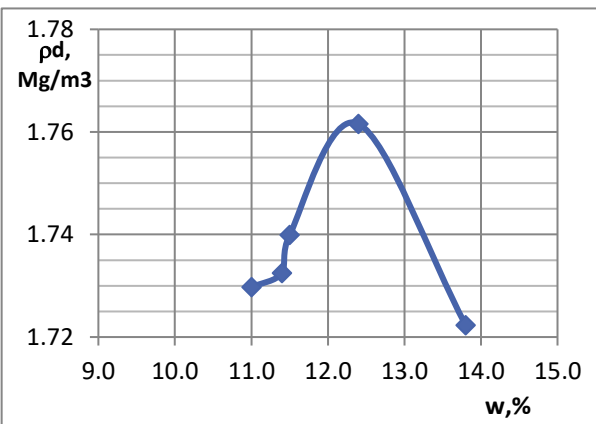


Customer: "Steiger engineering" Ltd.  
Date of received of samples: 10.06.2021.

Location: <b>Rail Baltica Parnu - Estonian/ Latvia border. Quarrier Q80</b>	Type of sample	<b>D</b>
Soil description:  <i>Medium grained SAND</i>	Lab. No.	621S116
	Sample No	Q80 - 20
	Depth, m	-

### Proctor compaction testing result

Nr.	Water content w, %	Bulk density of soil $\rho$ , Mg/m <sup>3</sup>	Dry density of soil $\rho_d$ , Mg/m <sup>3</sup>
1	11.0	1.92	1.730
2	11.4	1.93	1.732
3	11.5	1.94	1.740
4	<b>12.4</b>	<b>1.98</b>	<b>1.762</b>
5	13.8	1.96	1.722
Max dry density of soil, Mg/m <sup>3</sup>			<b>1.76</b>
Optimum moisture, %			<b>12.4</b>



### Plasticity and sulphates soluble in acid testings results

Liquid limit $w_L$ , %	Plastic limit, $w_p$ , %	Plasticity index, $I_p$ , %	Sulphate soluble in acid, %	
			SO <sub>3</sub> ,	SO <sub>4</sub> ,
non-plastic			<0,0012	<0,0015

Customer: "Steiger engineering" Ltd.

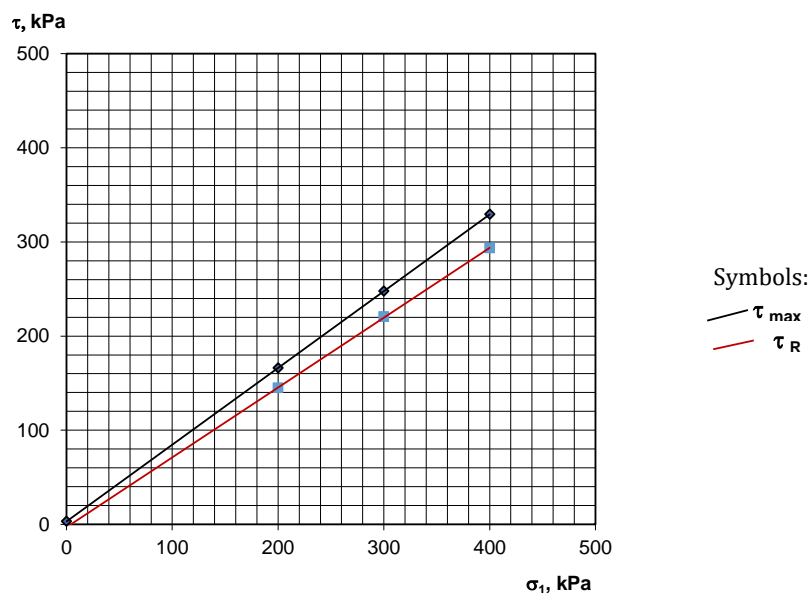
 Date of received of samples: **10.06.2021.**

<b>Consolidated drained direct shear test</b>		
Test method	<b>LVS EN ISO 17892-10:2018</b>	
Location: <b>Rail Baltica Parnu - Estonian/ Latvia border. Quarrier Q80</b>	Type of sample	<b>D</b>
Soil description:  <i>Medium grained SAND</i>	Lab. No.	621S116
	Sample No	Q80 - 20
	Depth, m	-

**Physical properties of soil**

Specimen No.	w, %	S <sub>r</sub>	ρ <sub>s</sub> Mg/m <sup>3</sup>	ρ <sub>0</sub> Mg/m <sup>3</sup>	ρ <sub>d</sub> Mg/m <sup>3</sup>	e	n, %	Initial specimen dimensions			Shear speed, mm/min
								H, mm	D, mm	S, mm <sup>2</sup>	
1	12.4	0.61	2.65	1.94	1.73	0.535	34.9	22.99	60.1	2835.9	0.500
2	12.4	0.61		1.94	1.73	0.535	34.9	22.97	60.1	2834.0	
3	12.4	0.61		1.94	1.73	0.535	34.9	22.75	60.0	2827.4	

Specimen No.	Pressure σ <sub>1</sub> , kPa	Max shear strength					Residual shear strength					After testing w <sub>r</sub> , %
		H deform %	τ max, kPa	tg φ	φ', grādi	c', kPa	H deform %	τ <sub>R</sub> , kPa	tg φ	φ' <sub>R</sub> , grādi	c' <sub>R</sub> , kPa	
1	200	2.4	166.2	<b>0.815</b>	<b>39.2</b>	<b>3</b>	14.8	144.8	<b>0.743</b>	<b>36.6</b>	<b>0</b>	21.0
2	300	2.3	247.6				14.8	220.4				18.0
3	400	2.8	329.2				14.7	293.3				17.7



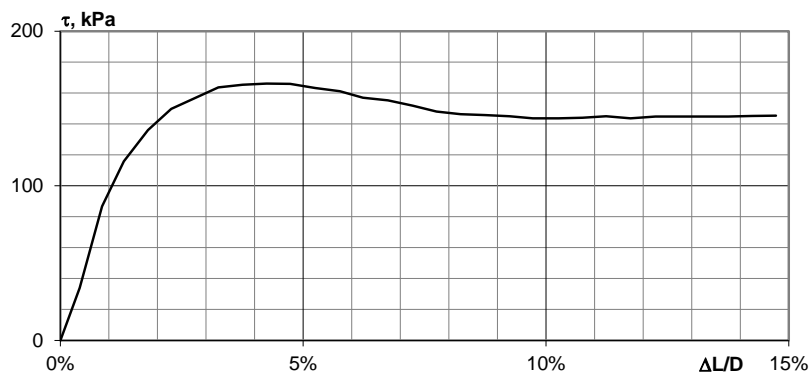


Customer: "Steiger engineering" Ltd.  
Location: Rail Baltica Parnu - Estonian/ Latvia border. Quarrier Q80

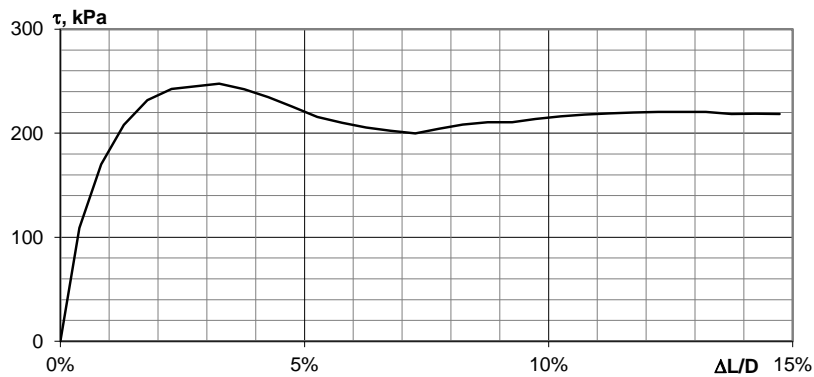
**DIRECT SHEAR RESISTANCE CURVES**

Lab. no.	621S116	Sample No	Q80 - 20
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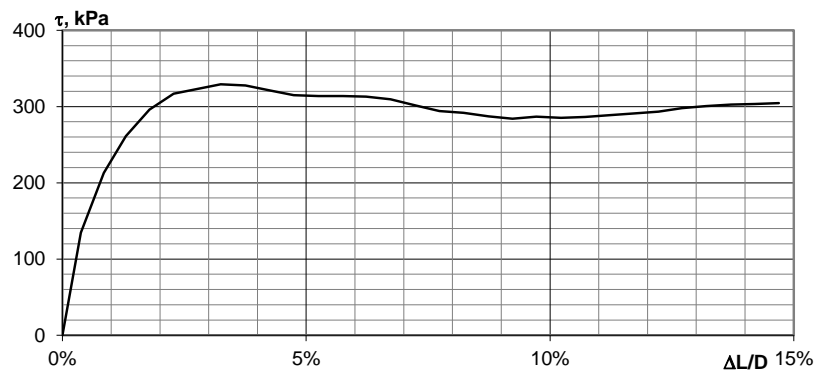
$\sigma_1 = 200 \text{ kPa}$



$\sigma_1 = 300 \text{ kPa}$



$\sigma_1 = 400 \text{ kPa}$





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Customer: "Steiger engineering" Ltd.

Location: Rail Baltica Parnu - Estonian/ Latvia border. Quarrier Q80

**DIRECT SHEAR RESISTANCE CURVES**

Lab. no.	621S116	Sample no.	Q80 - 20
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**Photos of the specimen in shear plane**

Specimen 1

$\sigma_1 = 200\text{kPa}$



Specimen 2

$\sigma_1 = 300\text{kPa}$



Specimen 3

$\sigma_1 = 400\text{kPa}$



The customer is liable for sampling process accuracy and quality.

Testing methods: Proctor compaction test - EN 13286-2:2012  
water content - EN ISO 17892-1:2015,  
bulk density - EN ISO 17892-2:2015,  
direct shear test - EN ISO 17892-10:2019.  
liquid limit - EN ISO 17892-12, p. 5.3. (fall cone method, 30°/60g)  
plastic limit - LVS EN ISO 17892-12, p. 5.5.  
Sulphates soluble in acid - LVS EN 1744-1+A1:2013, p.13


Testing date: 14.06.-29.06.2021.

Testing results apply to the material that is specified in the report.

It is prohibited to partially reproduce testing results without a written permit from the Latvian Geotechnical Laboratory.

The report was prepared by I. Grinbauma, reviewed by S. Terentjeva.

Date: 2.07.2021.

Head of laboratory  S. Terentjeva	Testing report 621S116-2021 Sheet 4 of 4
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