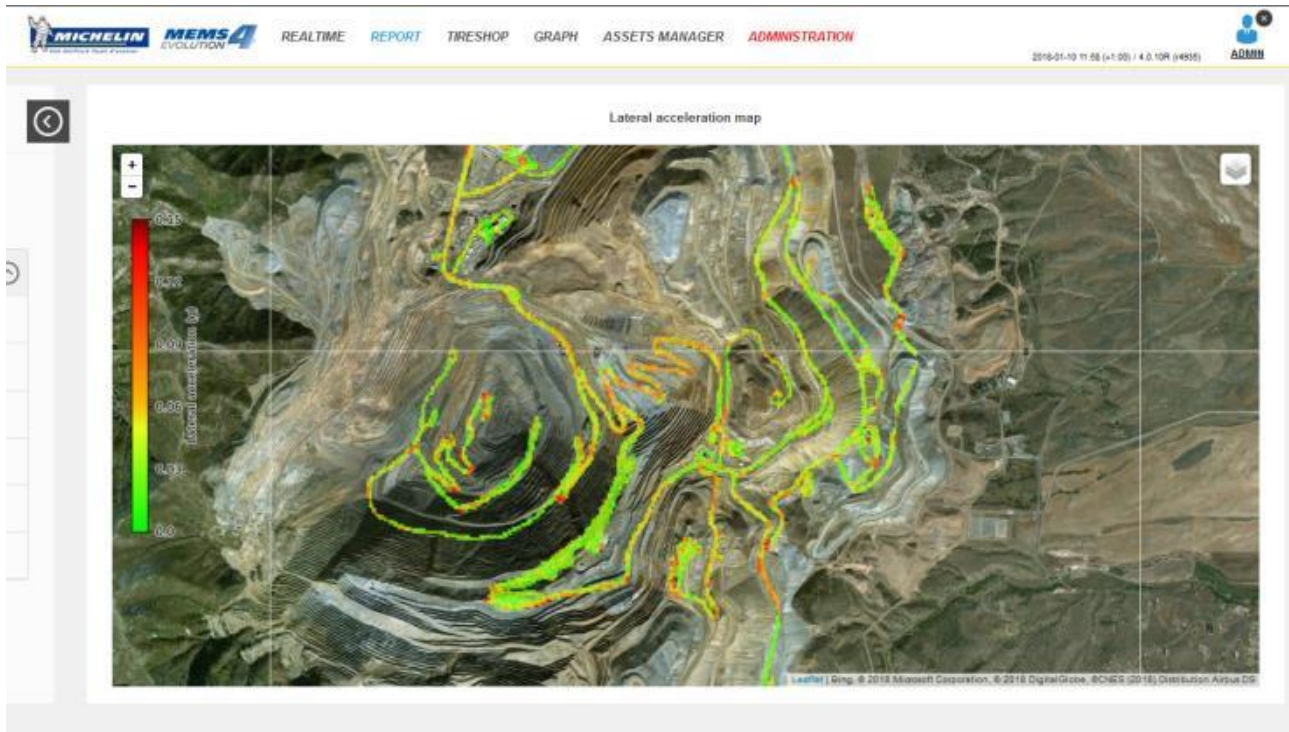
After  
-1%







# Monitoring site conditions reduces truck maintenance costs and tire damage



Position frequency map

Curve radius map

Speed map

Lateral acceleration map



# Monitoring peak temperature reduces tire damage

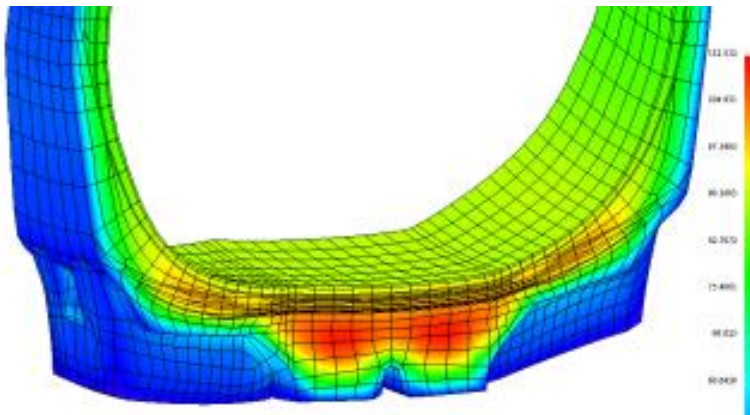
*TIRE TKPH*



*MAXI TIRE TEMPERATURE*



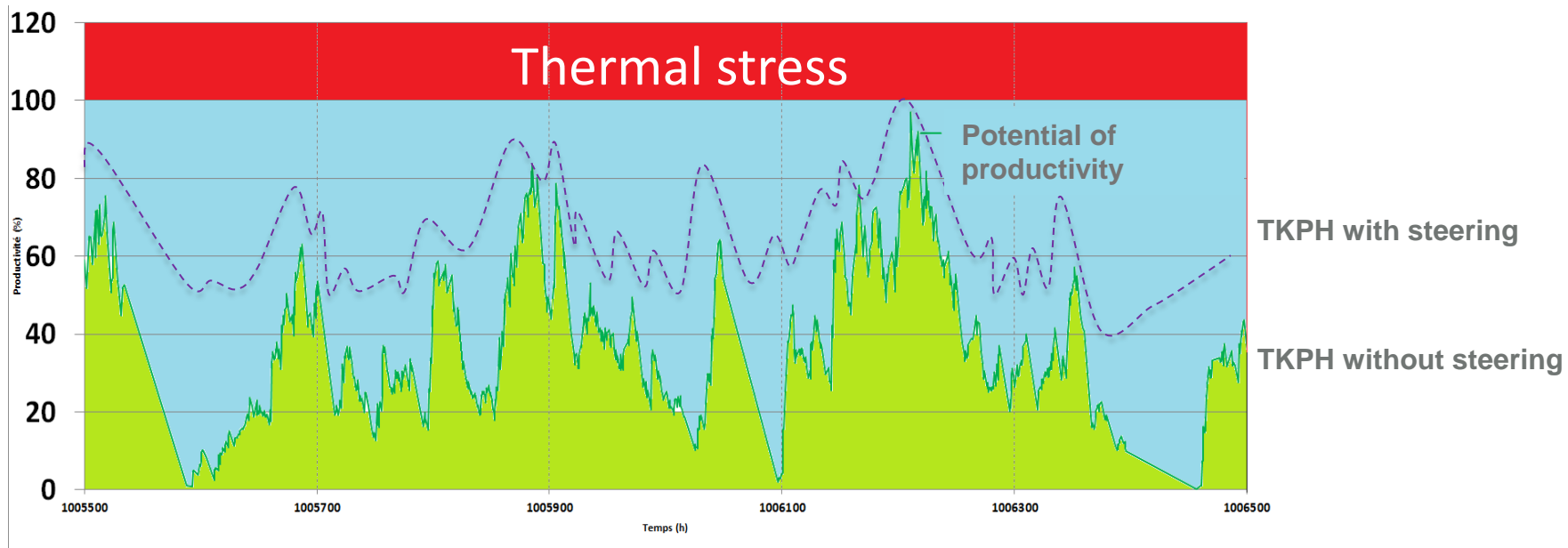
*TIRE LIMIT*



**MEMS**  
EVOLUTION



# Monitoring TKPH increases productivity





# MEMS<sup>®</sup>4, the most advanced monitoring system

	MEMS3	MEMS4	ITRACKII	TYRESENSE	BTAG (BRIDGESTONE)
P, T RT + Alert	✓	✓	✓	✓	✓
GPS + Alert		✓	✓	✓	
GPS + SSS map		✓	✓		
Smart Pressure		✓			
Reporting	✓	✓	✓	✓	✓
Interfaced FMS	✓	✓	✓	✓	✓
RFID Reader		✓	✓		
Liquid Sensor	✓	✓	<i>Limited</i>	✓	
Mobile Apps	✓	✓	✓	✓	



## Disclaimer

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## Contacts

**Edouard de PEUFEILHOX**  
**Matthieu DEWAVRIN**  
**Humbert de FEYDEAU**

**+33 (0)4 15 39 84 68**

27, cours de l'île Seguin  
92100 Boulogne-Billancourt – France

23, place des Carmes Dechaux  
63040 Clermont-Ferrand Cedex 9

*investor-relations@michelin.com*