

# 19<sup>th</sup> Seminar of Track Management STRAHOS 2022

## EXPERIMENTAL ANALYSIS OF STATIC PLATE LOAD TEST ACCORDING TO CZECH, FRENCH AND GERMAN METHODOLOGY

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# Introduction

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- Preparation of high-speed lines construction in the Czech Republic according to French regulations, standards and practises
- Preparation of a joint cross-border section of high-speed line between the Czech Republic and Germany
- SPLT determines the deformation resistance of the railway substructure



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# Static plate load test

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Czech  
methodology



300 mm

French  
methodology



600 mm

German  
methodology



300 mm



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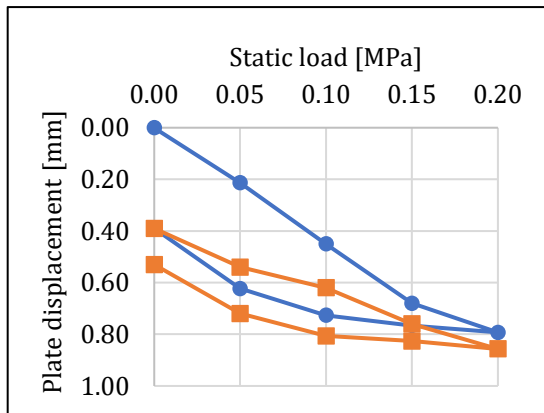
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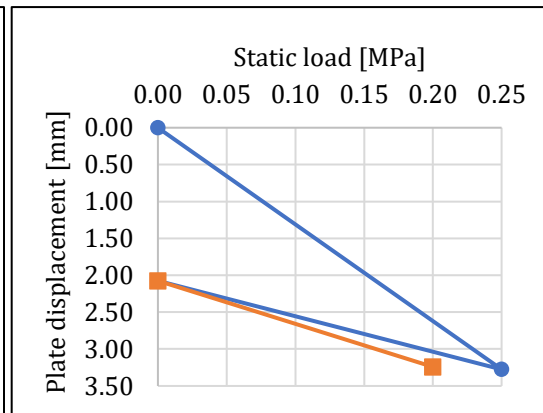
# Static plate load test

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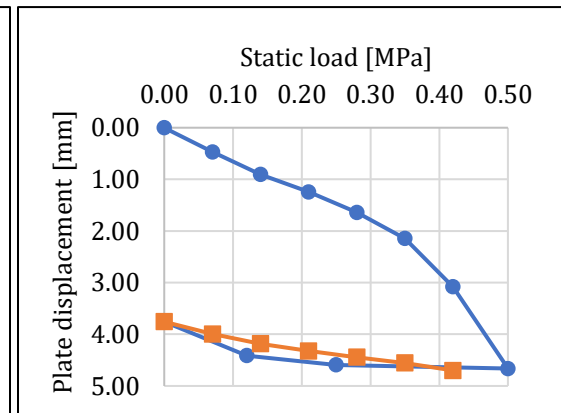
## Czech methodology



## French methodology



## German methodology



$$E = \frac{1,5 \cdot p \cdot r}{y}$$

$$EV = \frac{C}{Z}$$

$$E_V = \frac{1,5 \cdot r}{a_1 + a_2 \cdot \sigma_{max}}$$



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# Comparative campaigns

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- 5 comparative campaigns – 30 SPLT results



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# Comparative campaigns

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Location	Date	Layer 1	Layer 2
Zbraslav quarry	2021/06/02	CSM 0/32	CSM 0/63
Zbraslav quarry	2021/10/21	CSM 0/32	CSM 0/63
Soběslav	2021/10/27	CR 0/125	CSM 0/63
Uničov	2021/11/09	CSM 0/32	STH
Brandýs n. O.	2022/04/20	CSM 0/63	CSM 0/63



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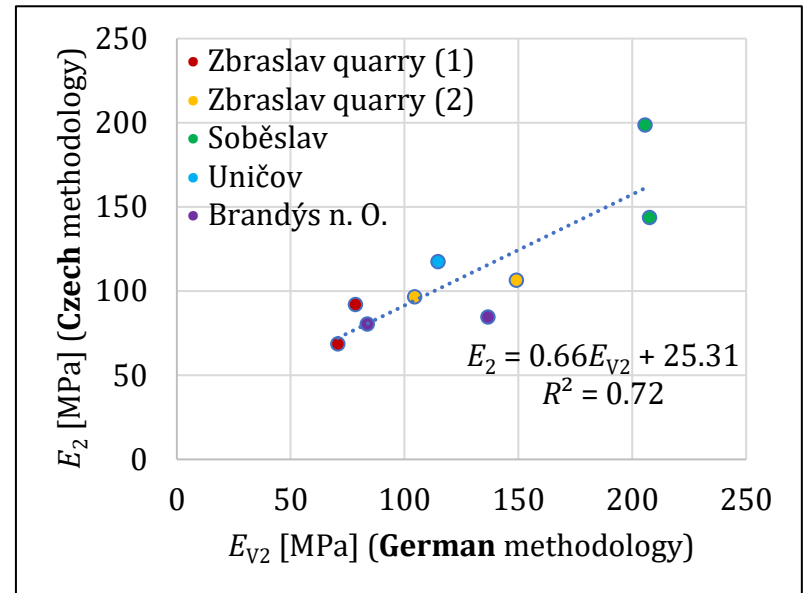
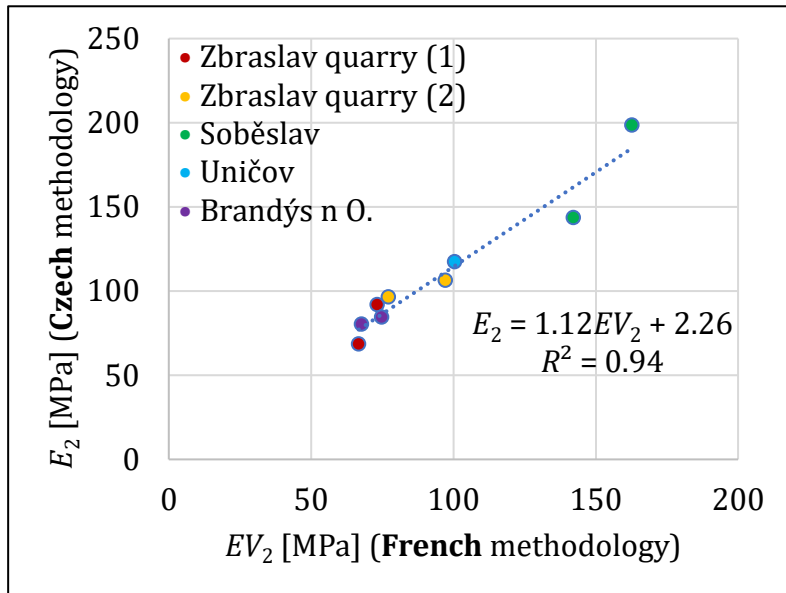
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# Results

## Deformation moduli from the second load cycle



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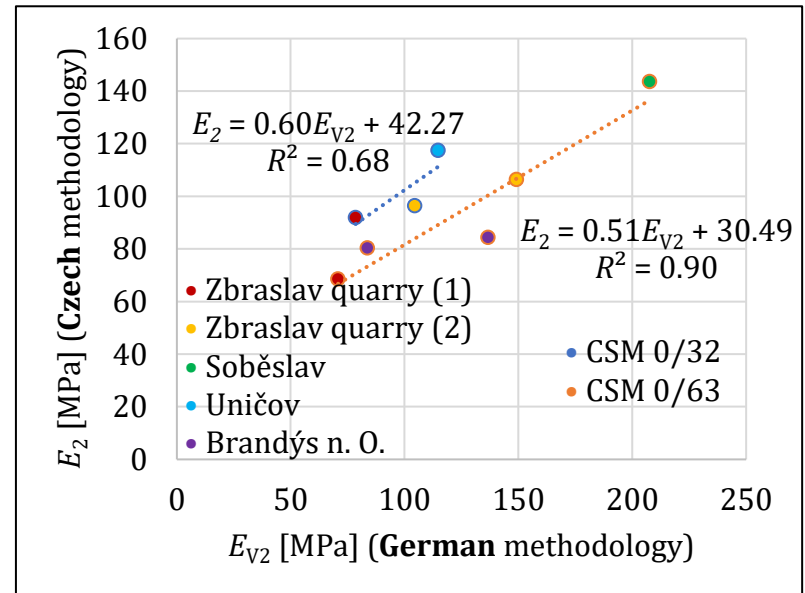
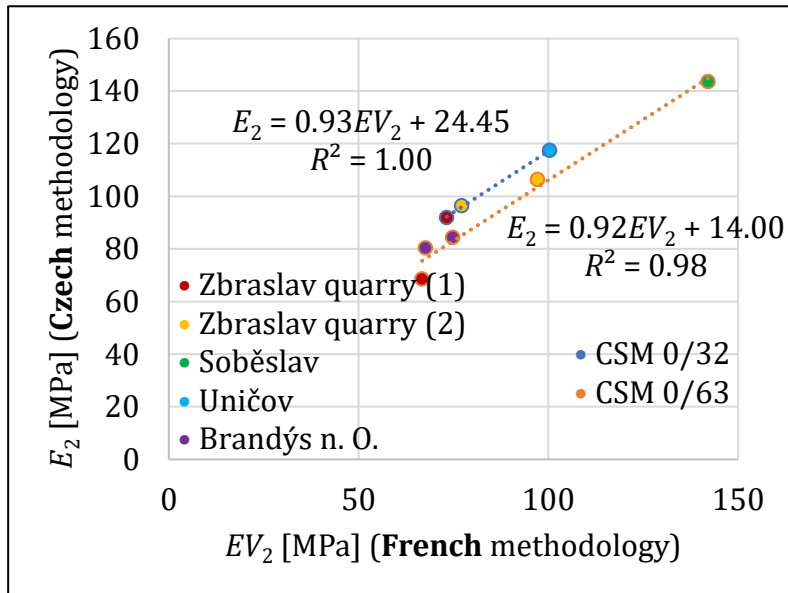
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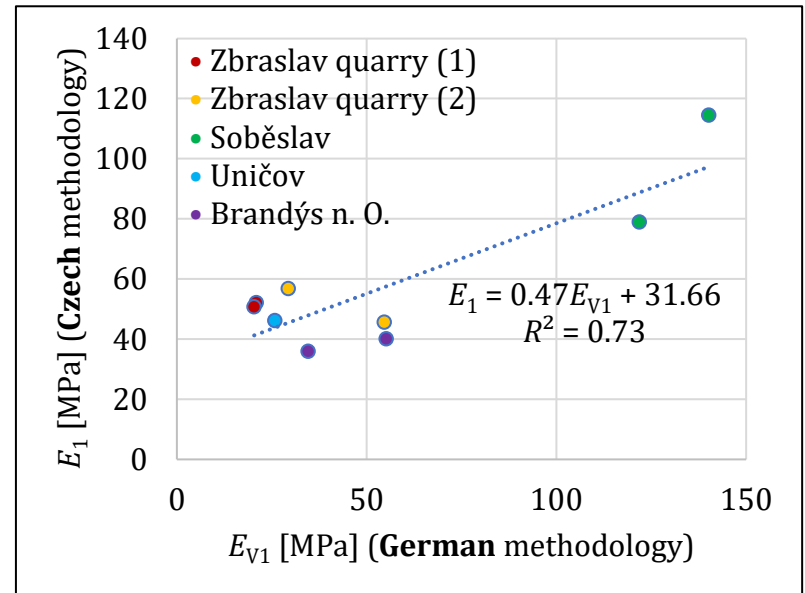
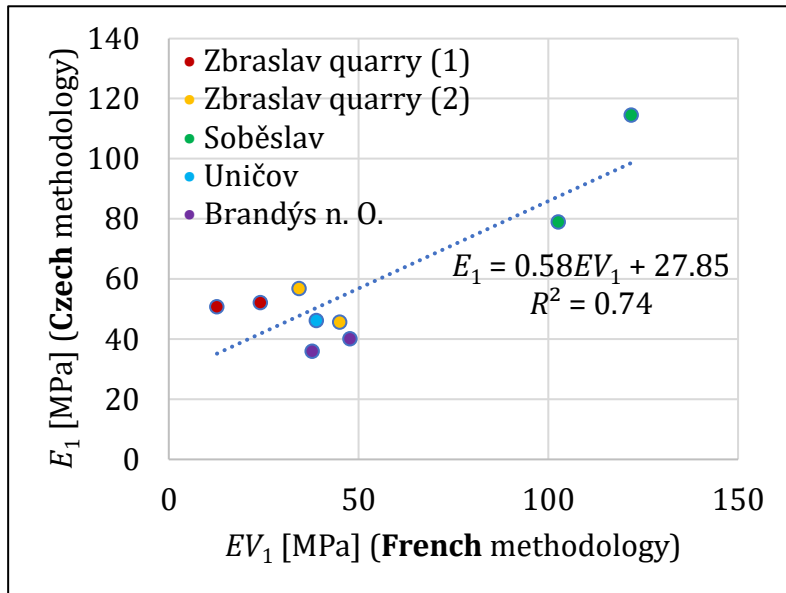
# Results

## Deformation moduli from the second load cycle



# Results

## Deformation moduli from the first load cycle



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# Discussion

	Correlation coefficient $R^2$	
	Material independently	
	First load cycle	Second load cycle
Czech and French methodology	0.74	0.94
Czech and German methodology	0.73	0.72
	CSM 0/32	CSM 0/63
	Second load cycle	
Czech and French methodology	1.00	0.98
Czech and German methodology	0.68	0.90



# Discussion

Material	Equation of linear trend	$R^2$ [-]	$EV_2$ , resp. $E_{V2}$ [MPa]	$E_2$ [MPa]
Comparison of SPLT according to the Czech and French methodology				
CSM 0/32	$E_2 = 0.93EV_2 + 24.45$	1.00	80	98.6
CSM 0/63	$E_2 = 0.92EV_2 + 14.00$	0.98	80	87.7
independently	$E_2 = 1.12EV_2 + 2.26$	0.94	80	92.0
Comparison of SPLT according to the Czech and German methodology				
CSM 0/32	$E_2 = 0.60E_{V2} + 42.27$	0.68	80	90.3
CSM 0/63	$E_2 = 0.51E_{V2} + 30.49$	0.90	80	71.3
independently	$E_2 = 0.66E_{V2} + 25.31$	0.72	80	78.1



# Conclusions

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- 30 SPLTs performed on different materials
- Mutual relations expressed independently and for selected materials
- Indicative correlation for values of the deformation modulus from the second load cycle
- Further comparative sets in 2022 – 2023



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# Thank you for your attention.

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