

Long-lasting Asphalt Pavement Structures in Poland.  
Game Changer in Pavement Design.

# PERPETUAL PAVEMENTS

8th International Conference Asphalt Pavements  
11th May 2023, Opatija



**STRABAG**  
WORK ON PROGRESS

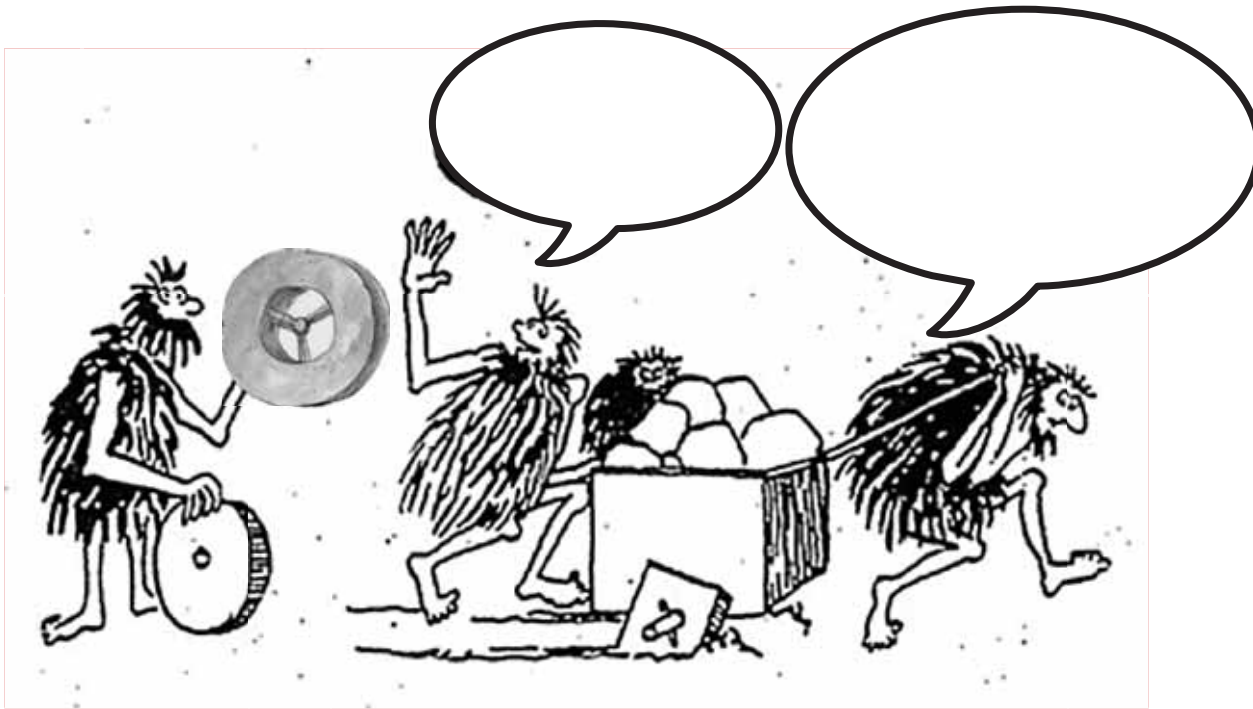


# DISCLAIMER

We do not want  
to re-invent the  
wheel!

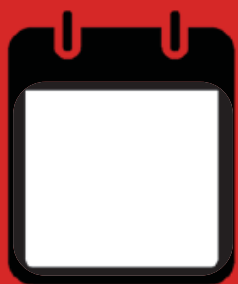


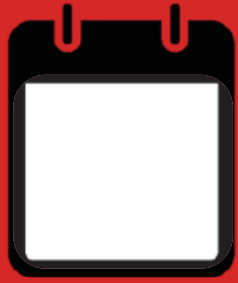
...we just want to put it where it belongs!

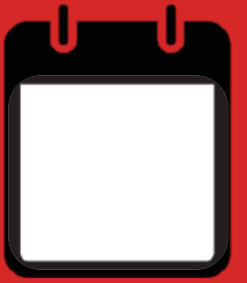




ON THE WAY  
TO SUSTAINABLE ROADS









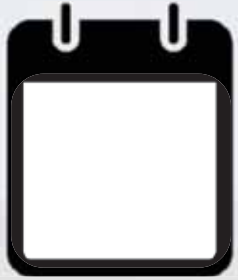


Perpetual pavement is „an asphalt pavement designed and built to last longer than 50 years without requiring major structural rehabilitation or reconstruction, and needing only periodic surface renewal (...)”

APA definitione (2001)



**TRADITIONAL  
ASPHALT  
PAVEMENT**



binder c. 8 cm  
AC 0/20 B-50

---

wearing c. 4 cm  
SMA 0/11 B-50

---

base c. 17 cm  
AC 0/25 B-50

---

115 kN  
ESALs

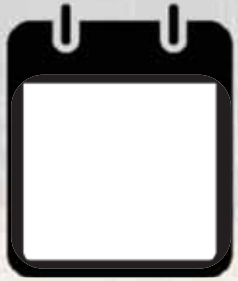






**HIGH  
STIFFNESS  
MODULUS AC  
„EME”**





9 cm  
AC 20 PMB

4 cm  
SMA 11 PMB

13 cm  
AC WMS 20  
„EME” 20/30

115 kN  
ESALs

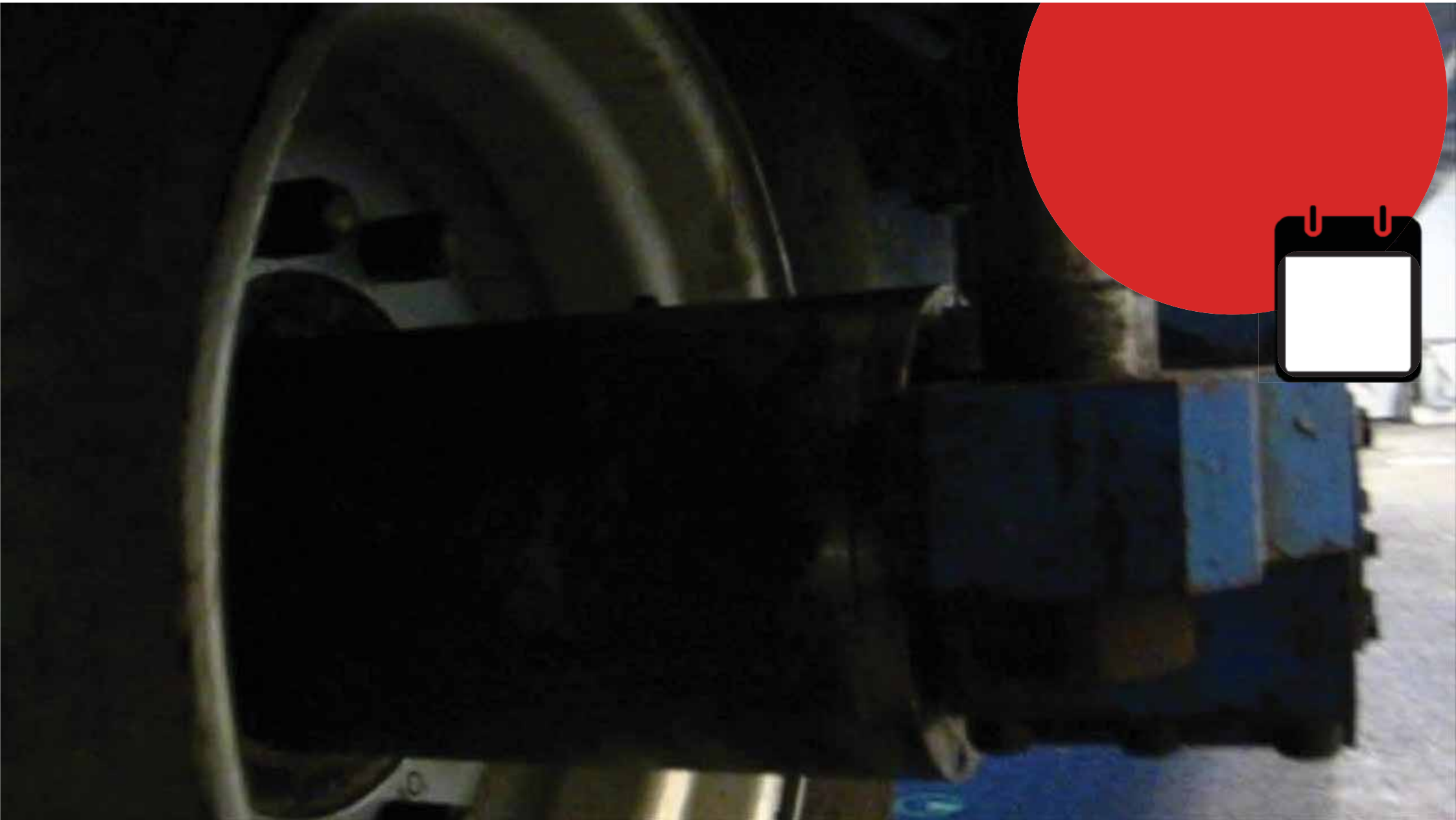


”

No. Try not.  
Do or do not.  
There is  
no try.

Yoda, The Empire Strikes Back







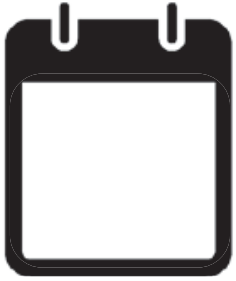


PROJECT PARTICIPANTS:

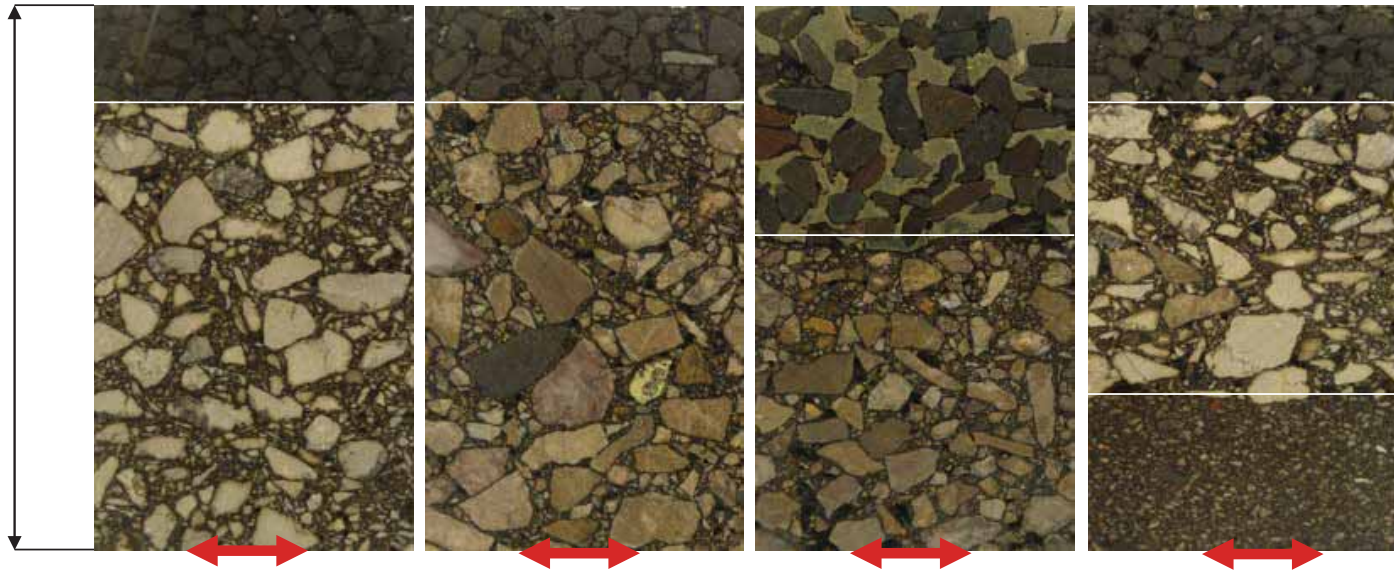


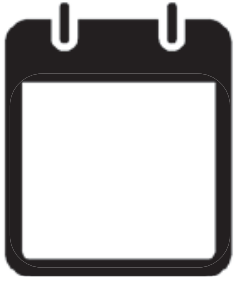






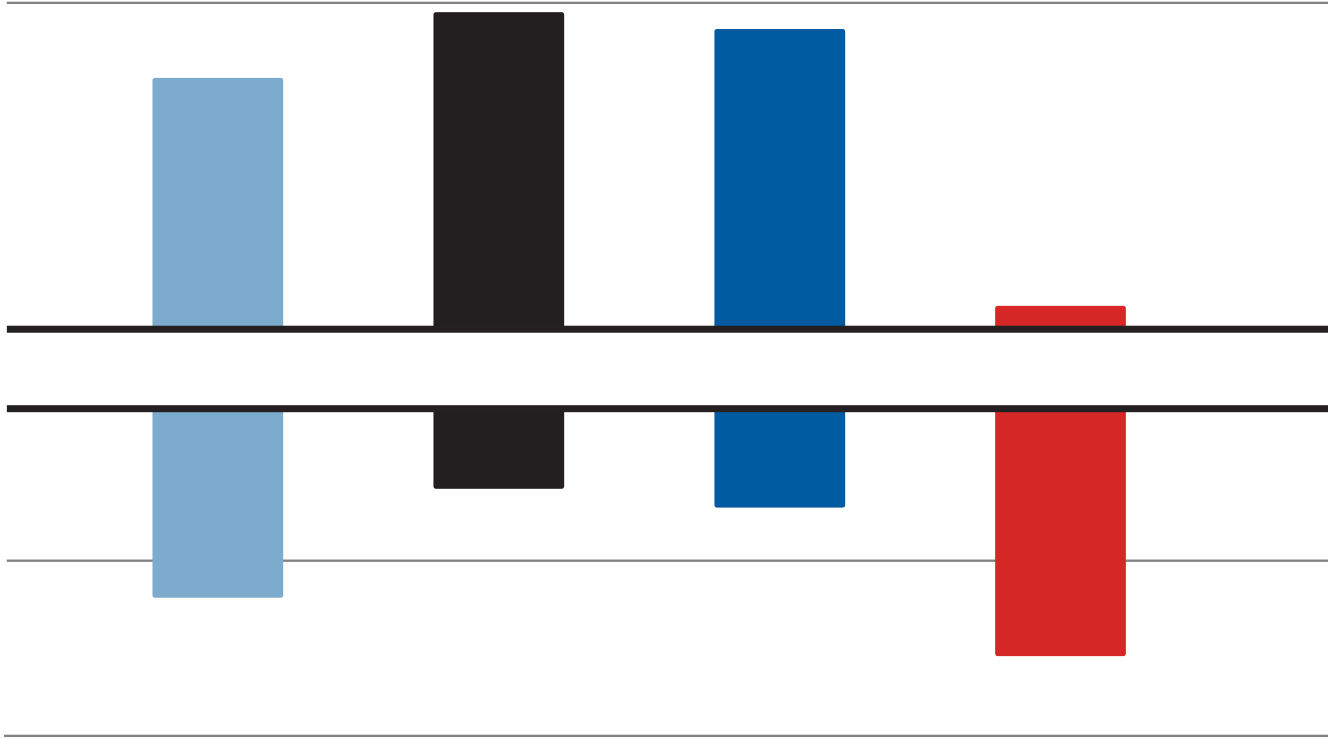
TESTED PAVEMENT TYPES:





Fatigue  
damage

Fatigue  
life





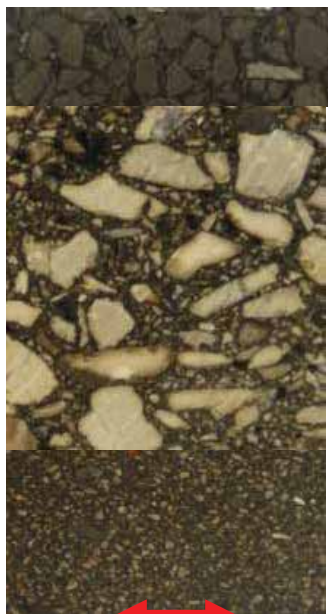
UNIA EUROPEJSKA  
EUROPEJSKI FUNDUSZ  
ROZWOJU REGIONALNEGO



PARP



INNOWACYJNA  
GOSPODARKA  
NARODOWA STRATEGIA SPÓJNOŚCI



**STRABAG**  
TEAMS WORK.

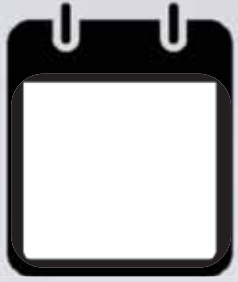






**HIGH  
STIFFNESS  
MODULUS AC**  
Polish Abrev.: AC WMS



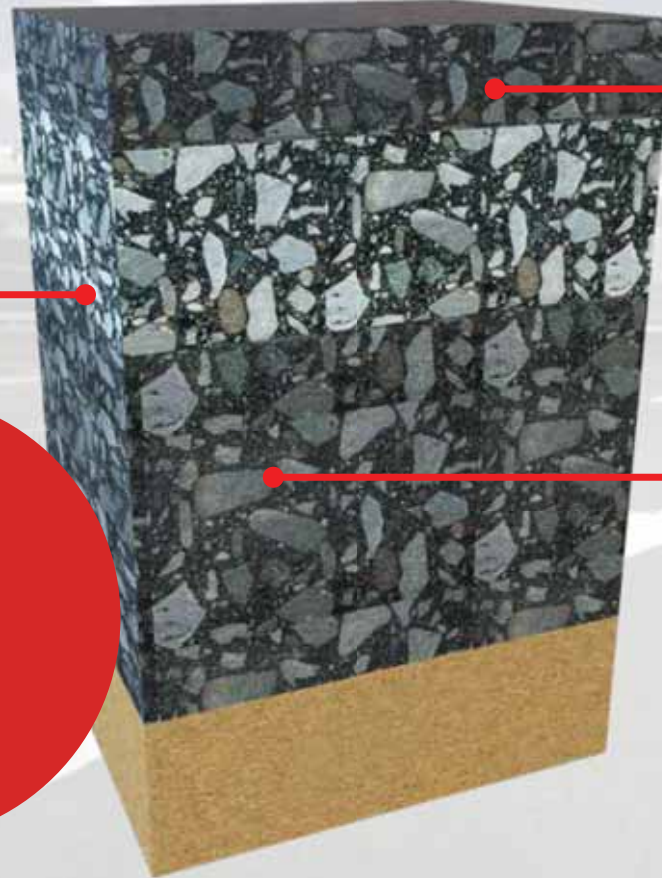


8 cm  
AC WMS 16  
PMB 25/55-60

4 cm  
SMA 11  
PMB 45/80-55

17 cm  
AC WMS 16  
20/30

115 kN  
ESALs





... and the winter came!



**LOW  
TEMPERATURE  
CRACKING**



”

Much  
to learn  
you still  
have.

Yoda, The Empire Strikes Back





„GET BACK TO THE LAB!”





TPA LAB, PRUSZKÓW 2012

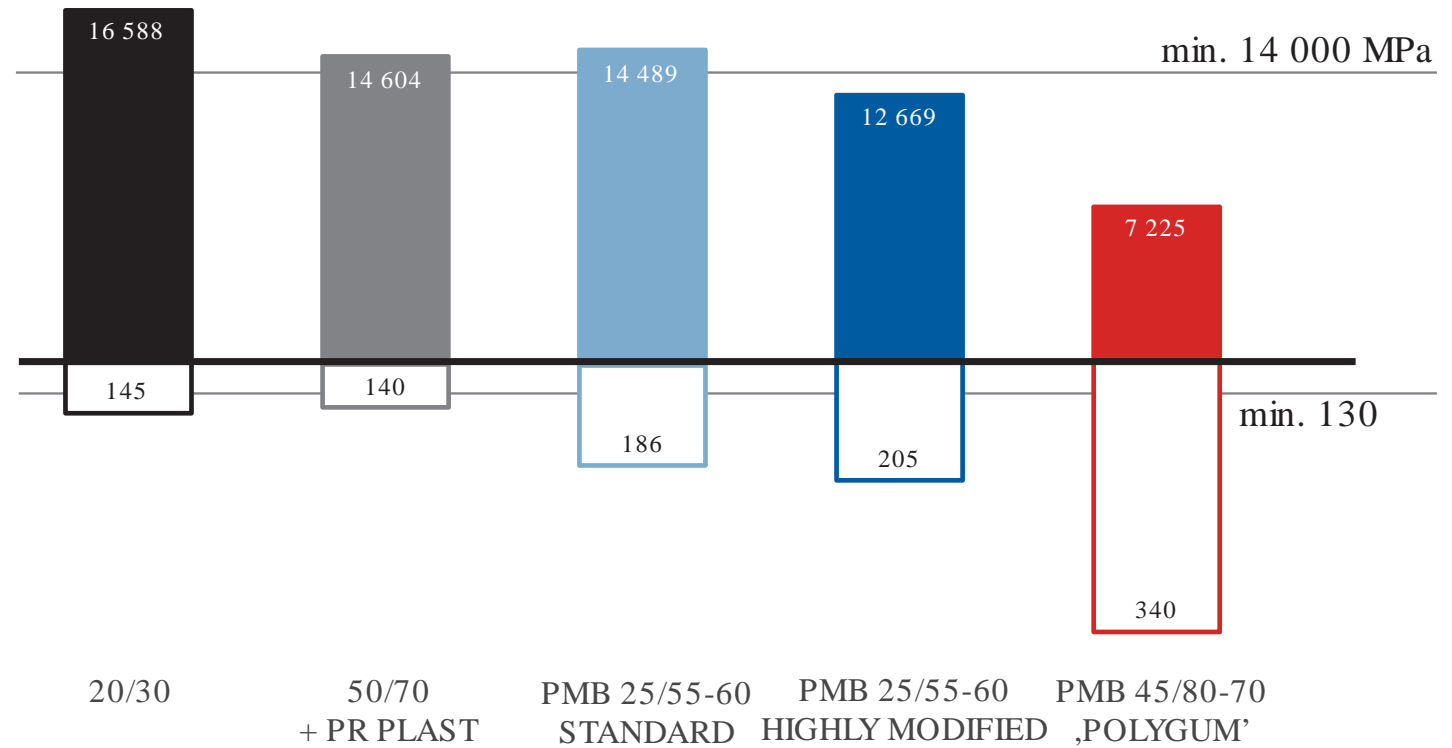


# STIFFNESS VS FATIGUE

# AC „WMS” 16 HIGH STIFFNESS MIX DESIGN 4PB-PR (10°C, 10 Hz)

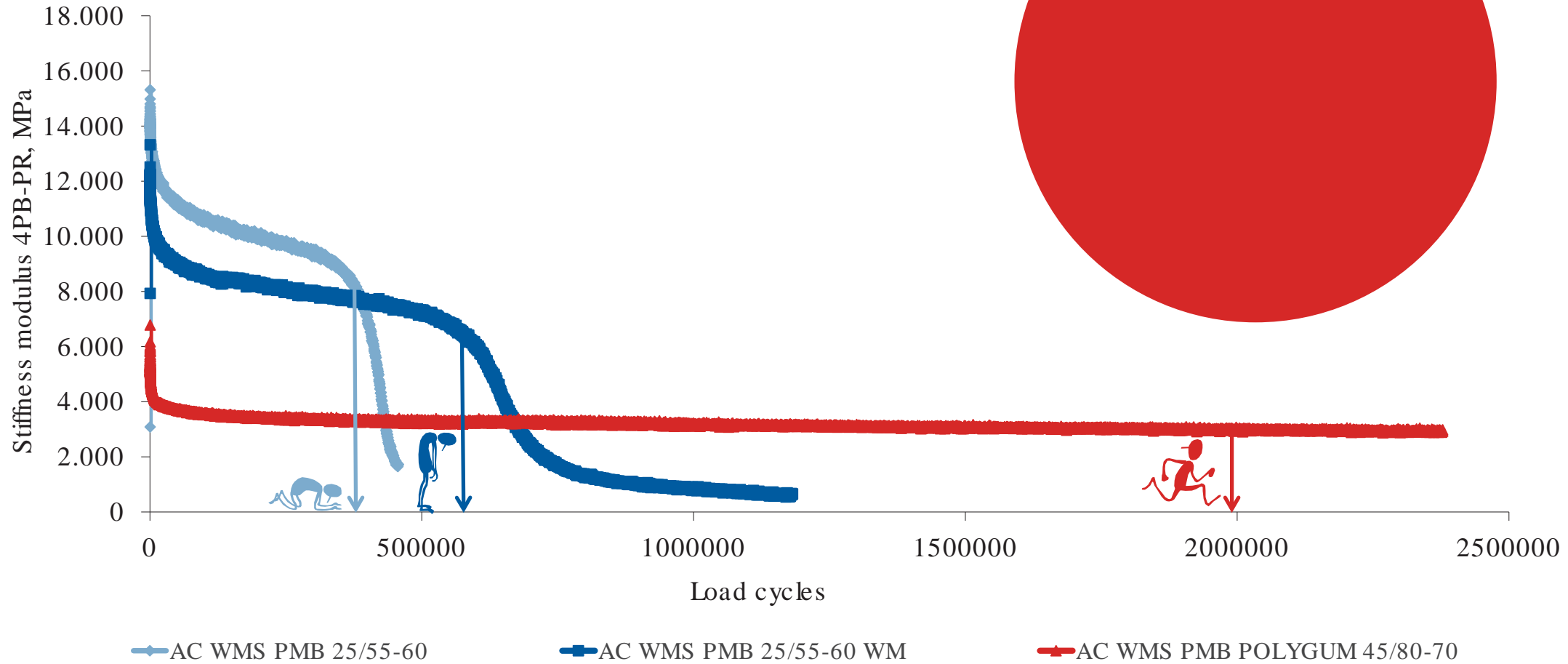
Stiffness  
modulus  $S$   
[MPa]

Resistance to  
fatigue  $R_6$   
[ /mm]



# DROP OF STIFFNESS @ FATIGUE TESTS

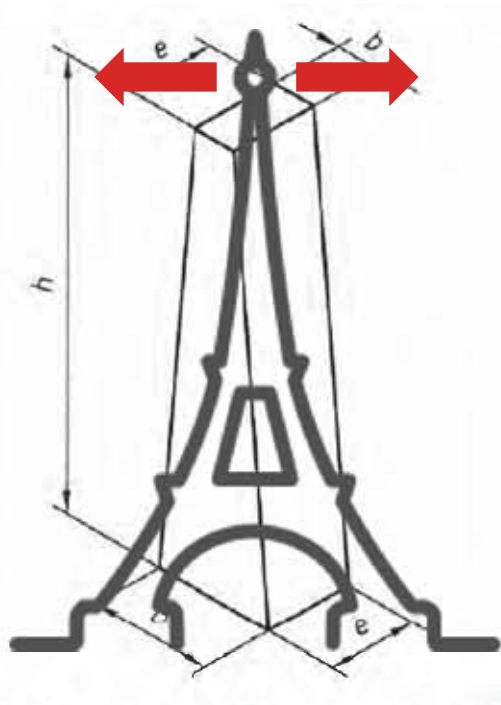
AC WMS 16 (EME) 4PB-PR (10°C, 10 HZ)



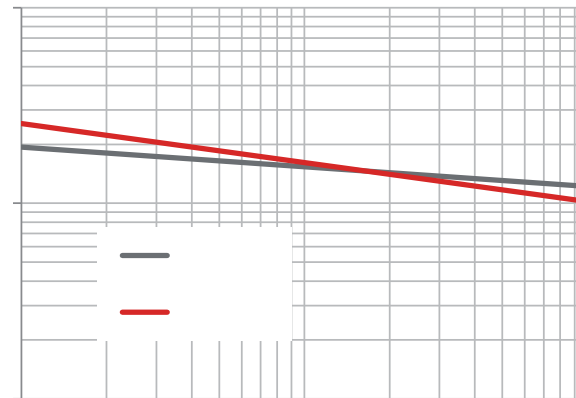


# FATIGUE CRITERION

2PB-TR (15°C, 10 Hz)

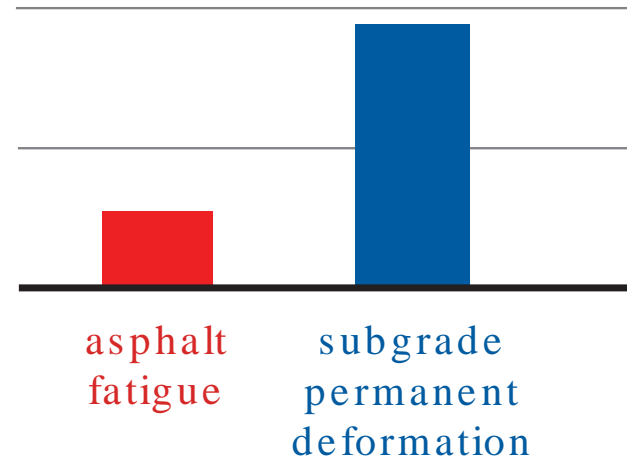
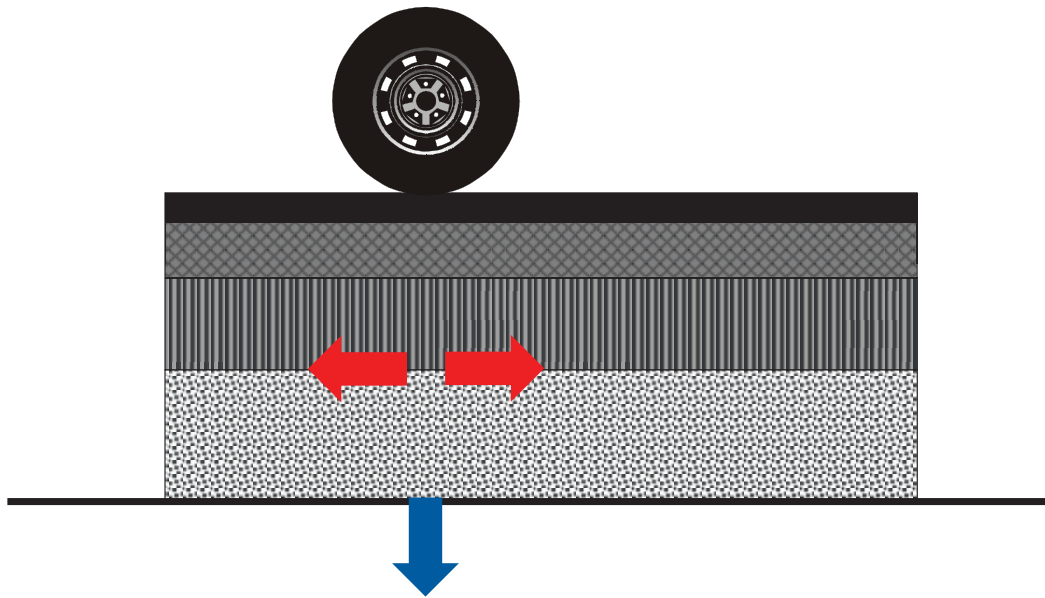


$$\left( \text{---} \left[ \frac{(\quad)}{(\quad)} \right] \right)$$



# TRAFFIC LOAD CLASS KR5

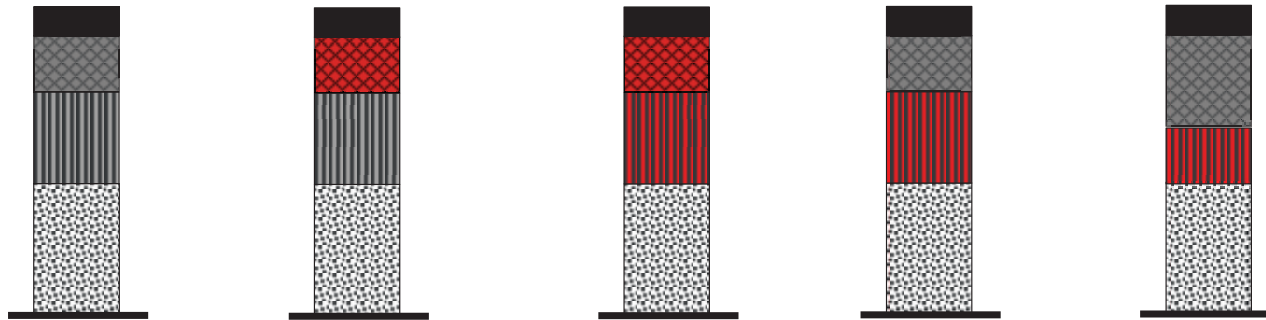
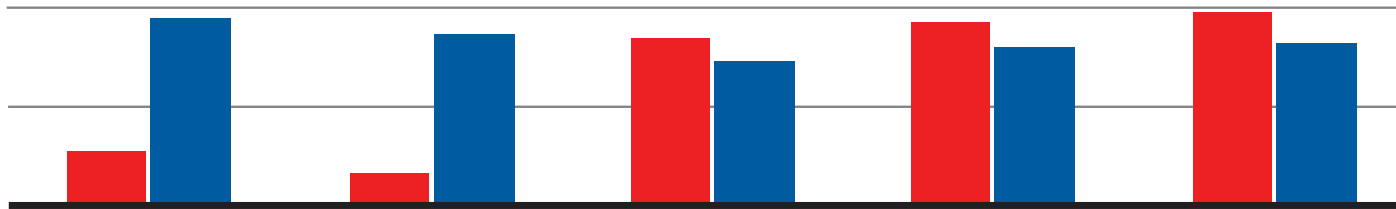
AC WMS USING 20/30 AND/OR PMB 25/55-60





# TRAFFIC LOAD CLASS KR5

AC WMS USING 20/30 AND/OR PMB 25/55-60





”

Mind what  
you have  
learned.  
Save you it  
can.

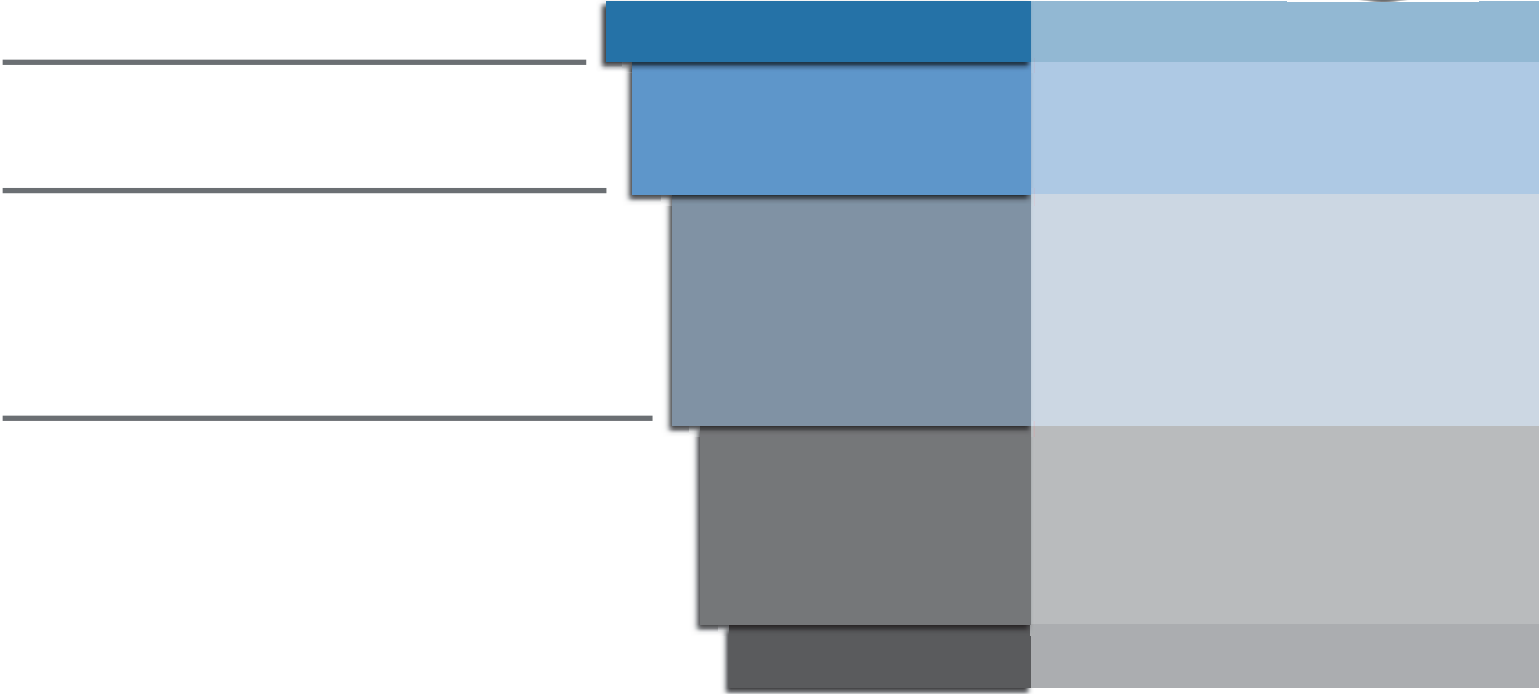
Yoda, The Empire Strikes Back





# FATIGUE FAILURE

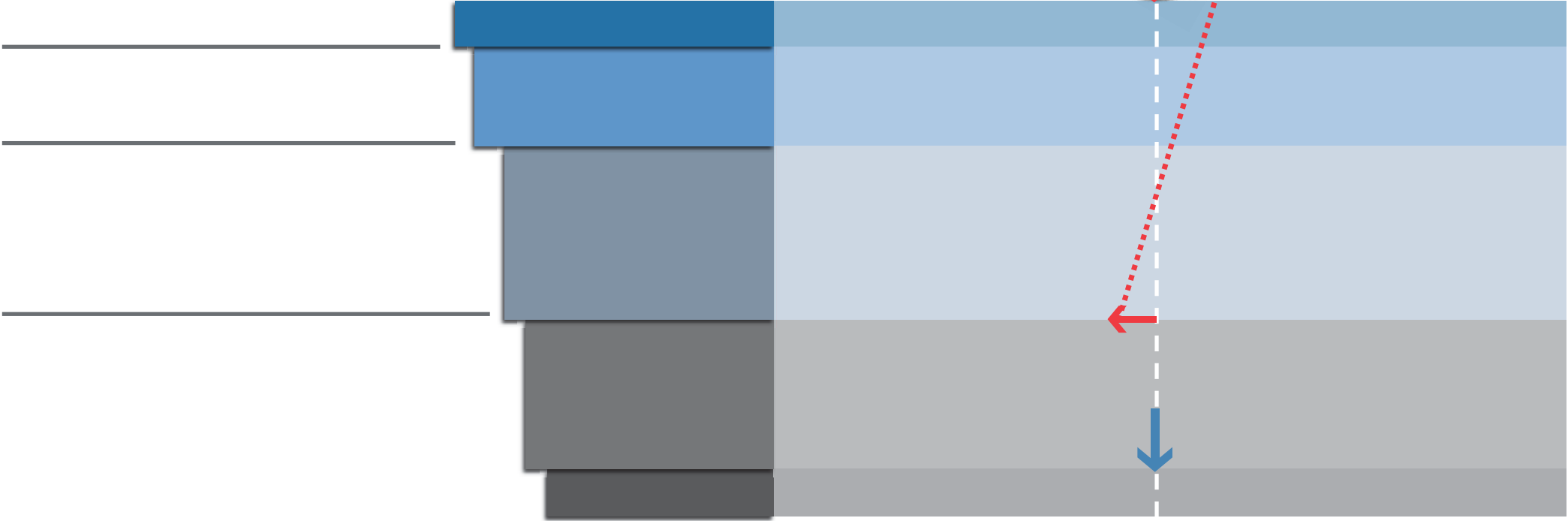
CRITICAL STRAIN AT BOTTOM





# FATIGUE FAILURE

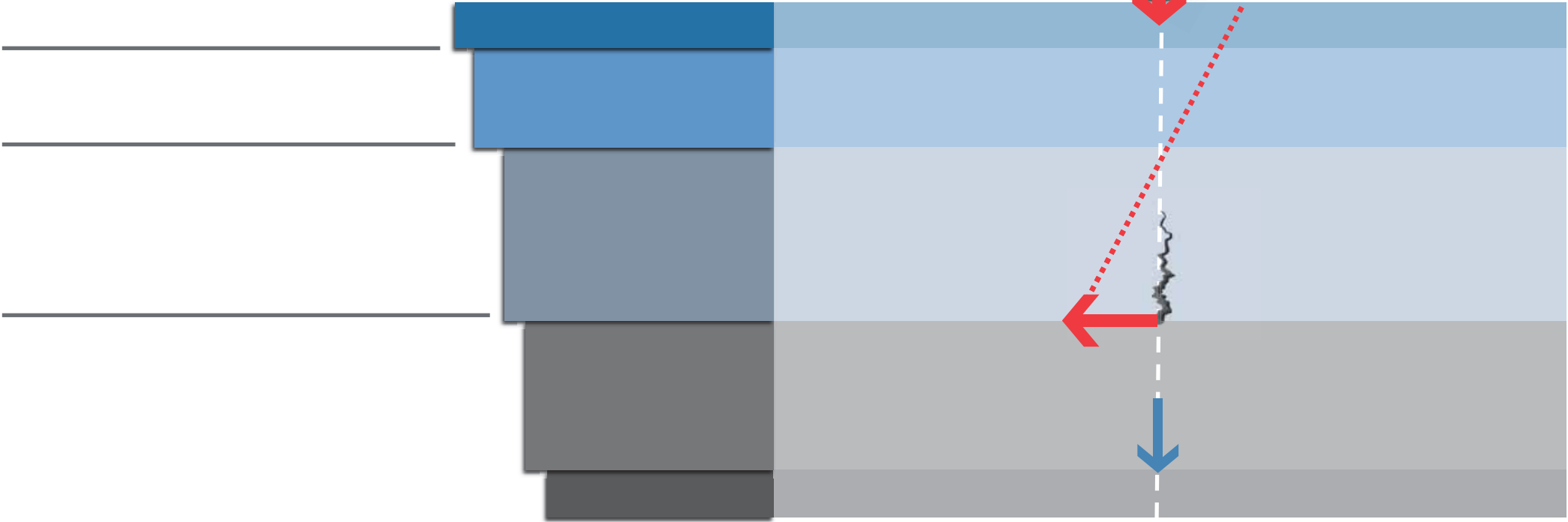
CRITICAL STRAIN AT BOTTOM

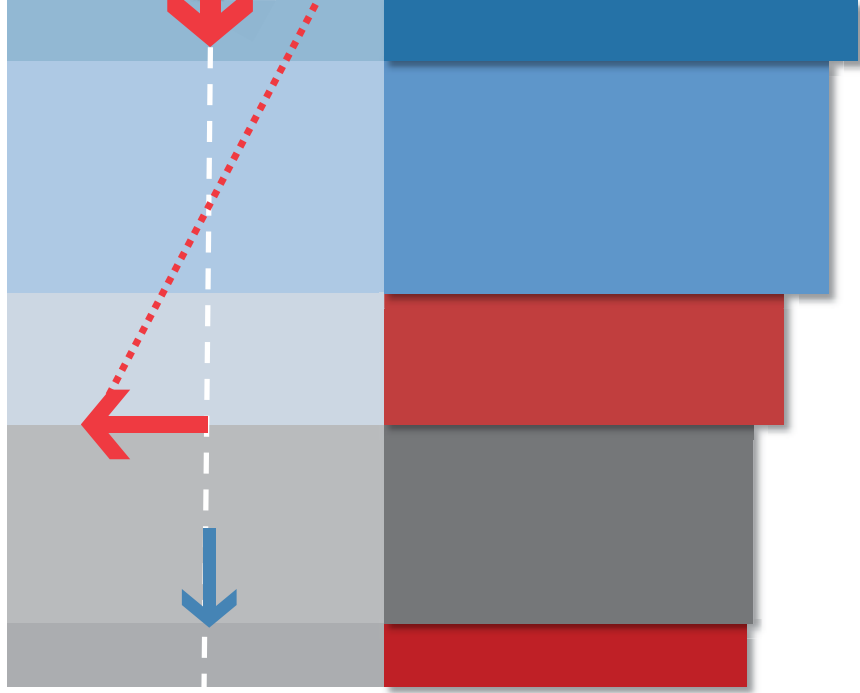
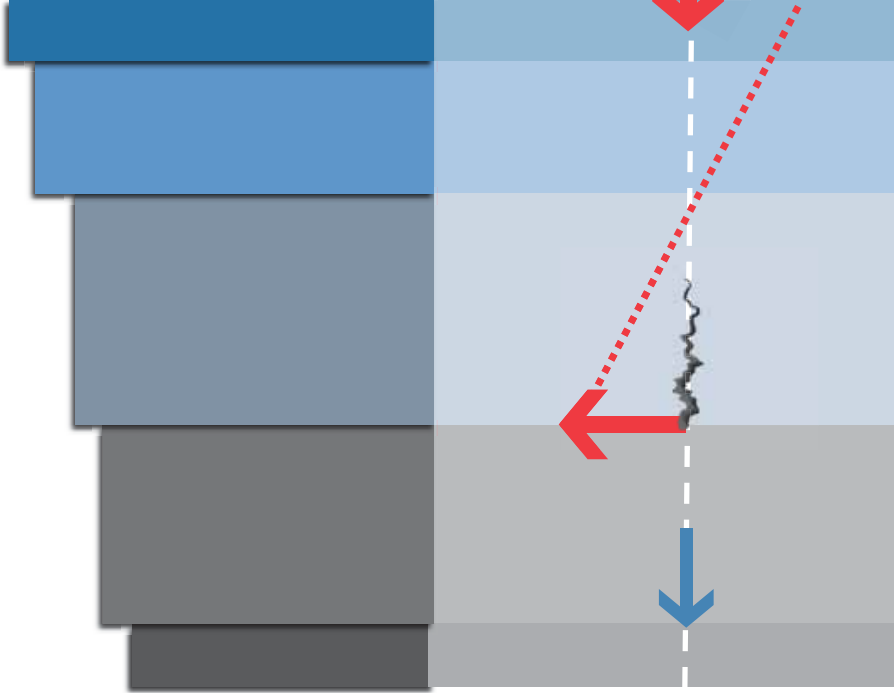
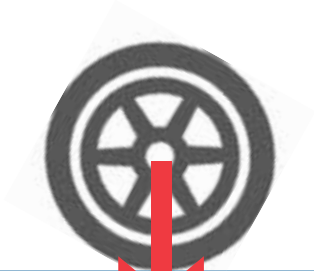


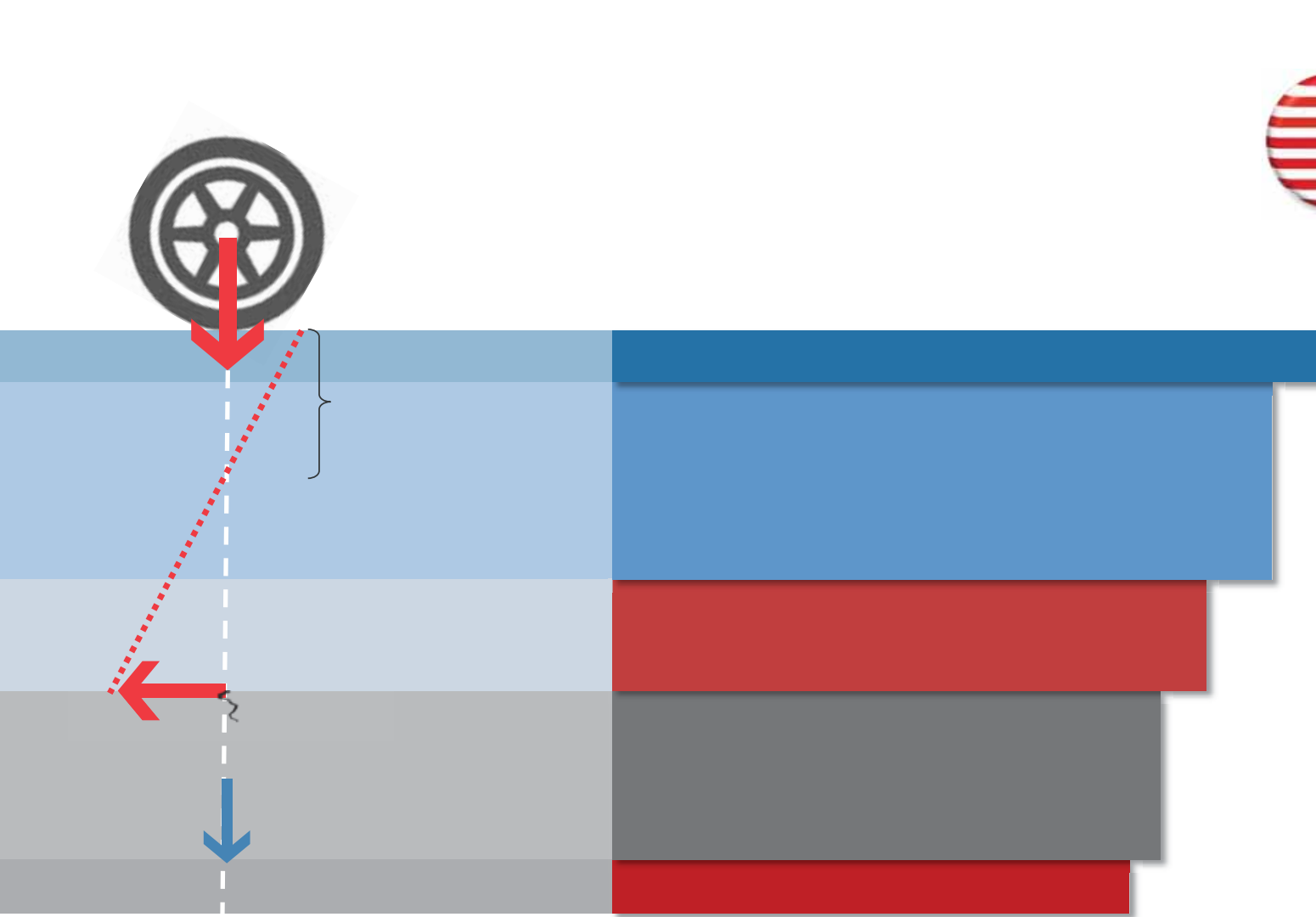


# FATIGUE FAILURE

CRITICAL STRAIN AT BOTTOM



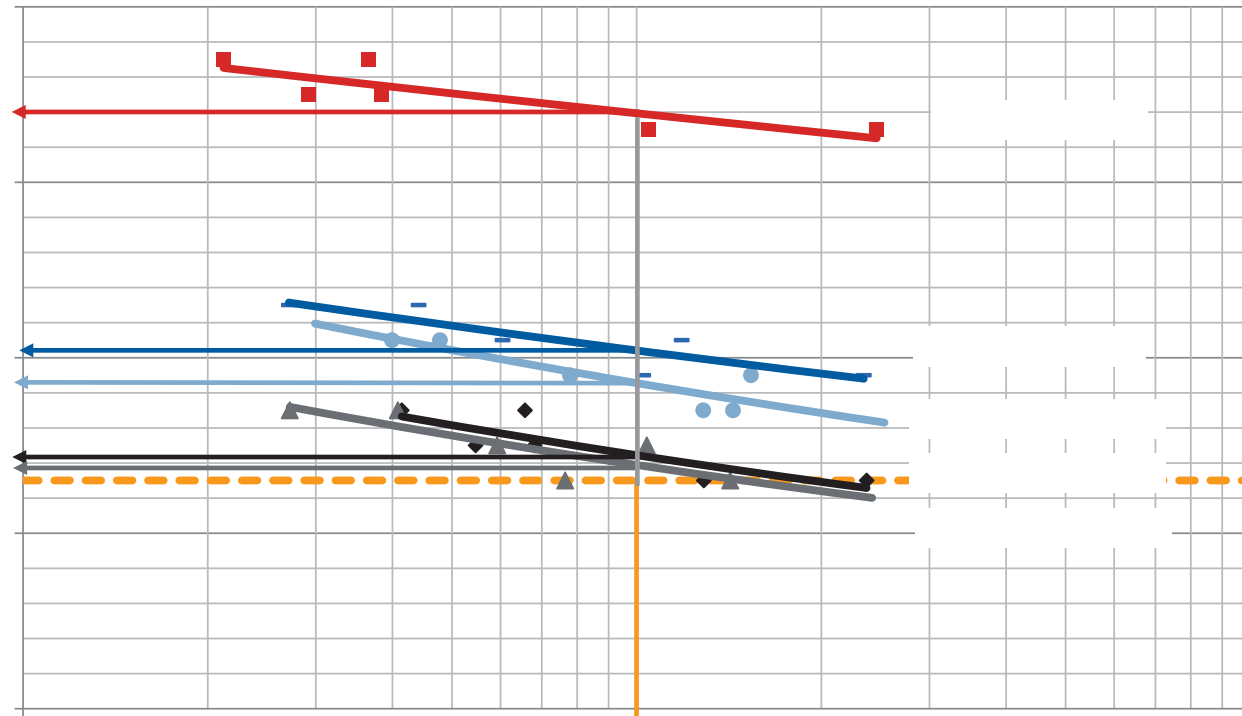




TPA

# PMB 45/80-80 POLYGUM

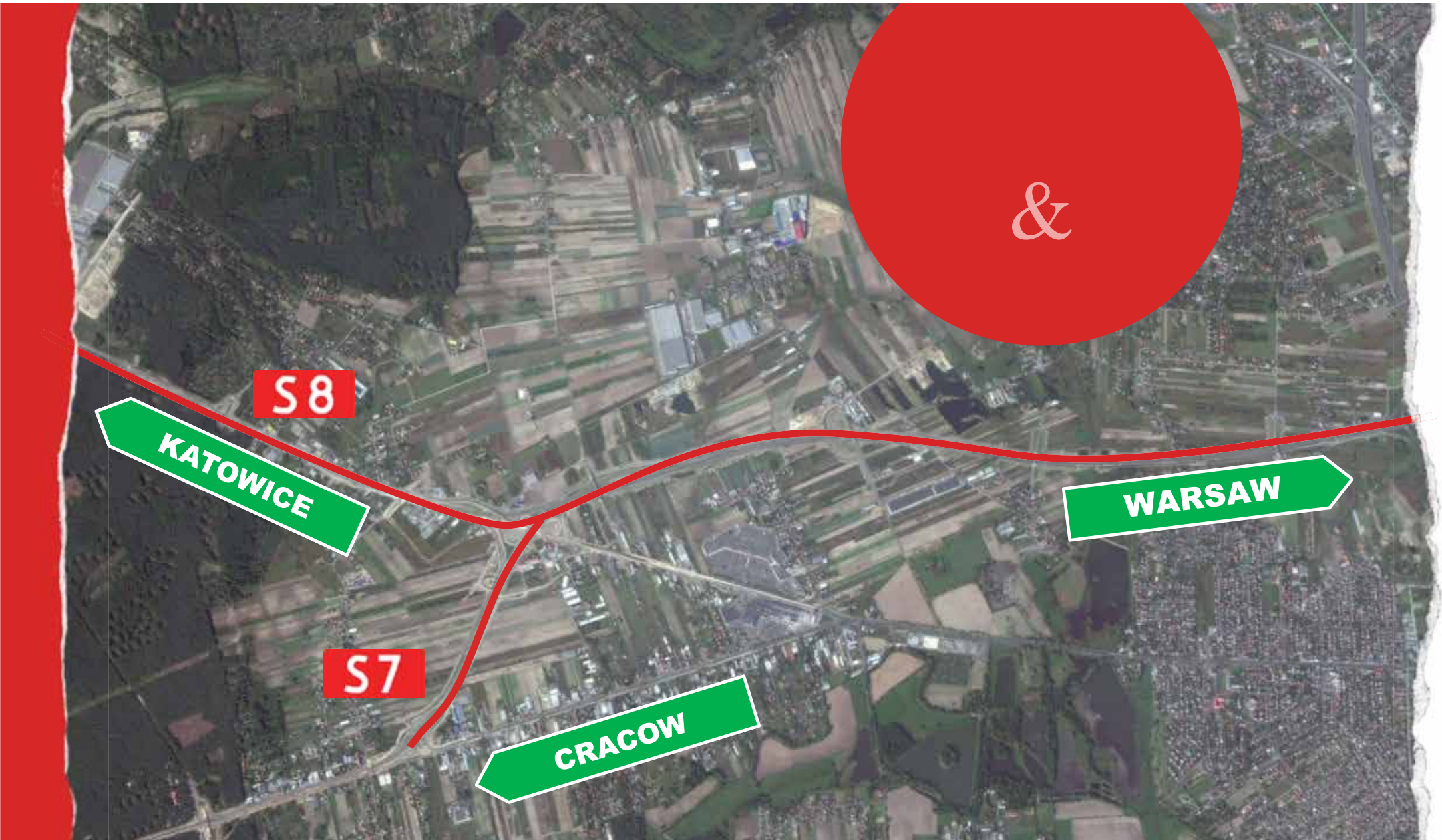
4PB-PR (10°C, 10 HZ) ACC. PN-EN 12697-24





# FIRST PERPETUAL PAVEMENT IN EUROPE





S8

KATOWICE

S7

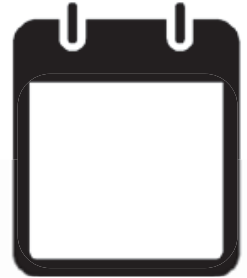
CRACOW

WARSAW

&

# S 8

## perpetual pavement



115 kN  
ESALs

traditional  
pavement



S 8





S 8





S 8

Magazyny

Na żywo



13.09.2014 | Superasfalt prosto z Polski – 18 lat gwarancji, 50 lat bez remontu

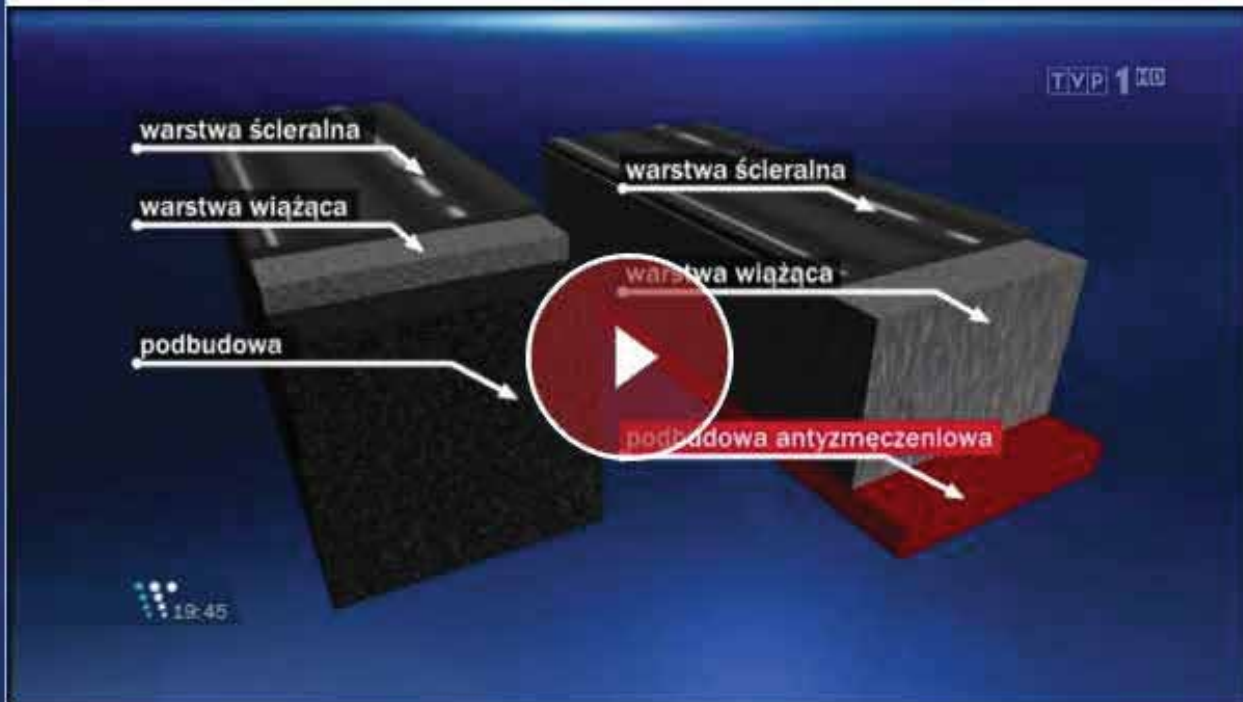
Drogowa rewolucja to nie żarty. Testowe 150 metrów superasfaltu leży już na S8. Żadnych dziur, kolein i nierówności – to będzie nowa polska specjalność. Drogowcy sprawdzają, czy asfalt się nie męczy, a zmęczeni kierowcy pewnie ... [rozwiń](#)

[Zrodlo: Fakty TVN]



## SIEMOŃCIE

Publikacja: 13 września 2014, 19:53



19:45

Lubię to! 0

Dobrych dróg w Polsce przybywa, ale dziury i koleiny, są wciąż zimą wielu z nas. Kierowcy płaczą i płacą. Drogowcy zazwyczaj tłumaczą się klimatem, że albo mamy upał albo siarczasty mróz. Ale uwaga, nadchodzi rewolucja - pod Warszawą jest właśnie testowany

## TWARZE

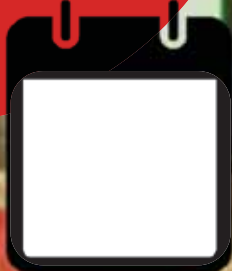
## TOP 10

1. — Anna Przybylska 1978-2014
2. — Pożegnanie
3. — (Nie)trzeźwy poranek
4. — Groźny zabójca
5. — Wojny stadionowe
6. — Putin jak Herkules
7. — System obrony
8. — W spirali długu
9. — Tragedia pod ziemią
10. — Wirus strachu





S 8



9:05  
WSTAJESZ  
I WIESZ  
MEC. P. SCHRAMM,  
KANCELARIA  
GESSEL

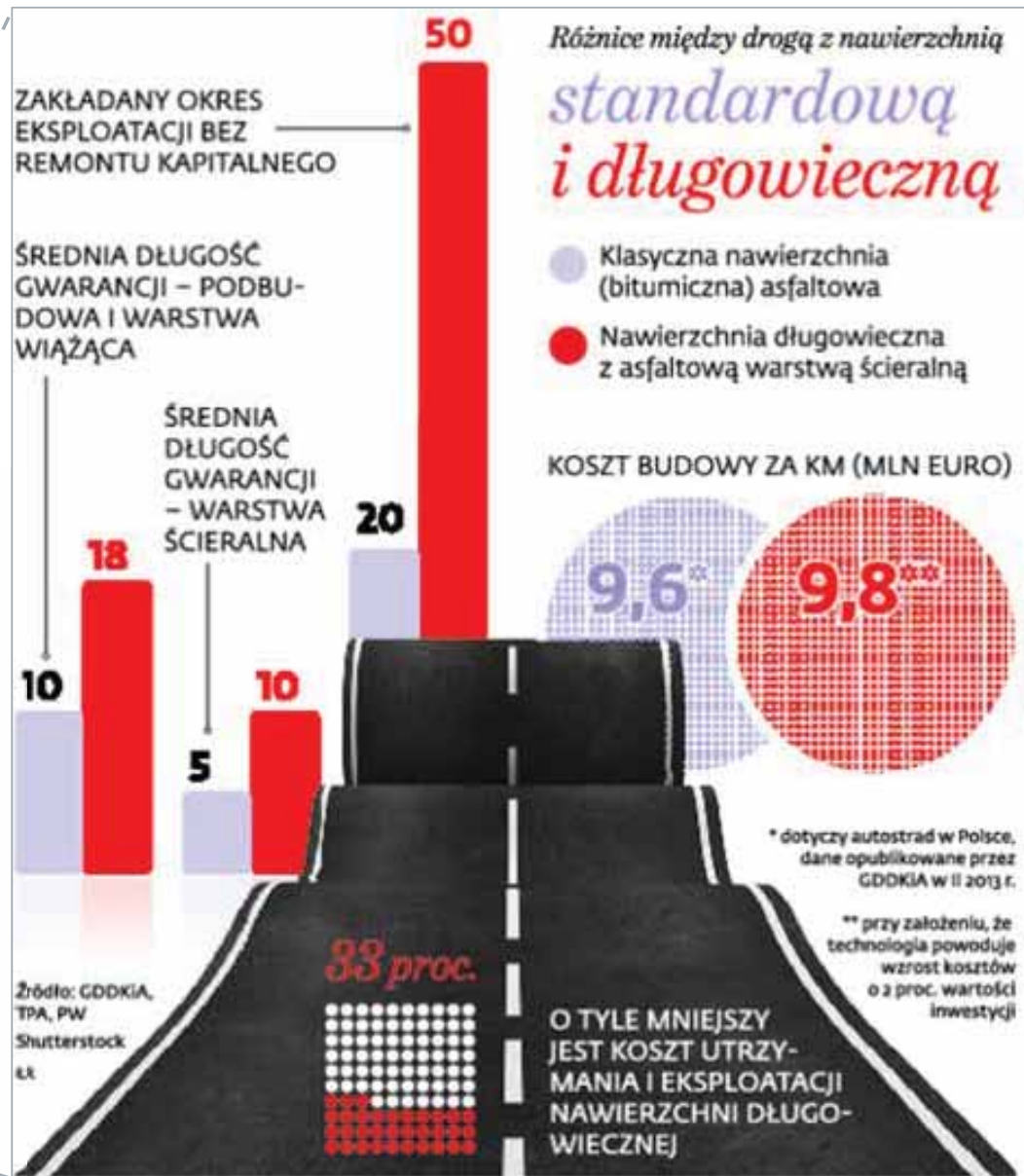


21:47  
ŚWIAT

Polska  
i Świat

PREMIER DONALD TUSK ZŁOŻYŁ DYMISJĘ NA RĘCE PREZYDENTA PILNE  
NDERSKIEJ KOMISJI: MALEZYJSKI BOEING 777 ZOSTAŁ STRĄCONY

S 8





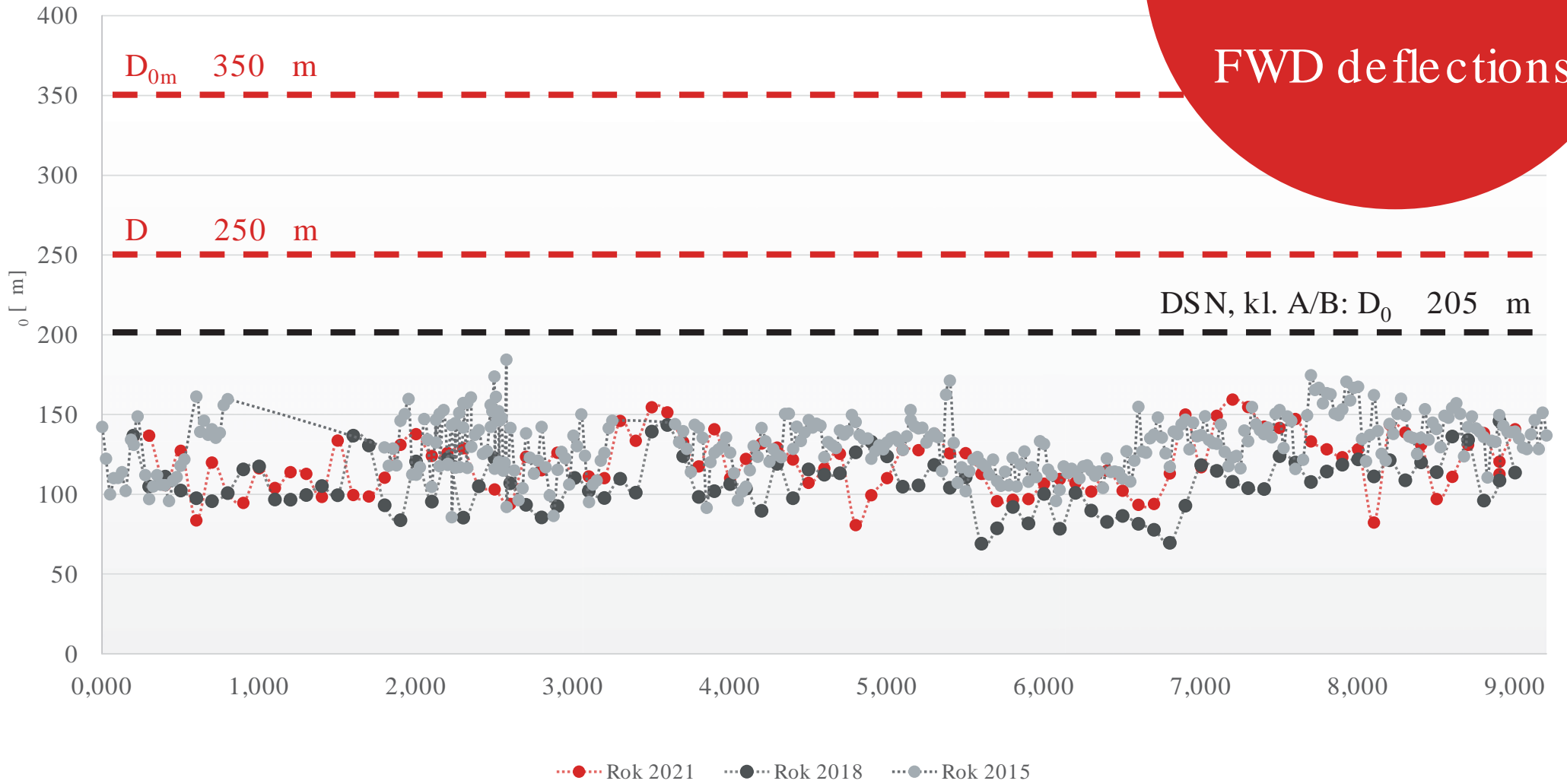


S8

# OPACZ – PASZKÓW

CENTRAL DEFLECTIONS, RIGHT SIDE, SLOW LANE

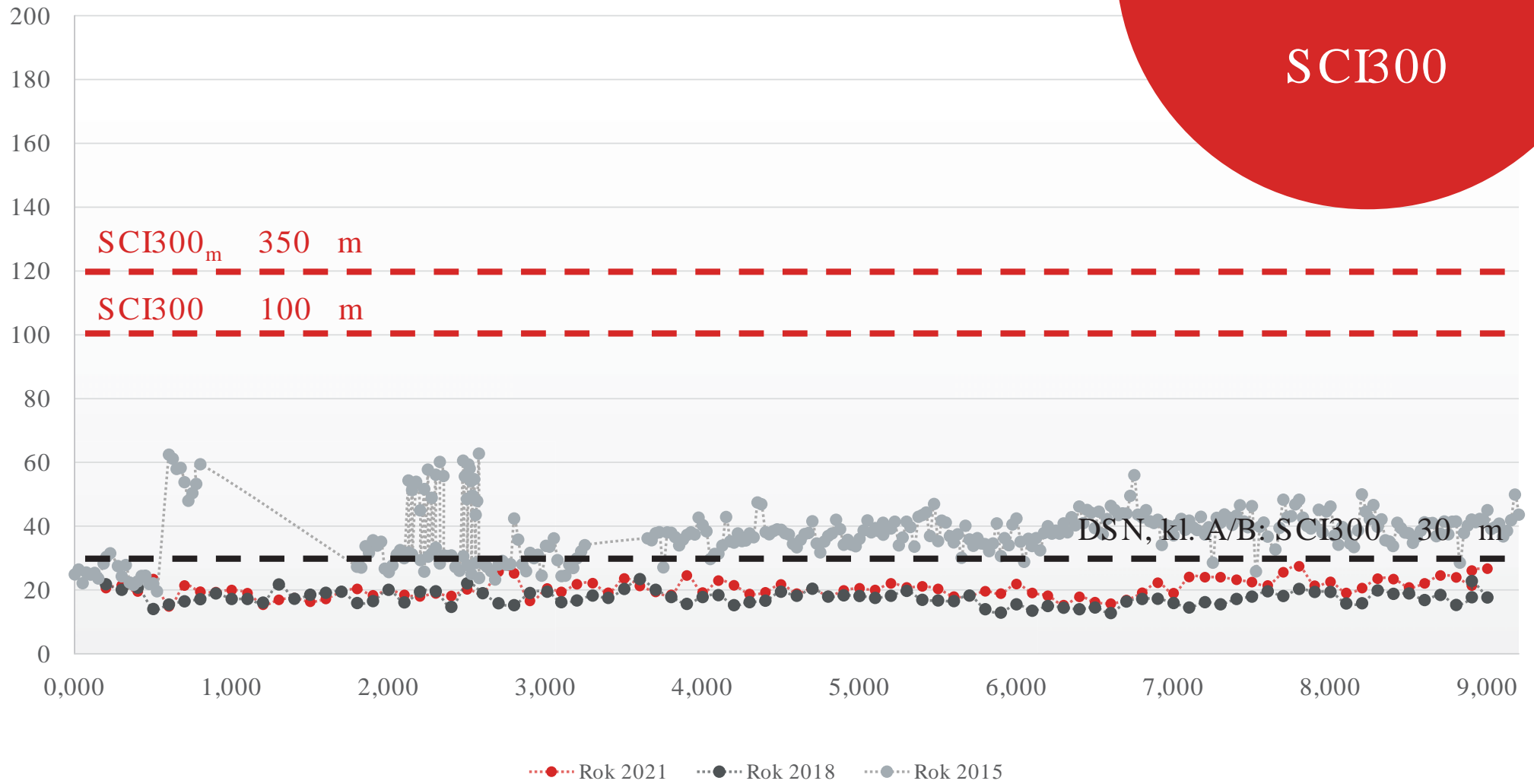
FWD deflections





# OPACZ – PASZKÓW

SCI300, RIGHT SIDE, SLOW LANE





AND THE STORY  
GOES ON...





Asfalt

Asfalt  
drogowy  
zwykły



Polimer  
SBS

Asfalt

Asfalt  
modyfikowany

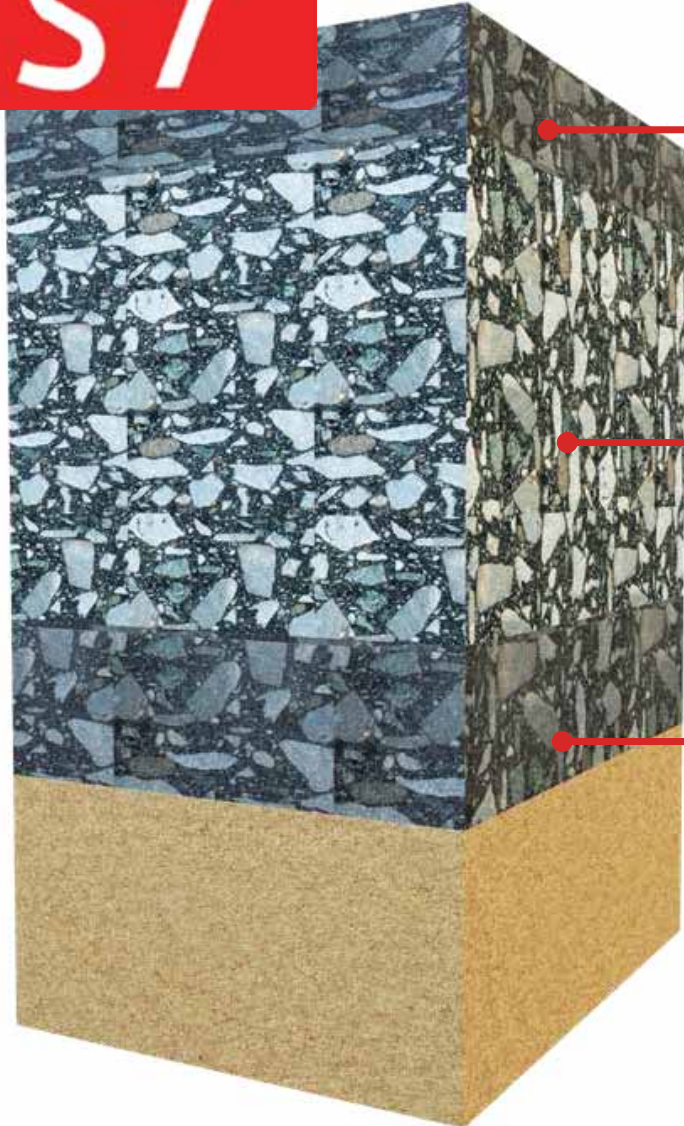


Polimer  
SBS

Asfalt

Asfalt  
wysokomodyfikowany  
(długowieczny)

**S7**



3 cm

**SMA 8 ARB**

17 cm

**AC WMS 16**

**PMB 25/55-60**

6 cm

**AC AF (anti-fatigue) 16**

**PMB 45/55-80 HiMA**



S6



3 cm

SMA 8 ARB

12 cm

AC WMS 16

PMB 25/55-60

7 cm

AC AF (anti-fatigue) 16

PMB 45/55-80 HiMA

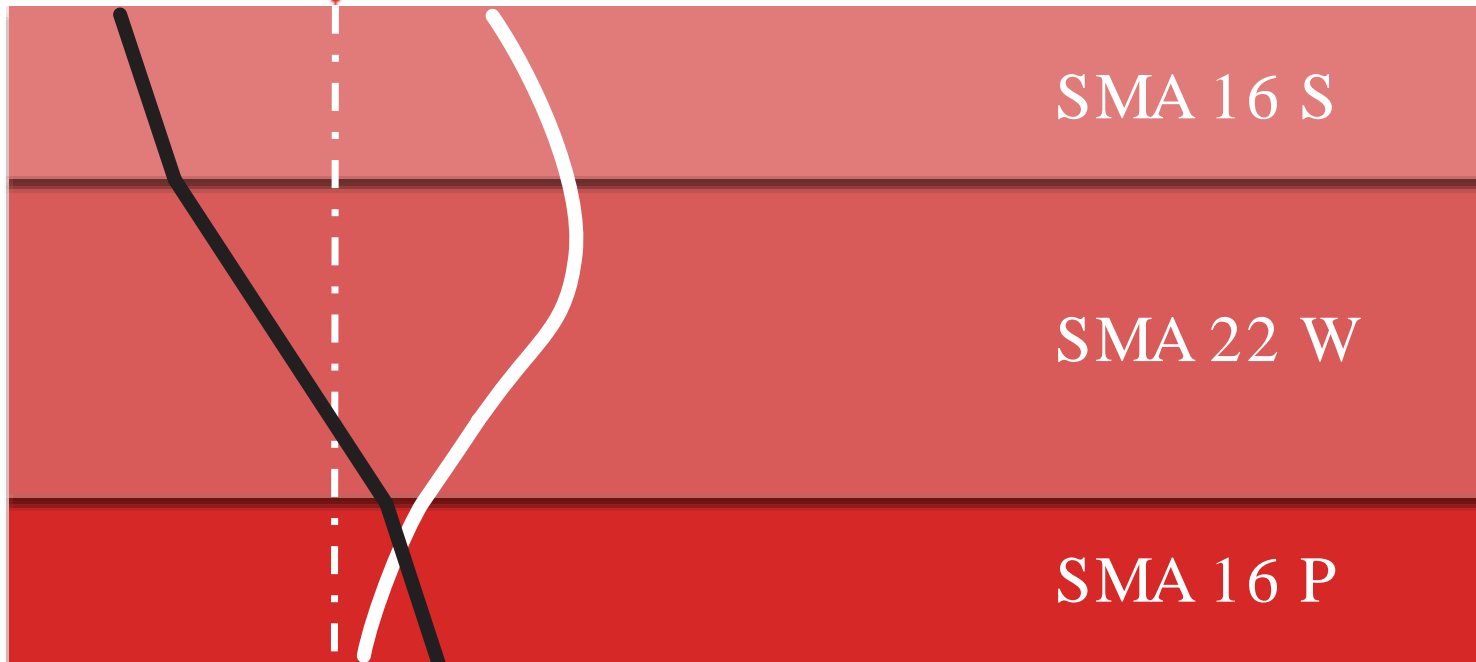












SMA 16 S

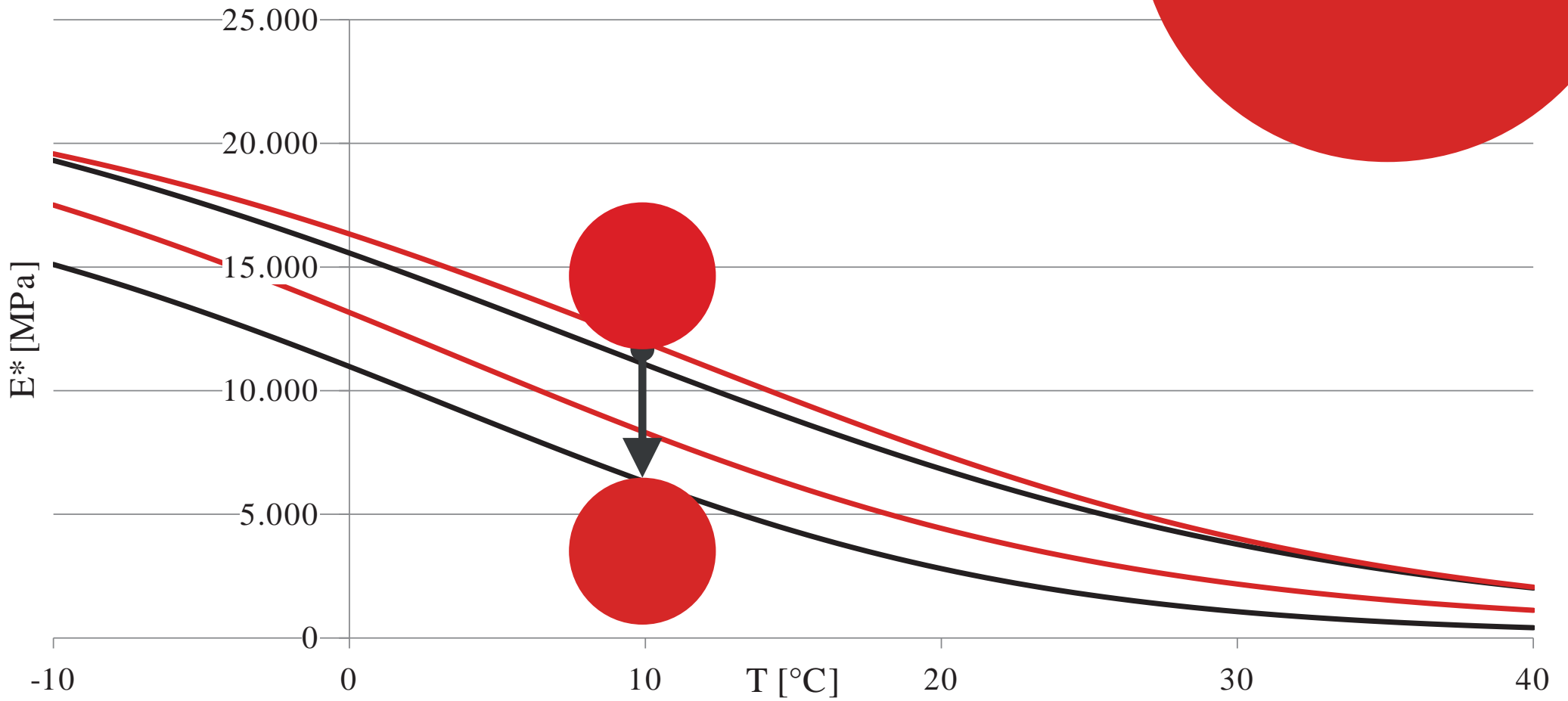
SMA 22 W

SMA 16 P



# DECREASE OF E\* @ SHORTER LOAD TIME

SMA 16 P i SMA 22 W

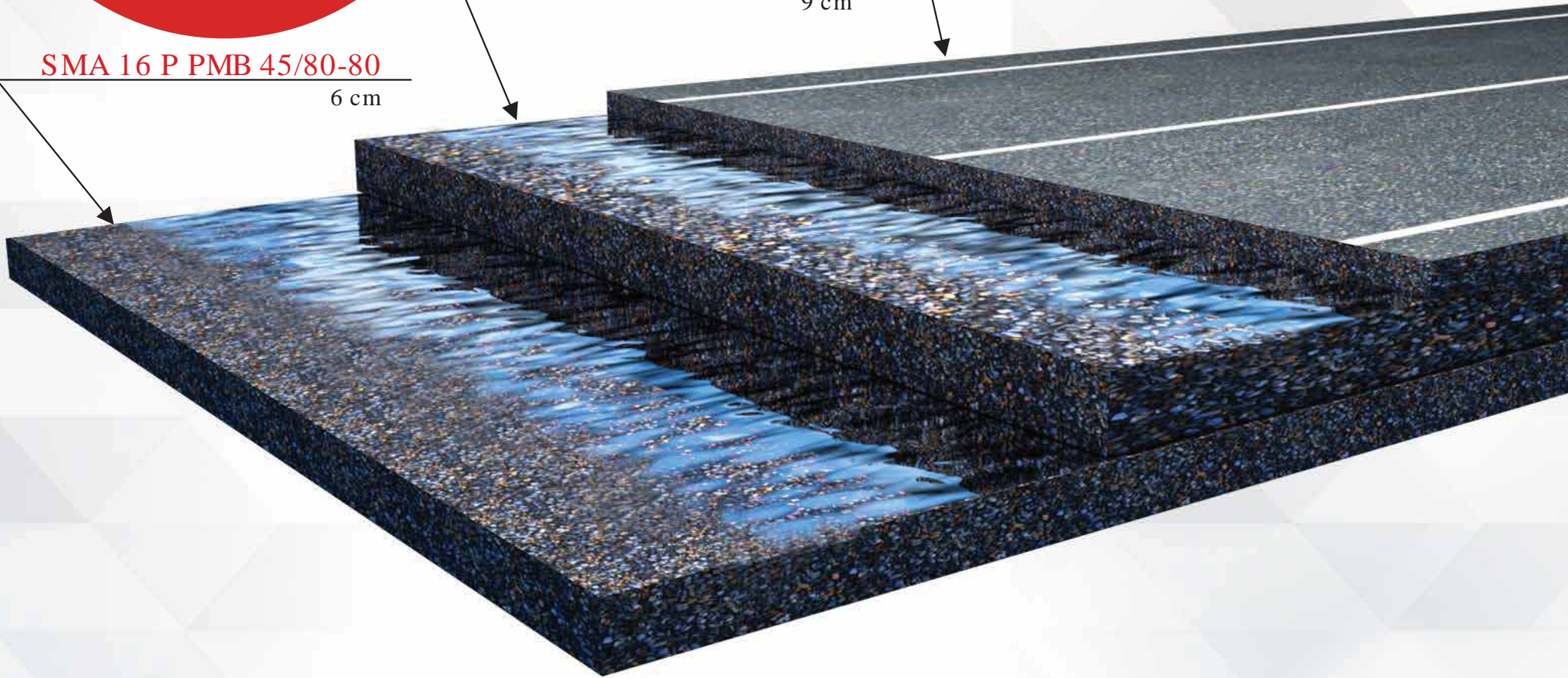




SMA 16 P PMB 45/80-80  
6 cm

SMA 22 W PMB 25/55-80  
9 cm

SMA 16 S PMB 45/80-80  
5 cm





5 cm

SMA 16 PMB 45/80-80



9 cm

SMA 22 PMB 25/55-80

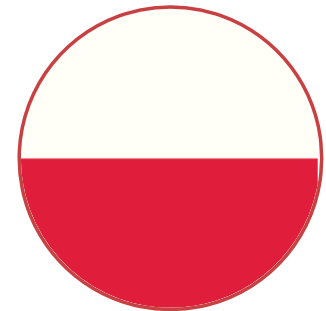
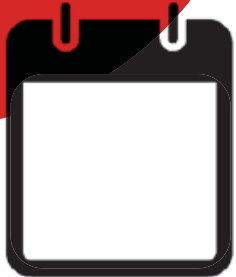


6 cm

SMA 16 PMB 45/80-80



TRIPLE SMA





938

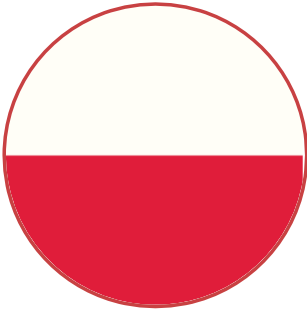
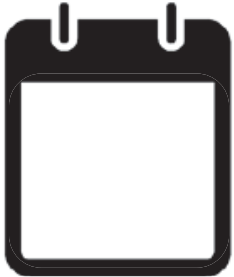


4 cm  
*SMA 11 45/80-80 HiMA*

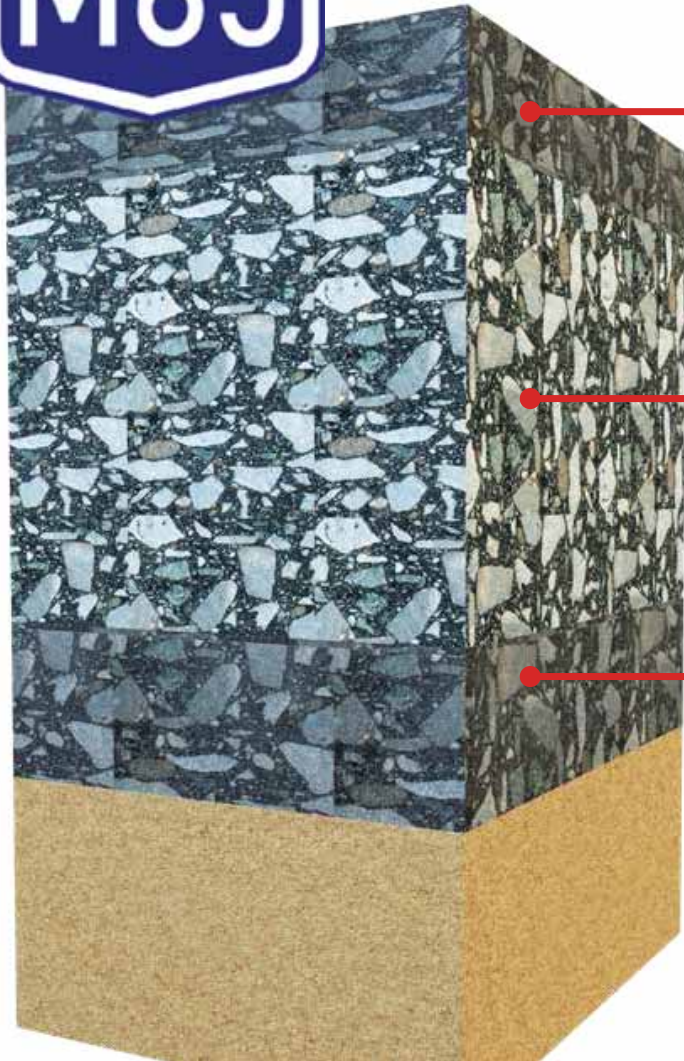
8 cm  
*AC 16 W*  
*PMB 45/80-80 HiMA + hydrated lime*

8 cm  
*AC 22 P*  
*PMB 45/80-80 HiMA + hydrated lime*

8 cm  
*AC 22 P*  
*PMB 45/80-80 HiMA*



**M85**



3 cm

**SMA 8 ARB**

12 cm

**AC EME 16**

**PMB 25/55-60**

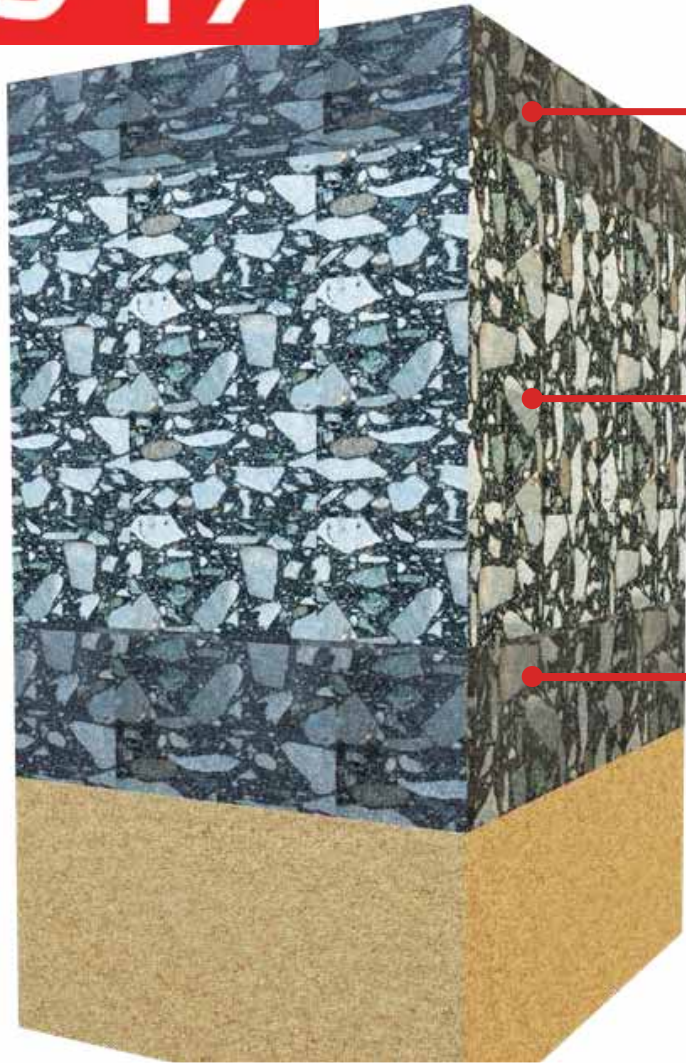
7 cm

**AC AF 16**

**PMB 45/80-80 HiMA**



# S 19



4 cm  
**SMA 11 ARB**

13 cm  
**AC 16 ARB**

8 cm  
**AC AF 11 ARB**





And thAN You  
Ask your self..?



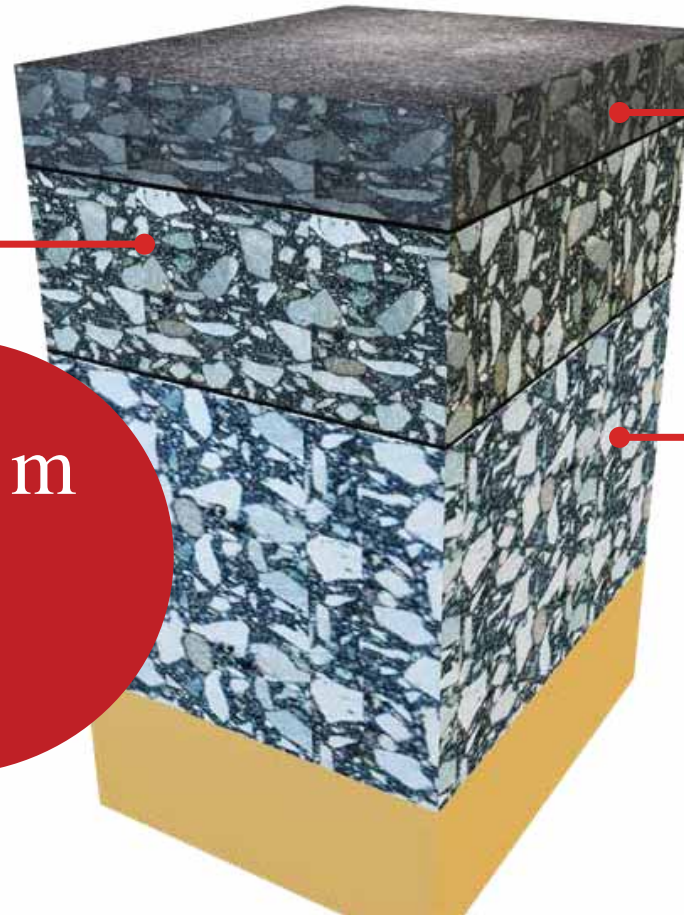
# FOR HOW LONG YET...?

AC 16 35/50 or PMB

SMA 8 or 11 PMB

>30 cm

AC 22 35/50



”

You must  
unlearn what  
you have  
learned.

Yoda, The Empire Strikes Back

