

WE DESIGN FOR YOUR SAFETY



BY SPECIALISTS, FOR PROFESSIONALS

# MISSION



We fulfil our mission by:

- Improving work safety.
- Providing reliable knowledge.
- Developing employee awareness.
- Giving professional advice.
- Building reliable and lasting business relationships.
- Creating economic benefits for our Clients.

**KOPRAS Sp. z o.o.**

EXCAVATION SUPPORT SYSTEMS

Company catalogue





## INTRODUCTION

Ladies and Gentlemen,

This year we are celebrating our 34th anniversary. The experience we have gained over these years has had a significant impact on our shoring constructions. This catalogue features our range of high-quality products, manufactured according to the latest technologies, while maintaining the most stringent European standards concerning construction, welding, pumping, and painting. Our line of "Shoring systems for temporary wall protection of excavations" features structures which have been tested and proven their reliability throughout our company's history.

Our systems hold EuroTest certificates issued by DGUV Test, which are recognised throughout Europe. We are a family company based fully on Polish capital and focused on our Clients and their satisfaction. Koprass is not only production, sales, and rental. It is a partnership in the implementation of investments from the design stage to the completion of construction works.

**We are the only manufacturer to buy back 100% of our products and each client can count on the return of our products after the completion of the investment. As part of our participation in each project, we help to design, adapt, select and use our products.**

We look forward to working with you.

*Marek Kopras*



## FOREWORD

Kopras is a leading manufacturer of shoring systems. We offer a wide range of products which guarantee the safe performance of construction work in temporary excavations (i.e. with an expected period of use of no more than 1 year).

**According to the Regulation of the Minister of Environment of 06.02.2003 on occupational safety and hygiene during construction works (Journal of Laws of 2003 No. 47, item 401) § 147.1 excavations with unreinforced vertical walls, without strutting or support, may be performed only up to a depth of 1 m in compact soils, in the event that the area around the trench is not encumbered in a strip with a width equal to the depth of the trench.**

Taking the above into account, it should be noted that it is possible not to use shoring systems only in certain cases of narrow excavations, i.e. with a bottom width not exceeding 1.5 m. In other cases, the stability of the excavation slopes should be ensured by providing suitable shoring. A wide range of possible solutions is presented in this catalogue (guide). It will allow you to select the appropriate shoring systems to ensure safe and cost-effective work.

Kopras is a manufacturer and supplier of Shoring Systems for Temporary Excavations as well as providing training in their operation and use. During our 33-year history, we have been constantly improving our products, as well as adding new items which can confidently compete with similar products of European companies, and sometimes our solutions outperform others available on the market in terms of innovation.

All our shoring system solutions were created on the basis of our own technologies, as a result of our constructors' work. The inspiration for most of the new solutions was and is undoubtedly the founder and owner of the company, Mr. Marek Kopras, who draws new ideas from his own experience, the experience of contractors, and from his cooperation with technical universities, in particular with the Institute of Construction and Geoengineering of the University of Poznań and the Poznań University of Technology. All Koprass products were created as a result of detailed static and strength calculations, as well as numerous tests.

The 2021 catalogue, in addition to the traditional and reliable Box systems, presents a number of their modifications with the use of fixed and detachable struts. One of our premium products are shoring systems made of aluminium profiles thanks to their durability, lightness, and the possibility of long-term use with low maintenance costs.

The 2021 catalogue also includes pit rail shoring for securing wide excavations with dimensions up to (21x21m), which allows for easy installation of e.g. prefabricated tanks or sewage pumping stations.

**Kopras, apart from the production and rental of shoring systems, provides training for the users of its products, as well as for future engineers studying at technical universities.**

Our employees have conducted speeches at numerous specialist conferences in Poland, presenting a number of possibilities of using our products, and also pointed improper uses which could pose a threat to the health and lives of users.

The main priority of our President, Marek Kopras, is to ensure the safety of people working in excavations, and to provide companies using Koprass products cost minimization through the selection of appropriate solutions, which are the responsibility of our technical advisors.

A careful study of the contents of this guide, which shows how to properly perform excavation work and indicates numerous mistakes made in practice, will ensure rational and safe work. The catalogue shows the wide range of possibilities offered by KOPRAS shoring systems.

*Wiesław Buczkowski*  
Profesor Wiesław Buczkowski

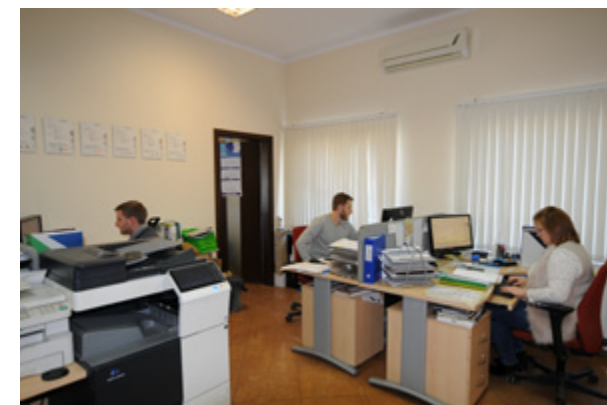
Poznań, March 2020



## NEW TECHNOLOGIES

Since the beginning of the first shoring systems for excavations, we have never ceased searching for better, more durable and cheaper solutions for securing temporary excavations. This applies in particular to individual shoring elements such as plates, rails, and struts. However, the most important factors are how the entire support system is constructed, the method of connecting individual elements and their selection, the technology of execution, the method of securing, and the order of assembly in the excavation.

Each year we introduce new constructions and solutions. Materials and elements which are connected together also change. Today, most production processes are carried out with the help of automatic machines, robots, and the details are cast, forged, extruded, pressed, and even glued. Painting takes place in our modern eco-friendly painting centre after cleaning in the shot-blasting chamber. The details are tested in laboratories, which provides the basis for obtaining quality certificates for products, the ET mark, and the entire production is carried out in accordance with the ISO 3834 standard.



## STAFF

We provide our competent staff with the opportunity to pursue their professional aspirations. Thanks to our employees' extensive experience in production, technical consulting and designing, we are able to provide the best possible customer service.

The commercial department and technical office of the company have for years supported design offices, investors and contractors at the stage of selecting the type of shoring for installation and construction works below ground level. Our Clients can confirm the reliability of our consulting services. We recommend which systems would be most optimal for each investment. The shoring and its configuration we recommend to our Clients is always cost-efficient, provides adequate strength, and ensures the right amount of space in the excavation.

It is the result of many years of the company's experience in using excavation shoring systems and responding to market needs. For many years, Kopras has been exhibiting its products at national fairs, trade exhibitions, and at foreign fairs. Trade fairs are not just a marketing opportunity for Kopras as a leader in this segment on the Polish market, but also provide a chance to interact with potential Clients and exchange experiences with other exhibitors.

The current product catalogue features a wide range of choices. Our development plans will ensure the extension of the catalogue in the future.

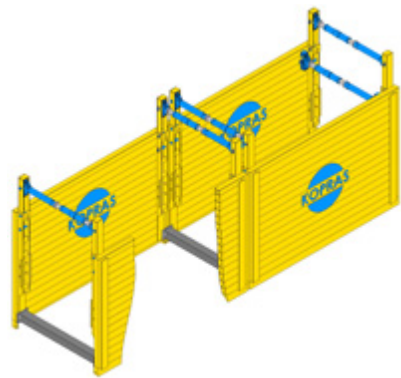
Due to the continuous development of our products, the strength and weights given in the tables may change. The actual value of strength and weights for a given product are provided in the offer and declaration of conformity.



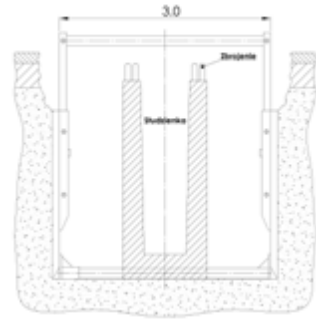
## FEATURED PROJECTS

## Implementation of a trench at the Volvo auto repair shop

The owner of the Volvo auto repair shop in Warsaw, Auto Gala, requested the securing of a trench excavation in the workshop's hall, which made it impossible to use traditional shoring systems. Koprás designed and produced a special solution for securing a 21 m long, 3 m wide, 3 m deep excavation, while leaving a 2.8 m working clearance beneath the strut. Thanks to the innovative solution, the general contractor carried out all activities related to securing the excavation and concrete works in accordance with the schedule, and the entire project was a great success.



## Designed solution



## Trench visualization and security



## Implementation

Selection of a temporary shoring system for the foundation of a rainwater tank in the Chabrowe Wzgórza apartment complex at Zeusa Street in the village of Kowale.

The project assumed the construction of a prefabricated reinforced concrete tank with dimensions of 24 m x 6 m below the ground surface at a depth of about 5 meters. Due to the existing situation, which resulted from the fact that residential buildings were built first, the construction of this tank could not take place without securing the excavation walls. The construction was planned below the foundations of the buildings and at a distance of 8 m from each of them.

Because the use of vibratory hammers would be risky for the foundations of newly constructed buildings, Kopras was asked to provide a solution. An additional difficulty was caused by the groundwater and an earlier attempt to perform the excavation without a shoring system. Kopras carried out calculations and suggested a suitable solution. The implementation proceeded without any problems under the supervision of specialists from the shoring system manufacturer. As a result of correct decisions and good cooperation of participants in the project, the tank was made on time, quickly, cheaply, safely and at a high standard, which was necessary, due to the required tightness and durability of the facility.



Previous state



## Implementation

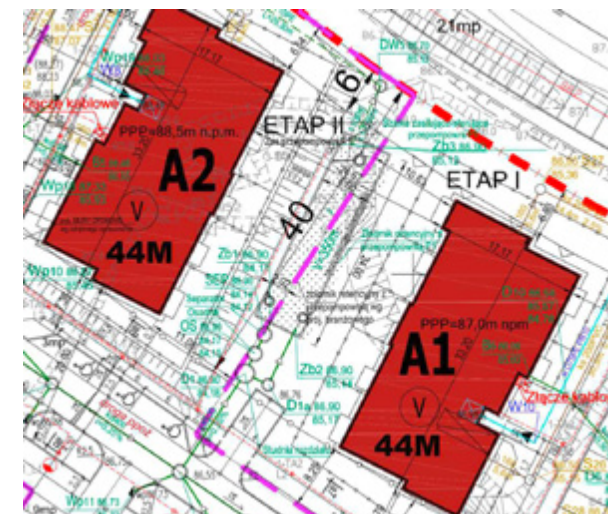


### Final effect

## SCOPE OF CUSTOMER SUPPORT

Our customers are our top priority, therefore we offer the highest possible level of support in the selection and use of shoring systems. When commencing a task, we have to choose the right shoring system in order to perform the work safely and in the most effective way possible.

As the only company on the market, we offer support in the scope of performing pressure calculations allowing the safe use of the shoring system. The first step is to send us the following data.



A map with the marked area of implementation and the marked place of carrying out tests

Formula for active ground pressure:

- in non-cohesive soils

$$e_a = K_a \cdot (\gamma \cdot z + q) \quad [kN/m^2]$$

- in cohesive soils

$$e_a = K_a \cdot (\gamma \cdot z + q) - 2c \cdot \sqrt{K_a} \quad [kN/m^2]$$

where:

$e_a$ -active ground pressure [ $\text{kN/m}^2$ ] – characteristic value

$\gamma$  - volumetric weight of soil [kN/m<sup>3</sup>]

 $\varphi_k$ - ground internal friction angle  $^{\circ}$ 

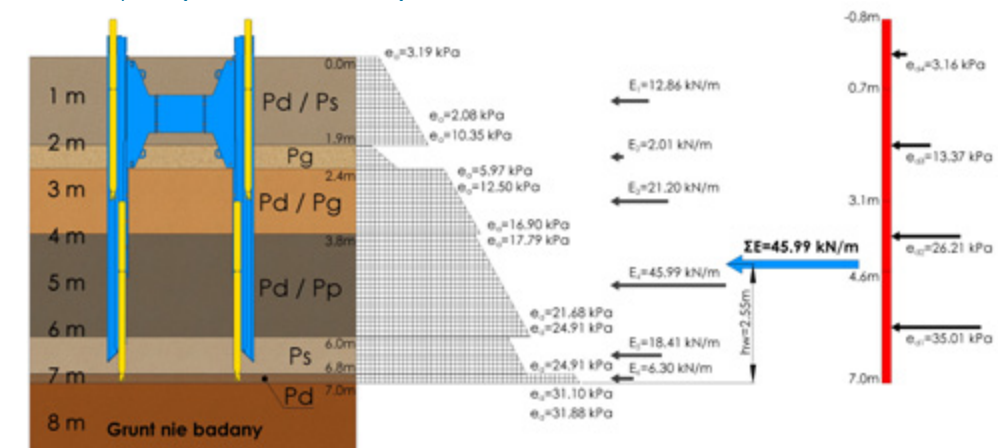
z - the depth on which the

q - surcharge load [kN/m<sup>2</sup>]

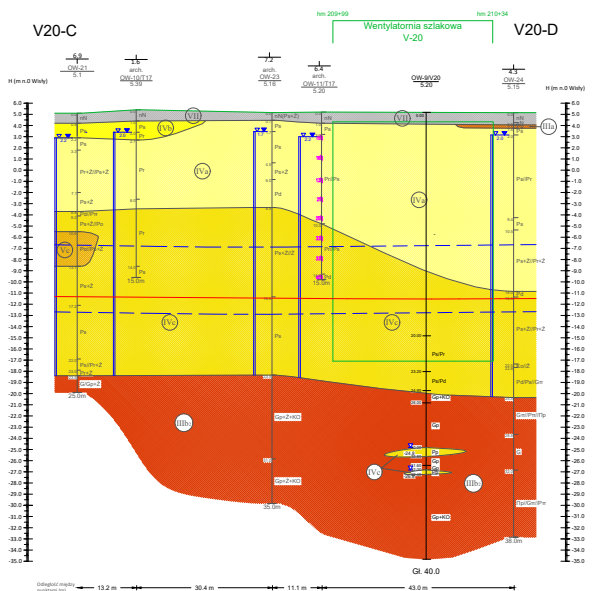
$K_a$ - soil pressure coefficient

c - soil cohesion [kPa]

We perform these calculations for you and provide ready-made solutions, and you do not incur any costs.



During the implementation of the task, we assist you from unloading and assembly on the construction site, through assembly in the excavation, and during disassembly. We help in unforeseen and emergency situations by introducing additional security measures or exchanging for more effective solutions.



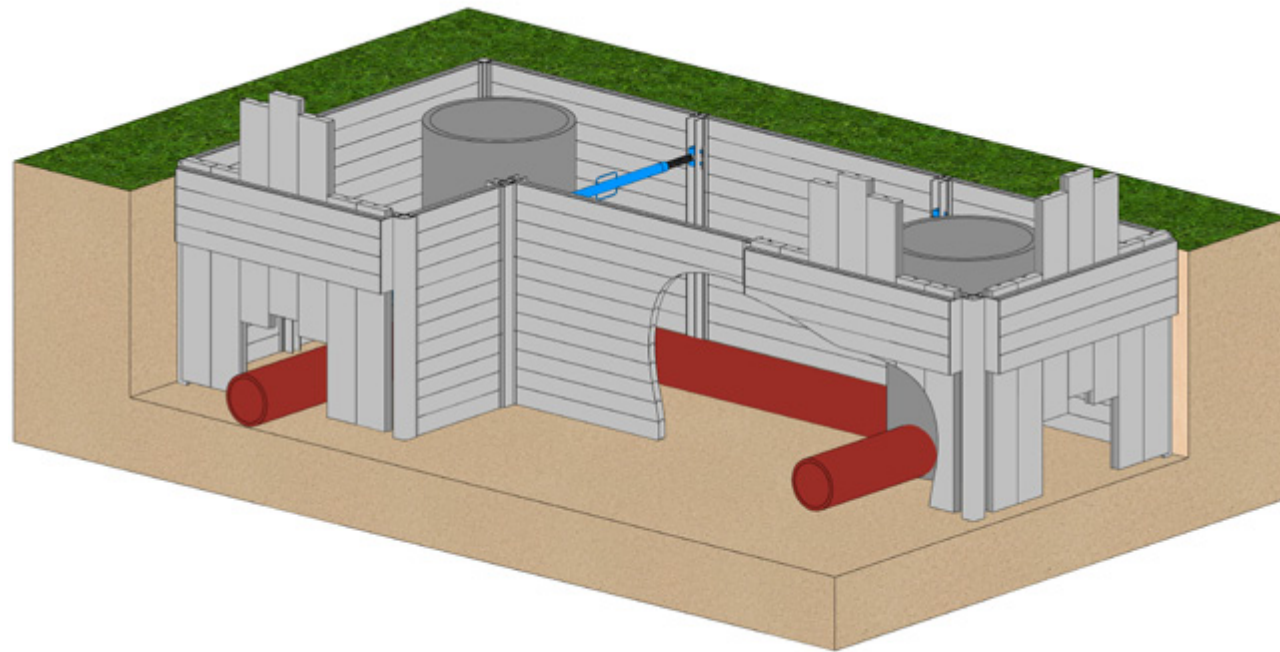
### Profile of drilling/probing

### Table of soil parameters

OBJAŚNIENIA GEOLOGICZNE		WARTOŚCI WYPROWADZONE PARAMETRÓW GEOTECHNICZNYCH wg EC7									
1	2	3	4	5	6	7	8	9	10	11	
Stratygrafia	Opis stratygraficzny Opis litologiczny	Nazwa warstwy geologicznej	Symbol warstwy wg PN-ISO 14688	Błędny profilu		Współczynnik tarcia $\alpha$ [°]	Ciężar właściwy $\gamma$ [kN/m³]	Ciężar właściwy $\gamma_{\text{sat}}$ [kN/m³]	Ciężar właściwy $\gamma_{\text{sat}}$ [kN/m³]	Współczynnik tarcia $\alpha$ [°]	
				Błędny profilu $\gamma_{\text{sat}}$ [kN/m³]	Błędny profilu $\gamma_{\text{sat}}$ [kN/m³]						
	głębokość, nieopisywana		GL, s/n								
	typ	Is	Y	-	-	209,5	1,23	0,000	4,0	0,25	-
	kreda jasińska	Is	IG	-	4,30	90,5	1,49	0,000	8,0	1,2	-
Ciepłota, wilgotność	głównie piaszczyste, prochniczone, piaszki gliniaste z domieszką grubzieliwy	3c	$\gamma_{\text{sat}}$ $\gamma_{\text{sat}} = \gamma + \rho \cdot g$	-	4,40	25,5	1,69	0,019	15,8	4,0	-
	piaski gliniaste, gliny piaszczyste	IIa	$\rho_s$ , $\rho_d$ , $\rho_{\text{sat}}$ , $\rho_{\text{sat}}$ , $\rho_{\text{sat}}$ , $\rho_{\text{sat}}$ , $\rho_{\text{sat}}$	-	4,40	16,5	2,15	0,025	14,6	24,0	-
		IIb	-	4,20	15,5	2,20	0,031	18,2	37,0	-	
		IIIs	0,50	-	11,5	2,70	0,0	35,5	62,0	-	
	piaski pylaste, drobne, średnie	IIIs	$\rho_s$ , $\rho_d$ , $\rho_{\text{sat}}$ , $\rho_{\text{sat}}$ , $\rho_{\text{sat}}$ , $\rho_{\text{sat}}$	0,70	-	9,0	1,89	0,0	30,5	56,0	-

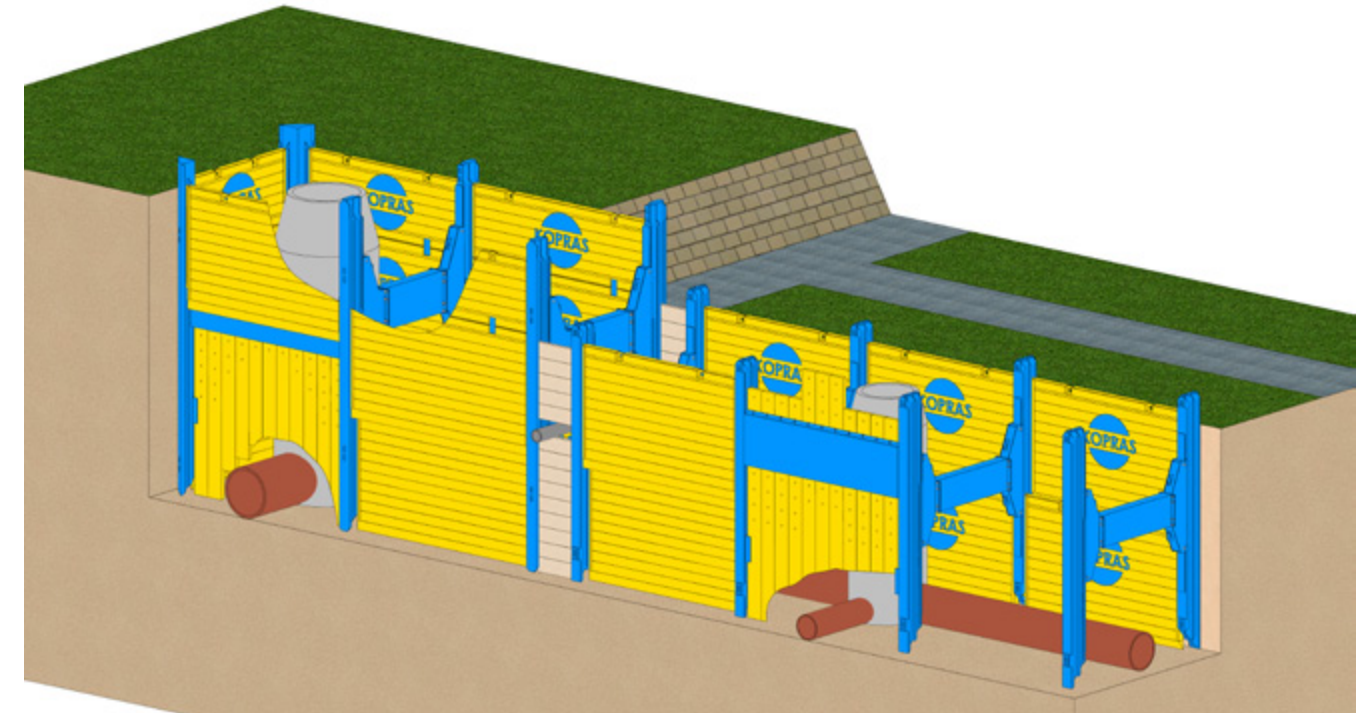


## THE USE OF DIFFERENT TYPES OF ALUMINIUM SYSTEMS

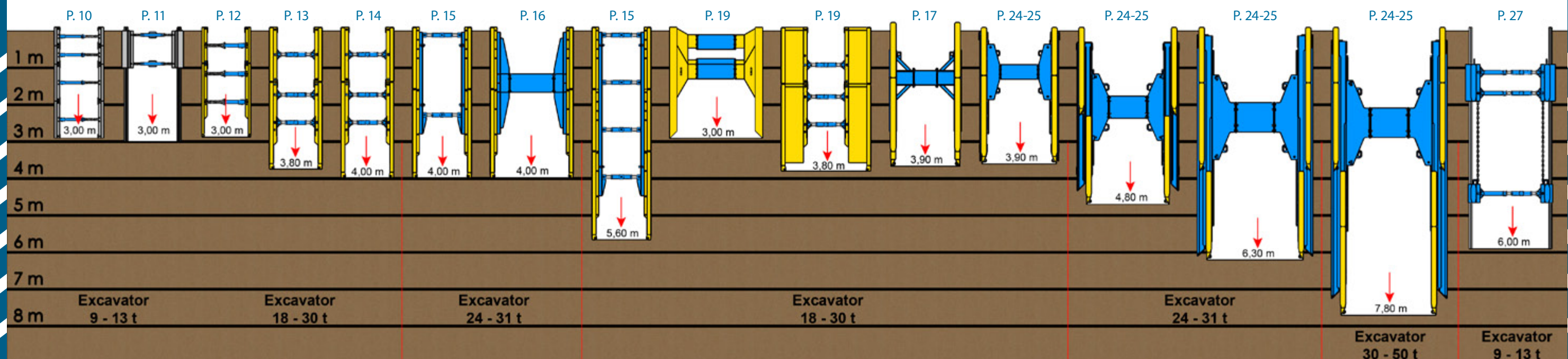


The use of a wide range of aluminium shoring elements as shown in the drawing allows for proper protection of smaller excavations in spite of collisions.

## THE USE OF DIFFERENT TYPES OF STEEL SYSTEMS



The use of a wide range of shoring systems as shown in the drawing allows for proper protection of the excavation in spite of collisions. The use of different lengths of plates allows for a precise approach to collisions and their shoring. All elements seen in the drawings (plates, top plates, linear rails and corner rails, struts with inserts up to 10 m long, segment walls) are available in our rental.

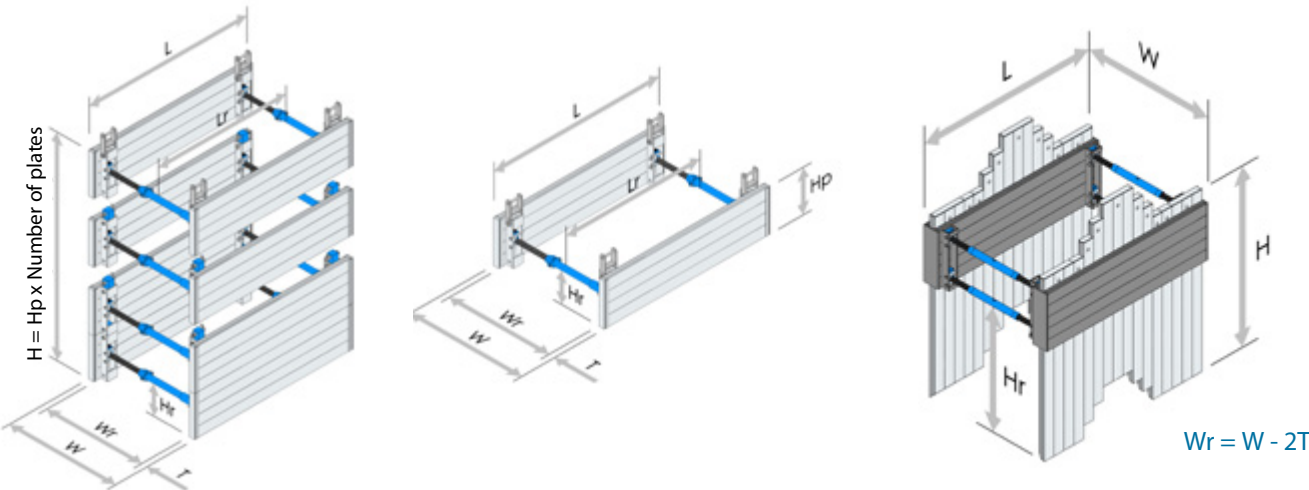




ALUBOX  
ALUMINIUM STRUCTURES

ALUMINIUM STRUCTURES  
PIT SHORING SYSTEMS

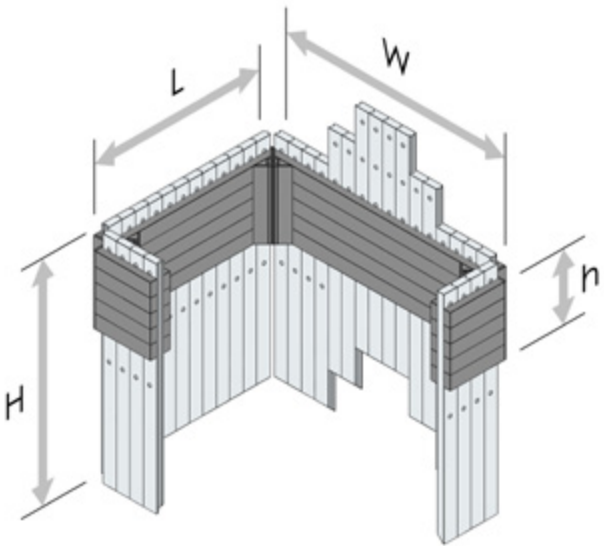
Aluminium is a very good construction material. Its service life is unlimited when properly used. Special profiles made of technically pure aluminium with increased durability allow for the construction of a wide range of shoring systems. Traditional boxes of various heights of plates and segment boxes are used to avoid transverse collisions. Most aluminium elements can be mounted manually. Aluminium box plates can be mounted using corner rails, which gives a wide range of pit shoring systems.



For shoring systems from 1500 mm to 2000 mm in height, the working clearance is 750 mm.

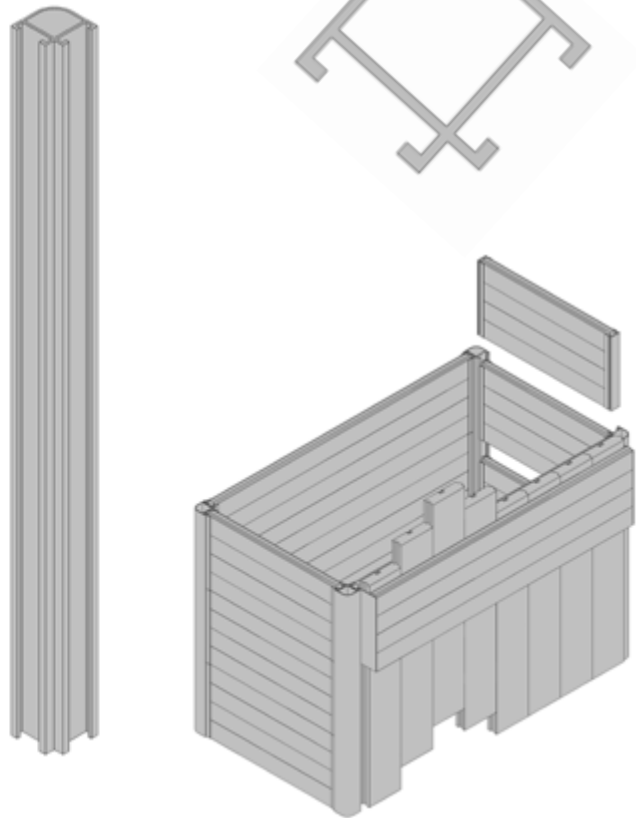
ALUMINIUM PLATES						
Plate length L [mm]	Plate height H <sub>p</sub> [mm]	Plate thickness T [mm]	Working length L <sub>r</sub> [mm]	Working clearance H <sub>r</sub> [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Plate weight [kg]
1000N	500	60	1200	220	90,0	16,4
1500N	500	60	1200	220	80,0	22,8
1500	500	60	1200	220	65,0	29,0
1500	1000	60	1200	320	65,0	58,0
2000N	500	60	1700	220	75,0	29,5
2000	500	60	1700	220	50,0	36,0
2000	1000	60	1700	320	50,0	72,0
2500N	500	60	2200	220	48,0	36,0
2500	500	60	2200	220	39,0	43,0
2500	1000	60	2200	320	39,0	85,0
3000N	500	60	2700	220	30,0	42,8
3000	500	60	2700	220	30,0	49,0
3000	1000	60	2700	320	30,0	98,0

SEGMENT WALL			
Wall length L [mm]	Wall height H [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Wall weight [kg]
1550	1700	30	135
1800	1700	28,5	139
2050	1700	25,2	158
1550	1900	22	138
1800	1900	20	158
2050	1900	19	170

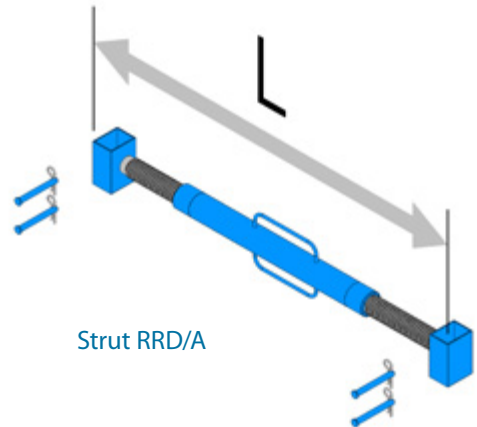


CORNER RAILS	
Rail length [mm]	Rail weight [kg]
700	4,7
1200	7,8
1700	11,2
2200	14,3

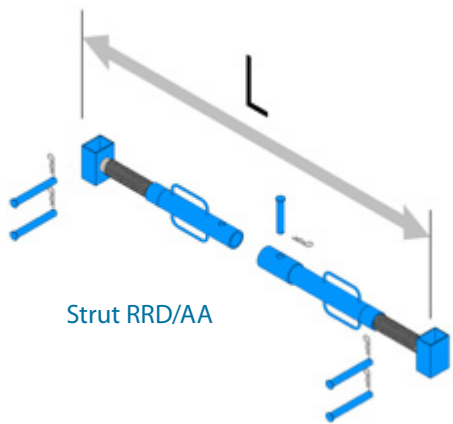
Aluminium corner rail



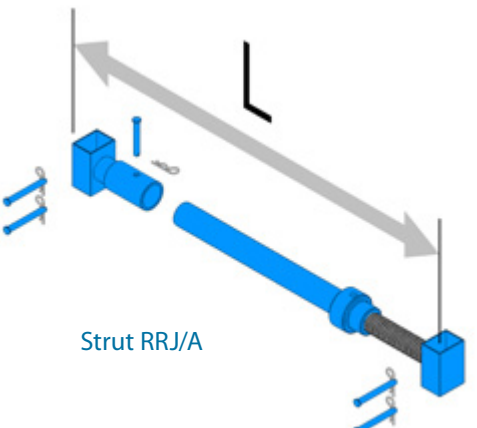
USED STRUTS



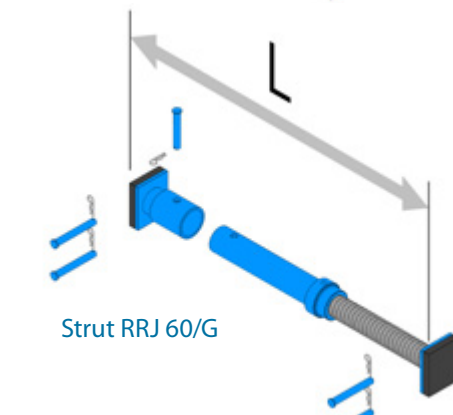
Strut RRD/A



Strut RRD/AA



Strut RRJ/A

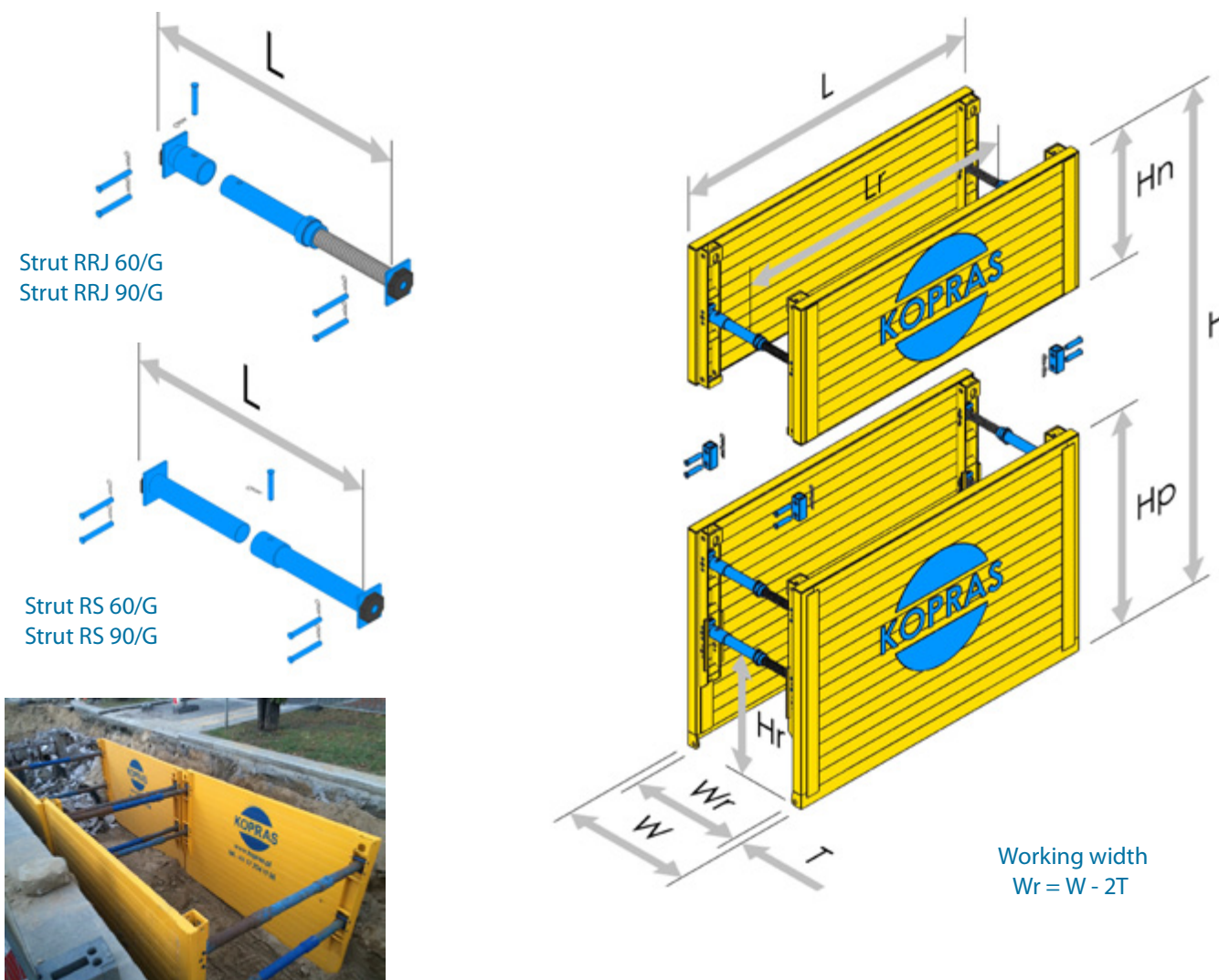


Strut RRJ 60/G



## MINIBOX

## USED STRUTS

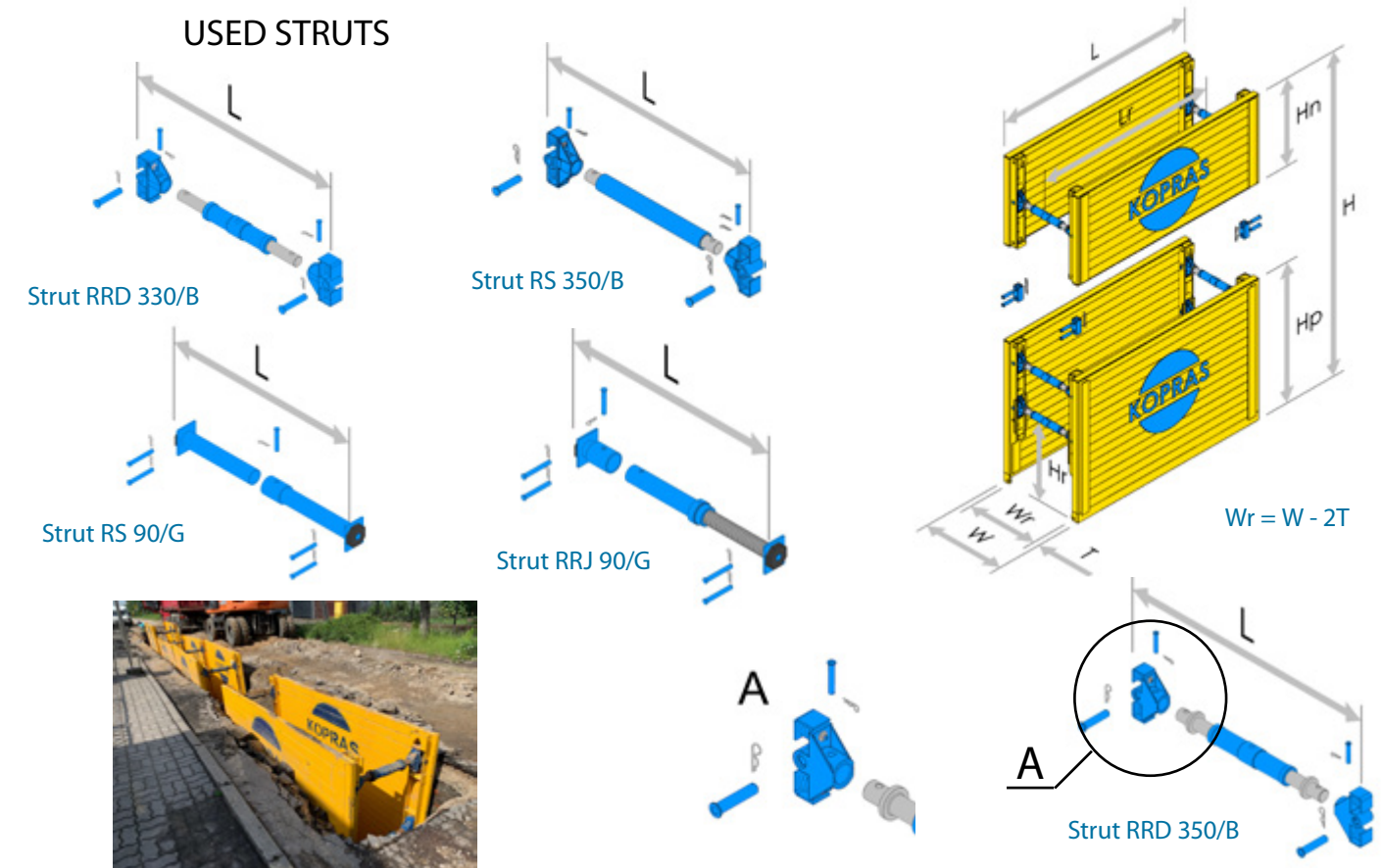


BASIC PLATES						
Plate length L [mm]	Plate height H <sub>p</sub> [mm]	Plate thickness T [mm]	Working length L <sub>r</sub> [mm]	Working clearance H <sub>r</sub> [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Plate weight [kg]
2000	1600	60	1600	900 / 780 / 660	27,5	245
2000	2000	60	1600	1040 / 920 / 800	27,5	295
2500	1600	60	2100	900 / 780 / 660	24	289
2500	2000	60	2100	1040 / 920 / 800	24	347
3000	1600	60	2600	900 / 780 / 660	20	333
3000	2000	60	2600	1040 / 920 / 800	20	400
TOP PLATES						
Plate length L [mm]	Plate height H <sub>n</sub> [mm]	Plate thickness T [mm]	Working length L <sub>r</sub> [mm]	Working clearance H <sub>r</sub> [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Plate weight [kg]
2000	1000	60	1600	-	27,5	165
2500	1000	60	2100	-	24	193
3000	1000	60	2600	-	20	221

It is possible to use inserts for all struts, which enables achieving a working width of up to 2000 mm. The weight of the complete trench box depends on the used top plate and strut.

## CITYBOX

## USED STRUTS



BASIC PLATES						
Plate length L [mm]	Plate height H <sub>p</sub> [mm]	Plate thickness T [mm]	Working length L <sub>r</sub> [mm]	Working clearance H <sub>r</sub> [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Plate weight [kg]
2000	2000	60	1600	1040 / 920 / 800	49	417
2000	2400	60	1600	1300 / 1100	38,5	481
2500	2000	60	2100	1040 / 920 / 800	33	491
2500	2400	60	2100	1300 / 1100	30,5	569
3000	2000	60	2600	1040 / 920 / 800	32,9	564
3000	2400	60	2600	1300 / 1100	32,9	656
3500	2000	60	3100	1040 / 920 / 800	29,7	637
3500	2400	60	3100	1300 / 1100	21,9	744
TOP PLATES						
Plate length L [mm]	Plate height H <sub>n</sub> [mm]	Plate thickness T [mm]	Working length L <sub>r</sub> [mm]	Working clearance H <sub>r</sub> [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Plate weight [kg]
2000	1000	60	1600	-	49	225
2000	1400	60	1600	-	49	291
2500	1000	60	2100	-	33	264
2500	1400	60	2100	-	33	343
3000	1000	60	2600	-	32,9	303
3000	1400	60	2600	-	32,9	394
3500	1000	60	3100	-	29,7	342
3500	1400	60	3100	-	21,9	445

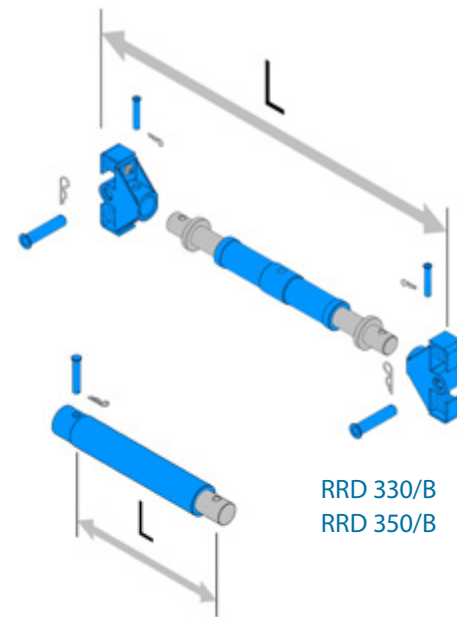
It is possible to use inserts for all struts, which enables achieving a working width of up to 4000 mm. The weight of the complete trench box depends on the used top plate and strut. In the case of plates with a height of 2400 mm, a larger clearance of up to 1520 mm can be achieved.



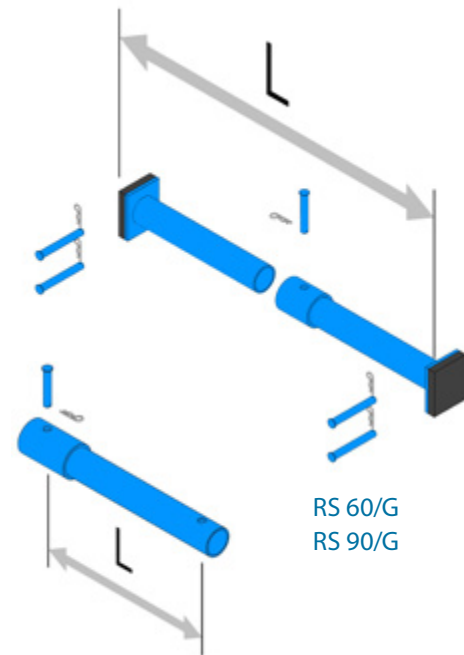
## BOX STRUTS

RRJ - Struts disassembled on one side  
 RRD - Struts disassembled on both sides  
 RS - Fixed struts

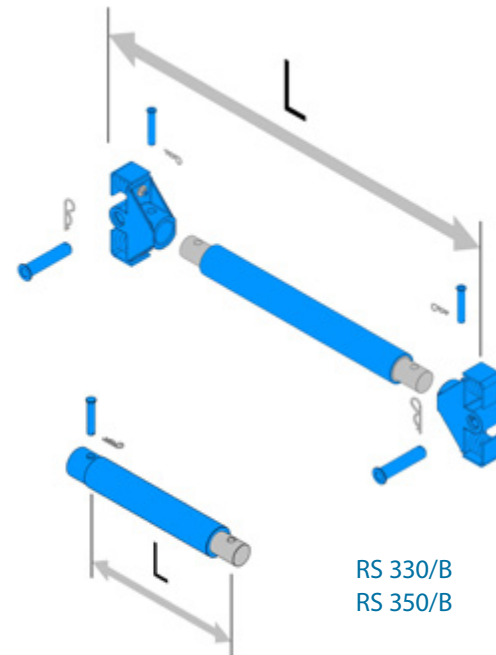
	RRD 330/B		RRD 350/B		RRD 330/B		RRD 350/B	
	Working width [mm]		Working width [mm]		Permissible pressure [kN]		Weight [kg]	
	min.	max.	min.	max.	Permissible pressure [kN]	Weight [kg]	Permissible pressure [kN]	Weight [kg]
Strut	800	1020	980	1250	351	46	467	68
Insert	400		400		297	10,8	415	17
Insert	500		500		286	11,9	401	19,5
Insert	600		600		258	13,2	372	22
Insert	800		800		222	15,8	320	27
Insert	1000		1000		196	18,4	312	32
Insert	2000		2000		98	35,4	230	56,5
Insert	2500		2500		-	-	170	68,5



RRD 330/B  
RRD 350/B



RS 60/G  
RS 90/G

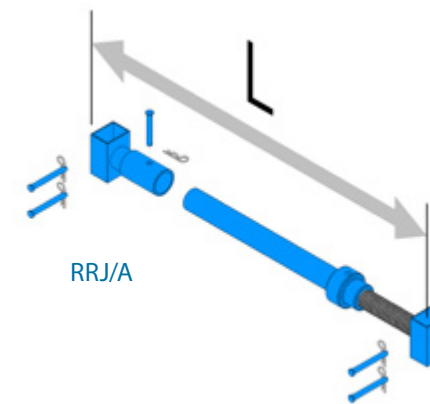


RS 330/B  
RS 350/B

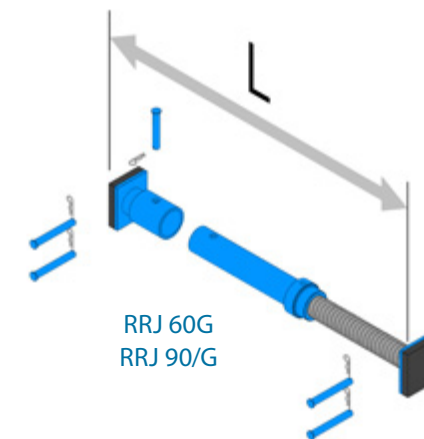
	Working width [mm]	RS 60/G		RS 90/G		RS 330/B		RS 350/B	
		Permissible pressure [kN]	Weight [kg]	Permissible pressure [kN]	Weight [kg]	Permissible pressure [kN]	Weight [kg]	Permissible pressure [kN]	Weight [kg]
Strut	1200	128	12,1	235	28,5	386	38	513	58,5
Insert	400	89	4,7	170	9	326	10,8	456	17
Insert	500	86	5,4	147	10,5	314	11,9	441	19,5
Insert	600	82	6	124	11,6	283	13,2	409	22
Insert	800	71	7,3	115	14,2	244	15,8	352	27
Insert	1000	66	8,7	111	16,8	215	18,4	343	32
Insert	1300	52	13,4	93	23,2	147	29,0	275	39
Insert	1800	-	-	68	29,5	108	33,0	230	51,5
Insert	2500	-	-	-	-	-	-	187	68,5

## BOX STRUTS

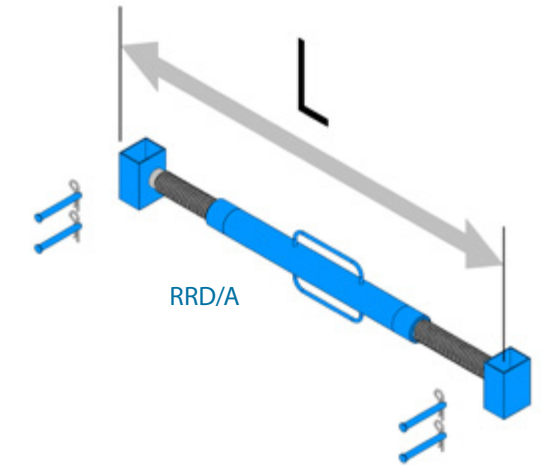
STRUT RRD/A				
TYPE	Working width [mm]		Permissible pressure [kN]	Weight [kg]
	min.	max.		
A	600	860	112	11,5
B	860	1200	106	13
C	1000	1400	80	15,5
D	1200	1800	72	19,5
E	1600	2200	58	25



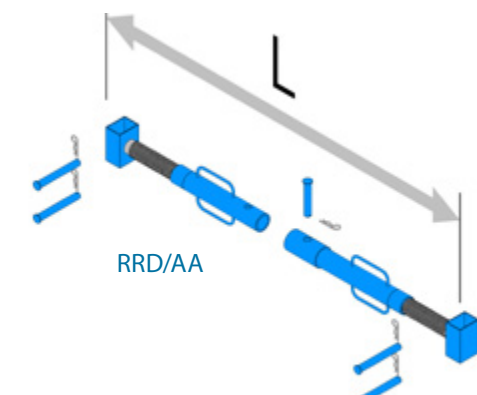
RRJ/A



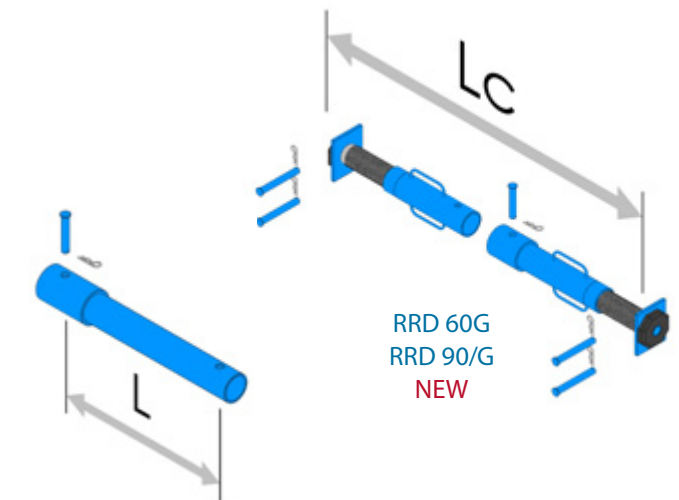
RRJ 60/G  
RRJ 90/G



RRD/A



RRD/AA

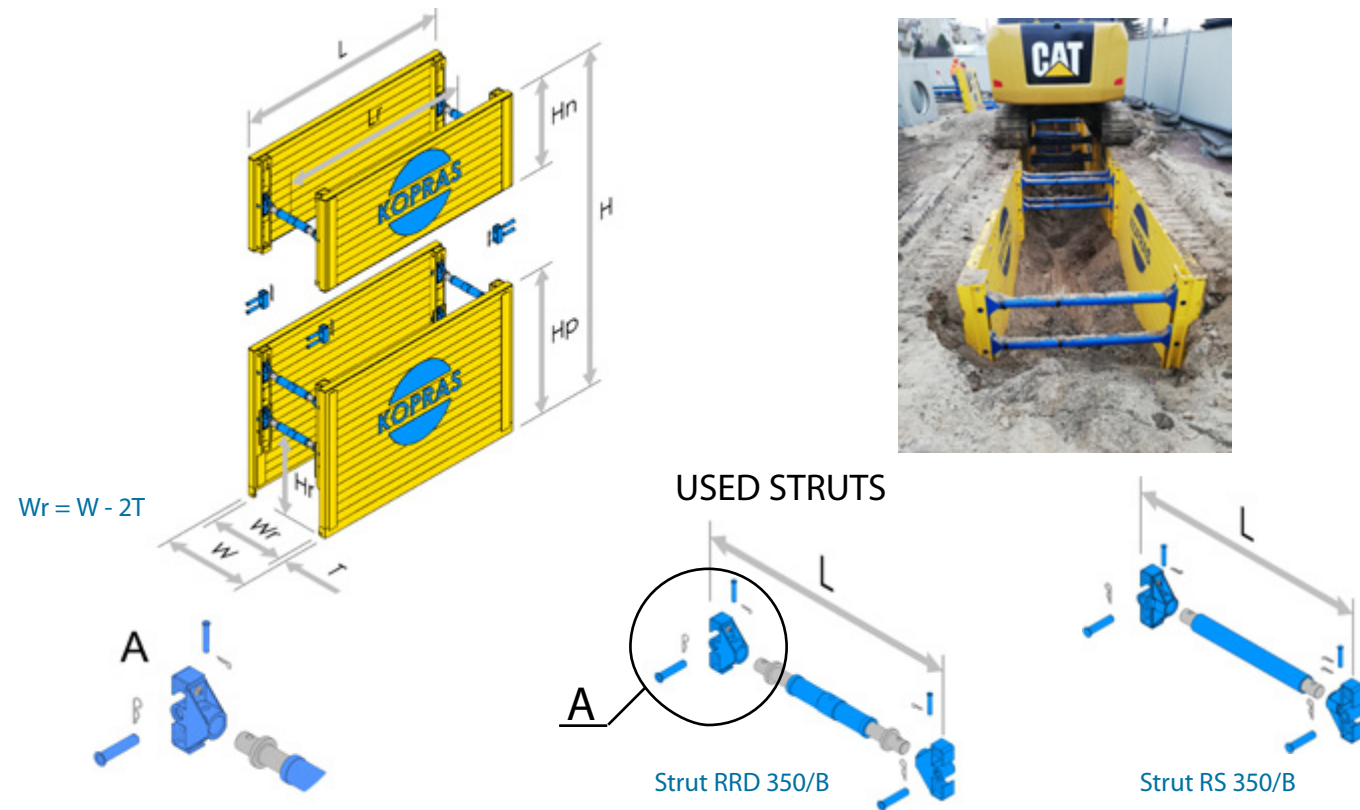


RRD 60/G  
RRD 90/G  
NEW

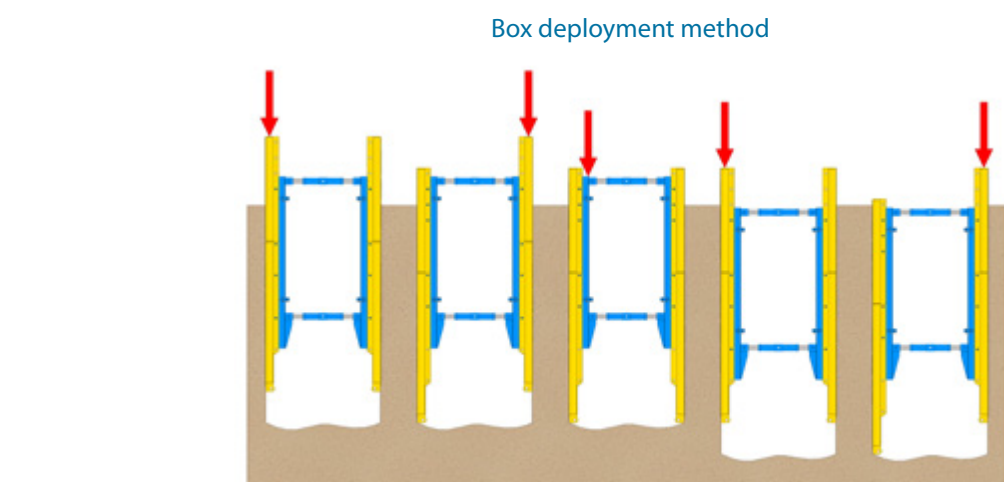
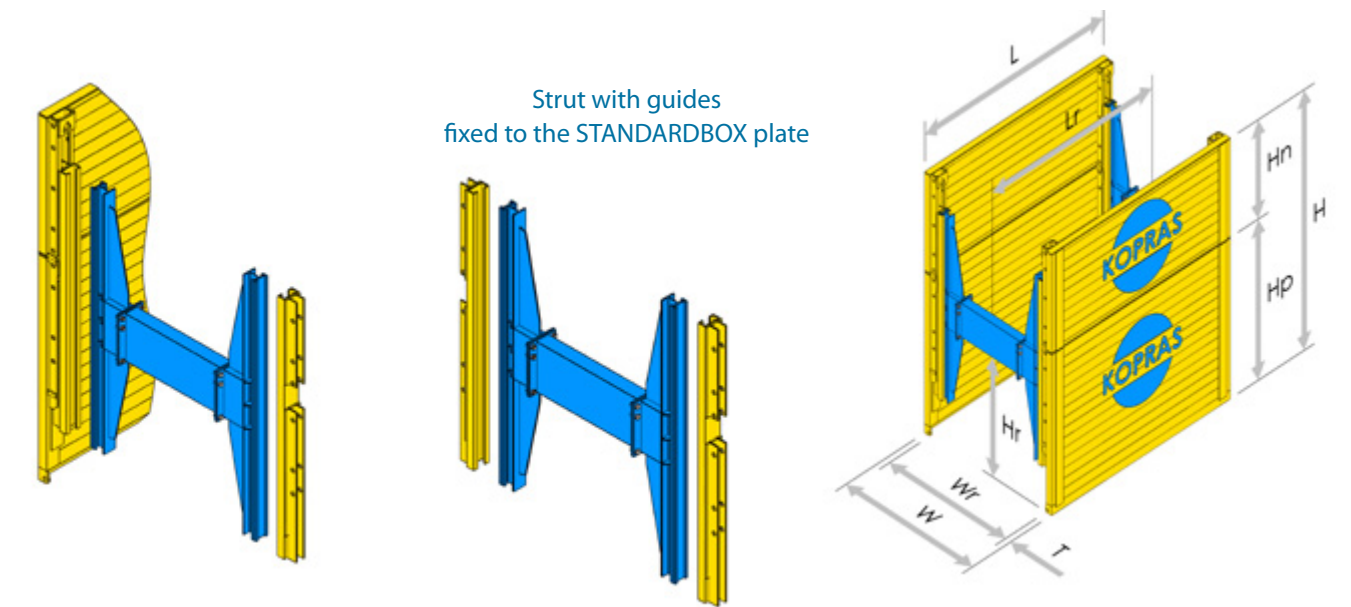
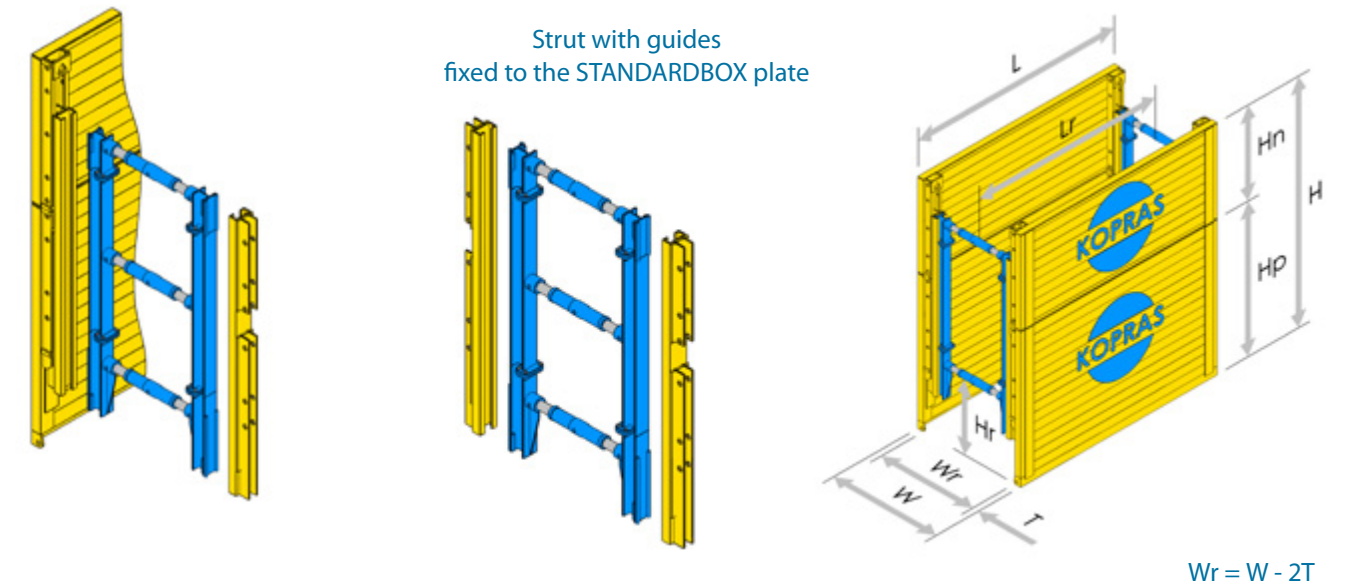
	Working width [mm]		RRJ/A		RRJ 60/G		RRJ 90/G		RRD/AA		RRD 60/G		RRD 90/G	
	min.	max.	Permissible pressure force [kN]	Weight [kg]	Permissible pressure force [kN]	Weight [kg]	Permissible pressure force [kN]	Weight [kg]	Permissible pressure force [kN]	Weight [kg]	Permissible pressure force [kN]	Weight [kg]	Permissible pressure force [kN]	Weight [kg]
Strut	800	1200	112	13,2	112	14	205	26,5	106	14	106	14	195	26,5
Insert	400		79	4,7	79	4,7	148	9	75	4,7	75	4,7	141	9
Insert	500		75	5	75	5	128	10,3	71	5,4	71	5	122	10,3
Insert	600		72	6	72	6	108	11,6	68	6	68	6	103	11,6
Insert	800		62	7,3	62	7,3	100	14,2	58	7,3	58	7,3	95	14,2
Insert	1000		58	8,7	58	8,7	97	16,8	55	8,7	55	8,7	92	16,8
Insert	1300		46	13,4	46	14	81	23,2	43	13,4	43	13,4	76	23,2
Insert	1800		-	-	-	-	62	29,3	-	-	-	-	55	29,3



## STANDARD BOX



The use of a single sliding strut for traditional boxes provides more possibilities of use and reduces the costs associated with damage to the threads of nuts and cast iron spring holders, so-called buffers limiting vertical deviation. Struts can be purchased separately and used in old types of boxes.

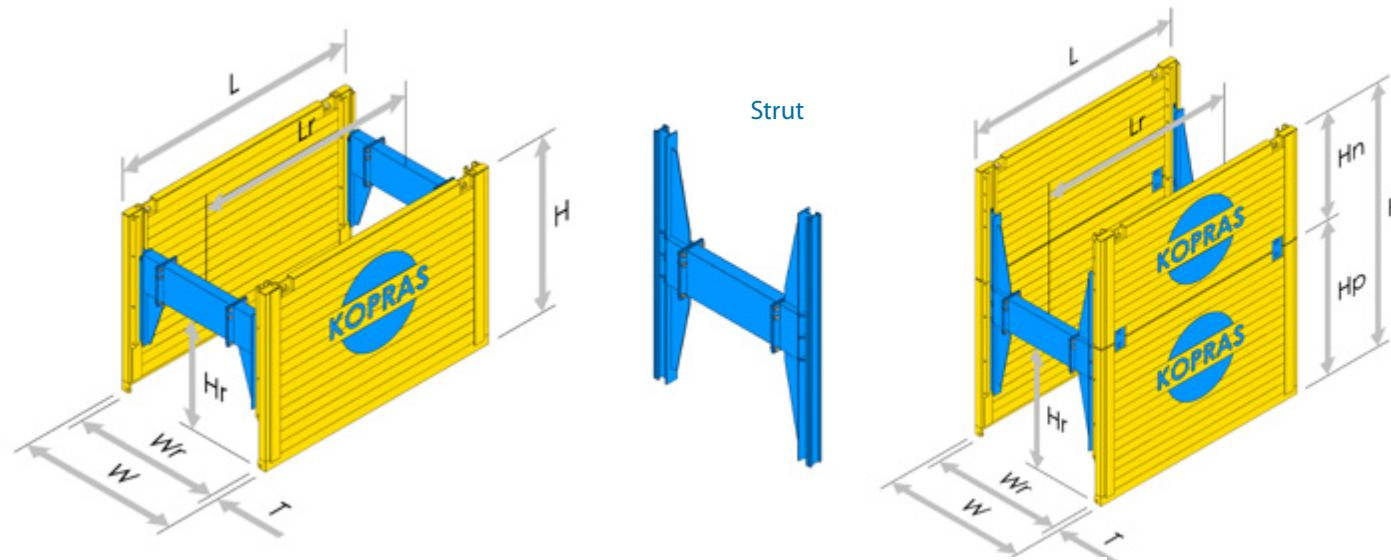
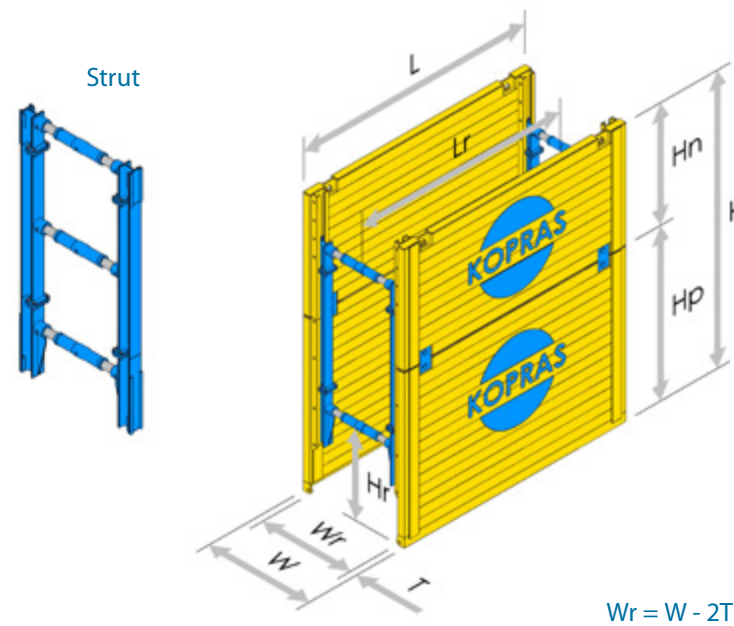


BASIC PLATES						
Plate length $L$ [mm]	Plate height $H_p$ [mm]	Plate thickness $T$ [mm]	Working length $L_r$ [mm]	Working clearance $H_r$ [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Plate weight [kg]
2000	2400	100	1600	1500 / 1250	115	610
2500	2400	100	2100	1500 / 1250	90	710
3000	2400	100	2600	1500 / 1250	74	820
3500	2400	100	3100	1500 / 1250	64	924
3500	2600	100	3100	1700 / 1450	48,5	1002
4000	2400	100	3600	1500 / 1250	56	1028
4000	2600	100	3600	1700 / 1450	42,5	1115
4000	2400	120	3600	1500 / 1250	64	1068
4000	2600	120	3600	1700 / 1450	48	1140
TOP PLATES						
Plate length $L$ [mm]	Plate height $H_n$ [mm]	Plate thickness $T$ [mm]	Working length $L_r$ [mm]	Working clearance $H_r$ [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Plate weight [kg]
2000	1400	100	1600	-	115	410
2000	1500	100	1600	-	115	435
2500	1400	100	2100	-	90	455
2500	1500	100	2100	-	90	485
3000	1400	100	2600	-	74	544
3000	1500	100	2600	-	74	550
3500	1400	100	3100	-	64	613
3500	1500	100	3100	-	64	650
4000	1400	100	3600	-	56	682
4000	1500	100	3600	-	56	700
4000	1600	120	3600	-	64	880

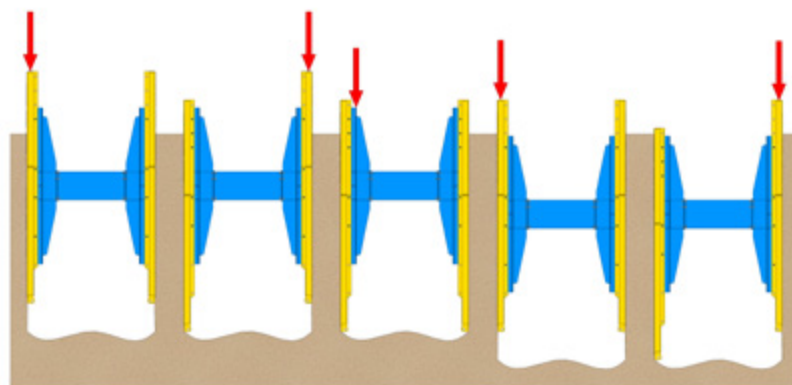


## STANDARD BOX PLATE WITH SPECIAL GUIDES

The use of an innovative solution for fixing adjustable struts to boxes allows to avoid triggering ground resistance during assembly and disassembly. This solution significantly reduces the number of strut damage and thus reduces the cost of exploitation of the shoring system.



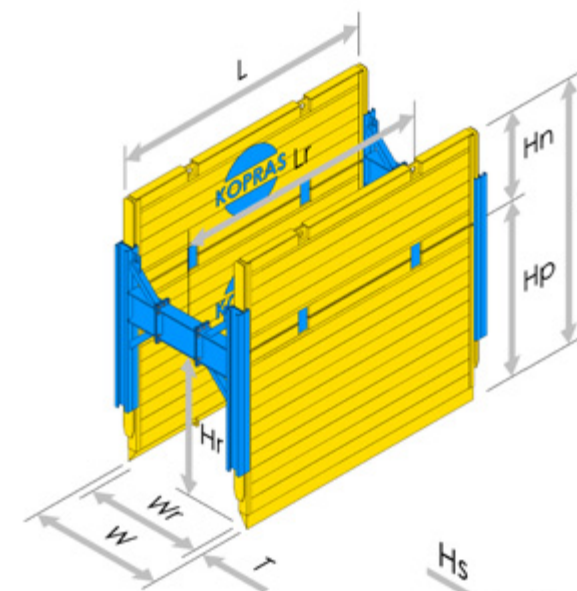
Box deployment method



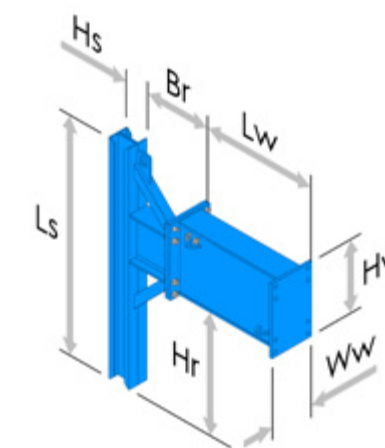
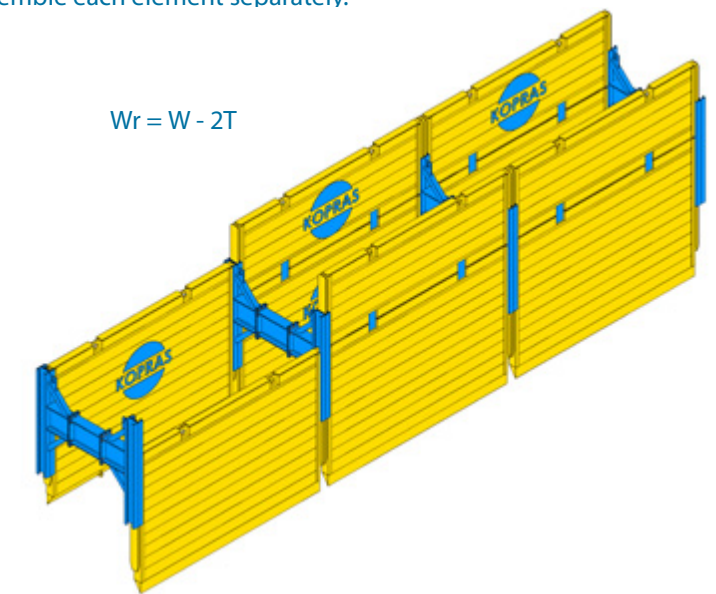
The specially designed sliding strut for STANDARD BOX type M boxes allows to make pipelines with large diameters, reduces damage, and eliminates unfavourable ground resistance. The costs, however, remain at the traditional STANDARD BOX level.

## INNOVATIVE SOLUTIONS – BOX WITH FIN PLATES

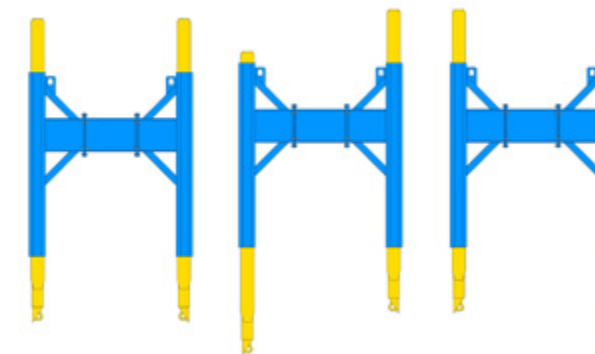
Dual-use construction: as a box and as a linear construction. Depending on your needs and possibilities, we can use traditional trench plates with fins as boxes or as a linear shoring system. This provides a number of advantages, such as the use of plates of a different length for the same task, which allows to avoid lateral collisions. It also enables the construction of pipelines with large diameters, a low failure rate, and lower repair costs. Moreover, it is possible to use lighter excavators and assemble each element separately.



$$Wr = W - 2T$$



Box deployment method



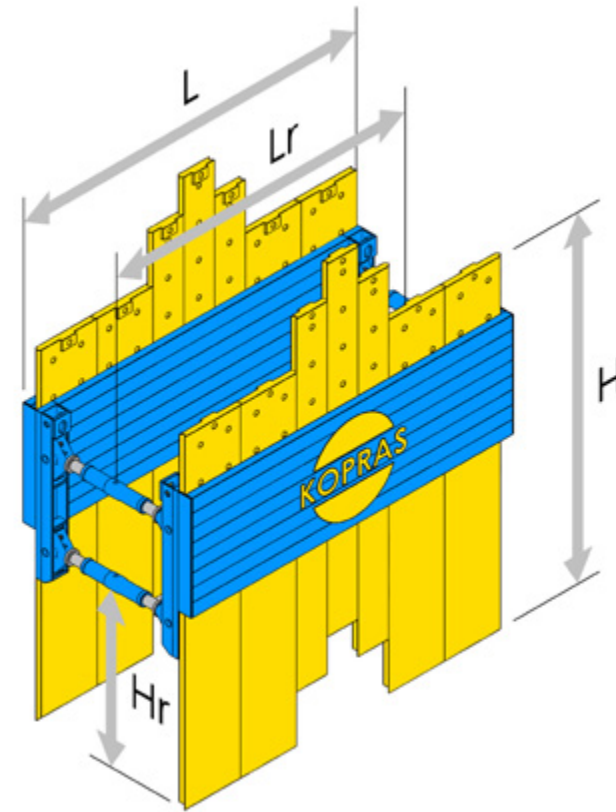
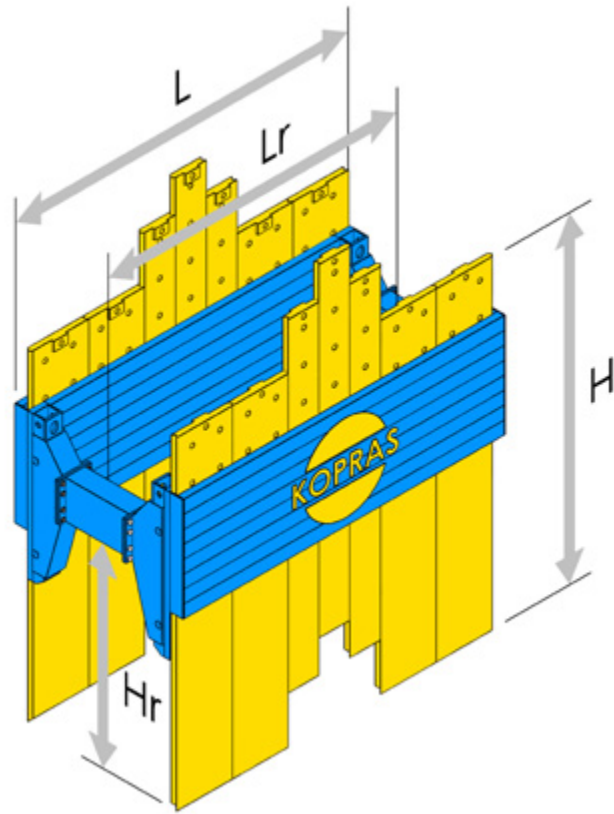
FIN PLATES				
Plate length L [mm]	Plate height Hp [mm]	Plate thickness [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Plate weight [kg]
3500	2400	100	49,2	886
3920	2400	120	86	1201

FIN TOP PLATES				
Plate length L [mm]	Plate height Hn [mm]	Plate thickness [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Plate weight [kg]
3500	1500	100	49,2	723
3920	1500	120	86	944



## SEGMENT BOX

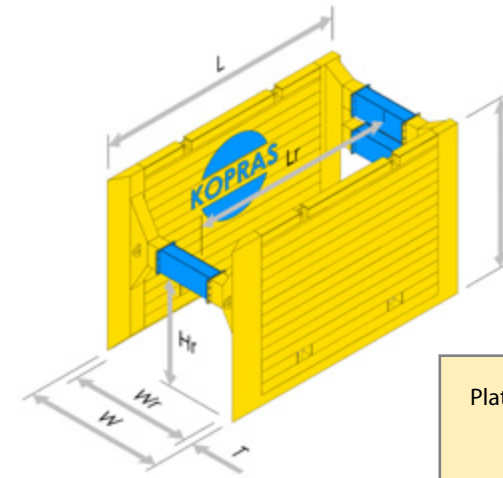
Segment boxes work well on construction sites in city centers, when there are many lateral collisions. Our segment box is a reliable product that has been in our offer for many years. The special sheet piles do not have defects which are typical for traditional mouldings.



SEGMENT BOX					
Box length L [mm]	Box height H [mm]	Pipe working area length Lr [mm]	Working clearance Hr [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	The weight of a box with struts unscrewed on both sides L = 980 ÷ 1250 mm [kg]
2200	2600	1705	1300	30	2100
2500	2600	1970	1300	30	2250
2700	2600	2240	1300	30	2490
3300	2600	2775	1300	30	2920
3500	3000	3040	1300	30	3360

## DRAG BOX

A drag box is a structure designed for laying pipes at smaller depths but the possibility of dragging it behind an excavator provides significant time benefits. Thanks to the special blades and struts, the box is resistant to damage despite the use of considerable forces.

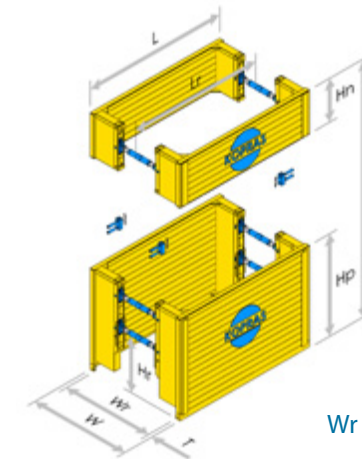


$$W_r = W - 2T$$

Plate length L [mm]	Plate height H [mm]	Height of clearance for Hr [mm]	Safe working load [kN/m <sup>2</sup> ]	Weight of box with Wr = 1500 mm [kg]
4000	2400	1400	32,5	3300
4000	3000	1800	28,9	3850



## PIT / CHAMBER BOX



$$W_r = W - 2T$$

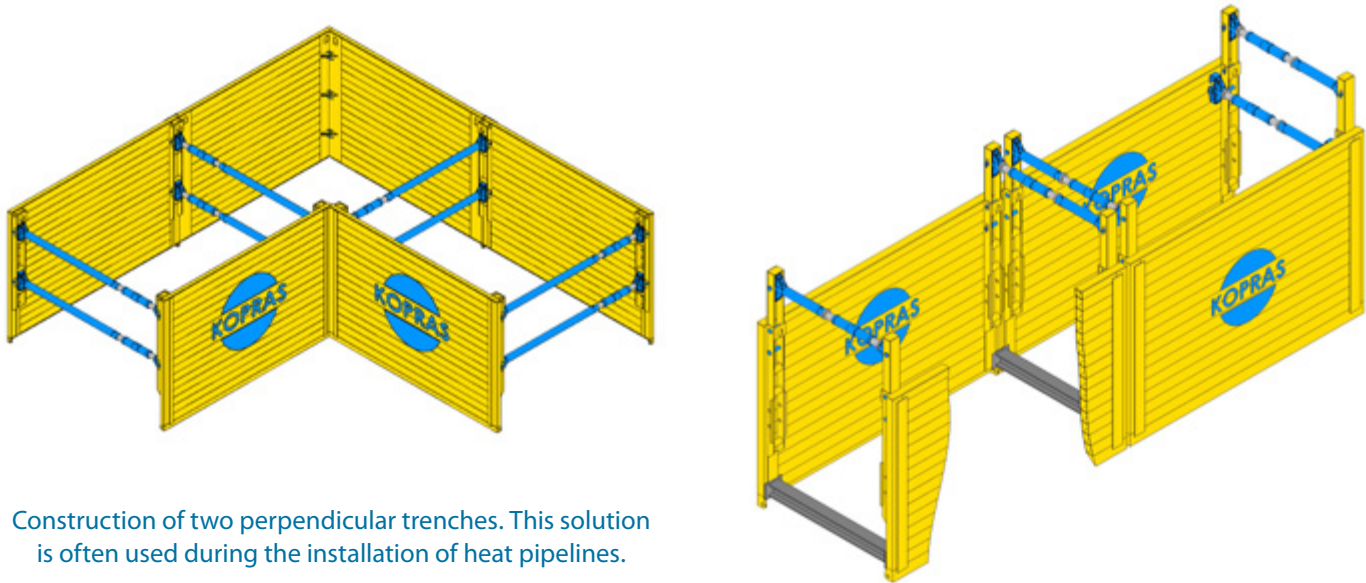
The pit / chamber box was designed for use wherever there is a need to insert inspection chambers



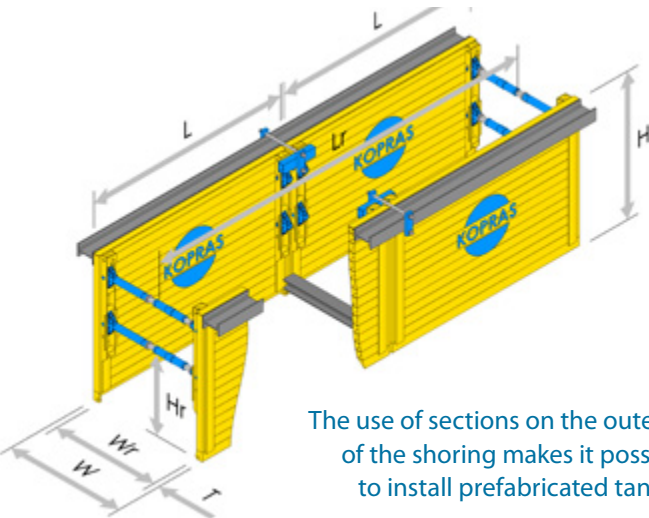
PIT BOX PLATE						
Plate length L [mm]	Plate height Hp [mm]	Plate thickness [mm]	Working length Lr [mm]	Working clearance Hr [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Plate weight [kg]
2000	2400	60	1600	1500 / 1300	53,9	634
2500	2400	60	2100	1500 / 1300	43	721
3000	2400	60	2600	1500 / 1300	33,7	807
3500	2400	60	3100	1500 / 1300	29,7	893
PIT BOX TOP PLATE						
Plate length L [mm]	Plate height Hn [mm]	Plate thickness [mm]	Working length Lr [mm]	Working clearance Hr [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Plate weight [kg]
2000	1400	60	1600	-	53,9	347
2500	1400	60	2100	-	43	382
3000	1400	60	2600	-	33,7	502
3500	1400	60	3100	-	29,7	557



Box plates with innovative solutions. On this page, we present the potential of using plates or walls of segment boxes in non-standard projects. For all those who already have boxes manufactured by us and for those who are looking for the most beneficial solutions, here are a few examples of the uses of boxes in other configurations.

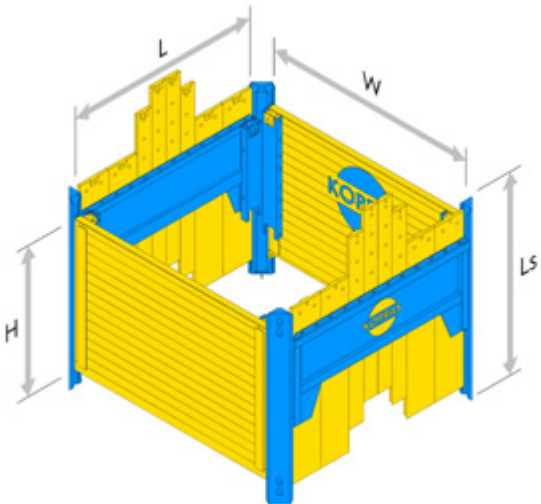
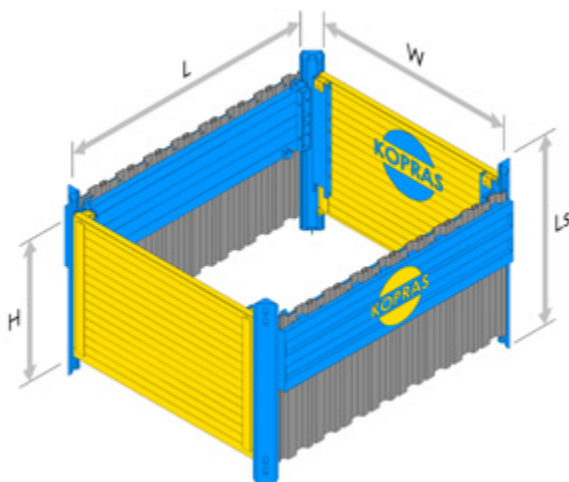


Construction of two perpendicular trenches. This solution is often used during the installation of heat pipelines.



The use of sections on the outer sides of the shoring makes it possible to install prefabricated tanks

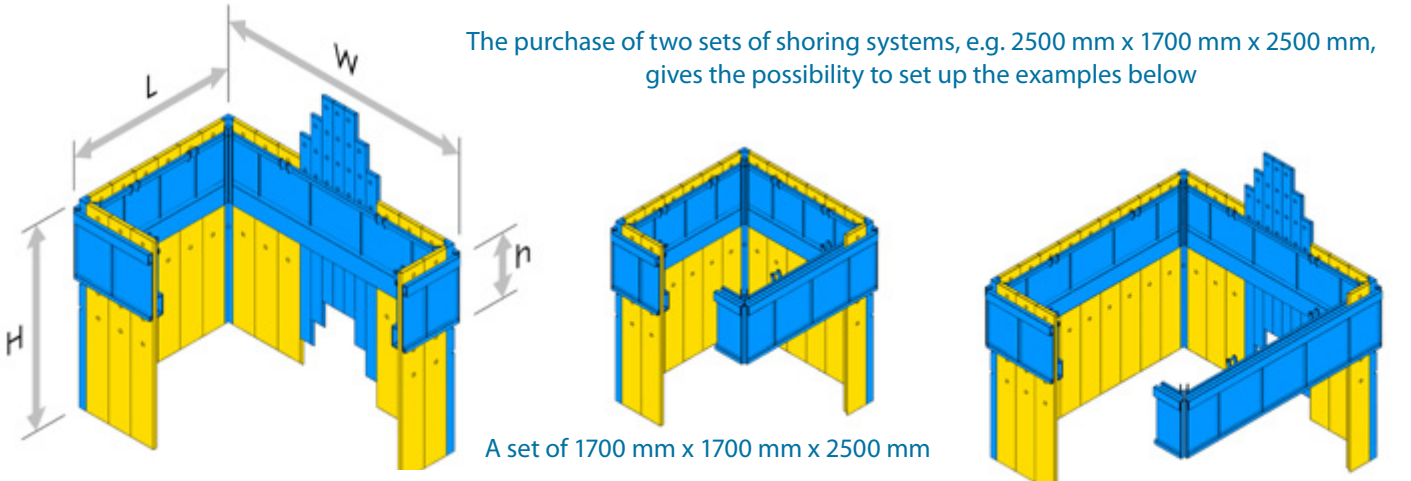
Through the use of extensions to guide rails, we provide more space in the shoring.



The use of corner connectors makes it possible to secure pit excavations, also with the use of segment walls.

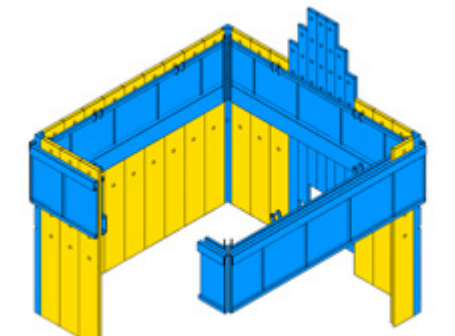
$W_r = W - 2T$

Pit-linear shoring systems are best suited for companies that use pipelines and often remove failures. The possibility of building a linear excavation allows to lay a pipeline in an open trench in an area with many transverse collisions.

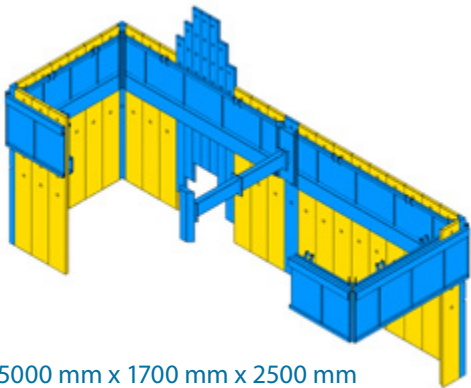


The purchase of two sets of shoring systems, e.g. 2500 mm x 1700 mm x 2500 mm, gives the possibility to set up the examples below

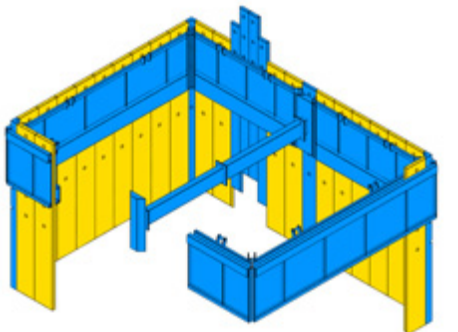
A set of 1700 mm x 1700 mm x 2500 mm



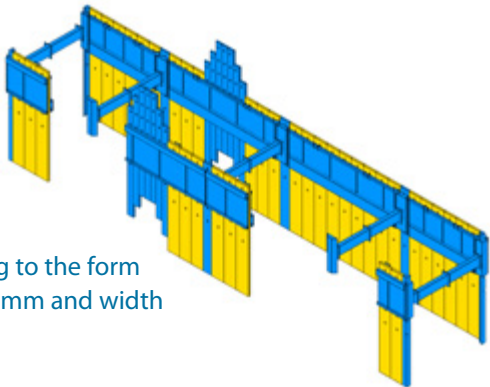
A set of 2500 mm x 2500 mm x 2500 mm



or a set of 5000 mm x 1700 mm x 2500 mm



or a set of 3400 mm x 2500 mm x 2500 mm



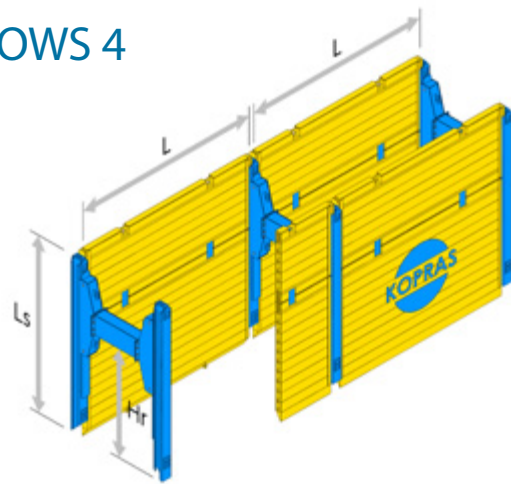
The solution of placing struts allows for the extension of the pit shoring to the form of a line or a set for linear shoring with a length of 8500 mm; depth 2500 mm and width e.g. from 1200 mm to 1700 mm and above if necessary

PIT SHORING				
Length L [mm]	Width W [mm]	Depth H [mm]	Permissible ground pressure [kN/m²]	Plate weight [kg]
2000	1200	2000	21	1825
2000	1500	2000	21	2000
2500	1700	2500	21	3128
2500	1700	3000	21	3805
3000	2000	2500	21	3372
3400	2500	3000	21	5315
5000	1700	3000	21	6151
8500	1200	3000	21	7761

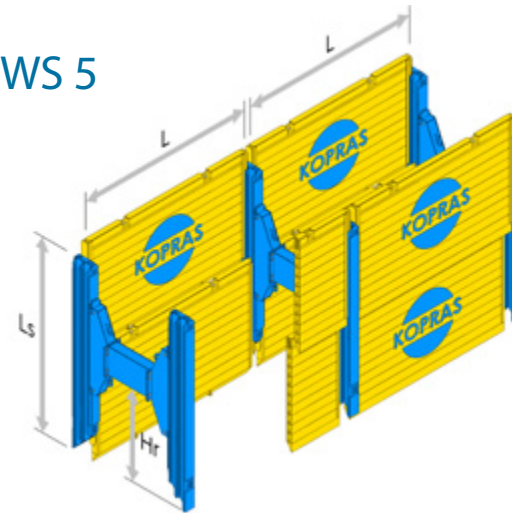


# RAIL SHORING WITH SINGLE ROLLING STRUT; FIN PLATES

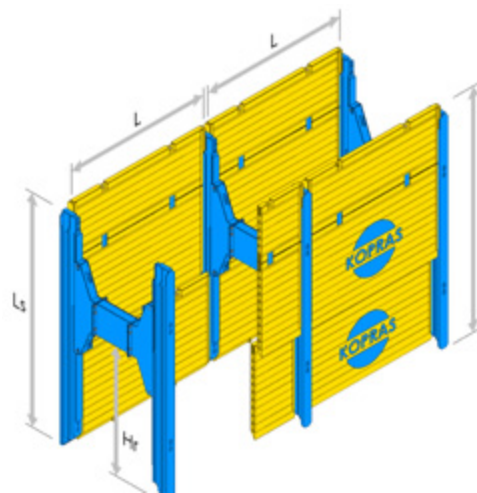
OWS 4



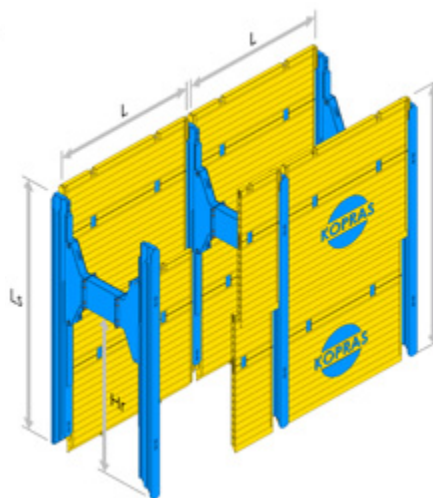
OWS 5



OWS 7



OWS 8



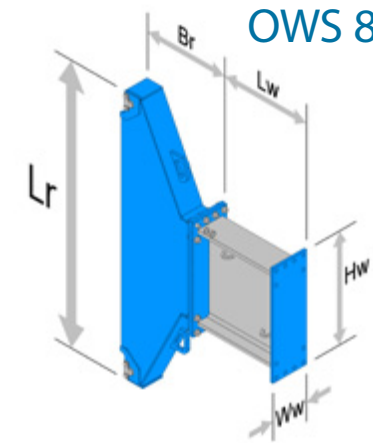
FIN PLATES

Plate length L [mm]	Plate height H [mm]	Plate thickness [mm]	Permissible ground pressure [kN/m²]	Plate weight [kg]
2000	2400	100	151,3	555
2500	2400	100	96,8	664
3000	2400	100	67,2	774
3500	2400	100	49,2	886
3500	2400	120	74,2	1084
3920	2400	120	86	1201
4160	2400	120	77	1269
4500	2400	120	66	1363
5000	2400	150	60,5	1851
5500	2400	150	50,1	2030
6150	2400	150	56,3	2581
7000	2400	150	50	3120

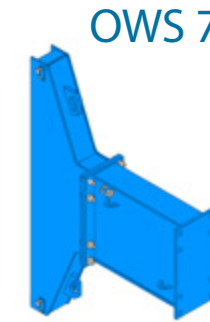
FIN TOP PLATES

Plate length L [mm]	Plate height H [mm]	Plate thickness [mm]	Permissible ground pressure [kN/m²]	Plate weight [kg]
2000	1500	100	151,3	444
2500	1500	100	96,8	536
3000	1500	100	67,2	628
3500	1500	100	49,2	723
3500	1500	120	74,2	850
3920	1500	120	86	944
4160	1500	120	77	995
4500	1500	120	66	1071
5000	1500	150	60,5	1508
5500	1500	150	50,1	1658
6150	1500	150	56,3	2039
7000	1500	150	50	2307

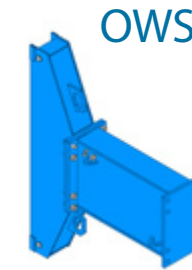
# RAIL SHORING WITH SINGLE ROLLING STRUT; RAILS AND ROLLER STRUTS



OWS 8



OWS 7



OWS 5



OWS 4

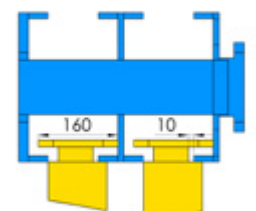
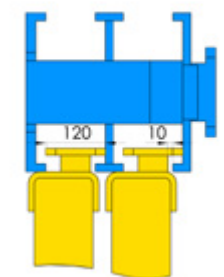
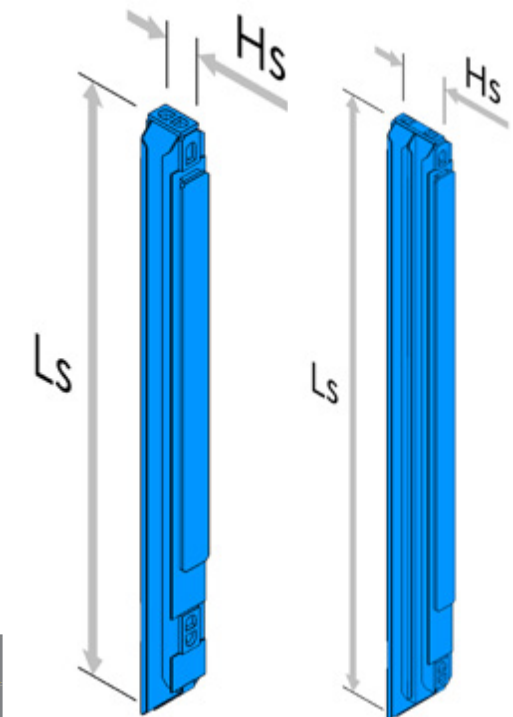
To meet your expectations, we offer more types of roller carts for struts and 7 m rails for use in special situations.

ROLLER STRUTS

Name	Strut segment length Lr [mm]	Strut cart dimension Br [mm]	Strut segment weight [kg]
OWS 4	1500	350	189
OWS 5/1,8	1800	450	309
OWS 5/2,3	2300	450	362
OWS 7	2300	650	560
OWS 8	3000	920	989

RAIL OF ROLLER STRUT

Name	Rail length Ls [mm]	Rail height Hs [mm]	Maximum clearance [mm]	Permissible bending moment [kNm]	Rail weight [kg]
OWS 4	3500	250	2240	276	375
OWS 4	4000	250	2740	276	427
OWS 5	4000	450	2340	598	629
OWS 5/5	5000	450	3090	598	673
OWS 7	6000	476	4005	1033	1319
OWS 8	6500	476	4068	1302	1745
OWS 8	7000	476	4568	1302	1889
OWS 8	7500	476	5068	1302	2039

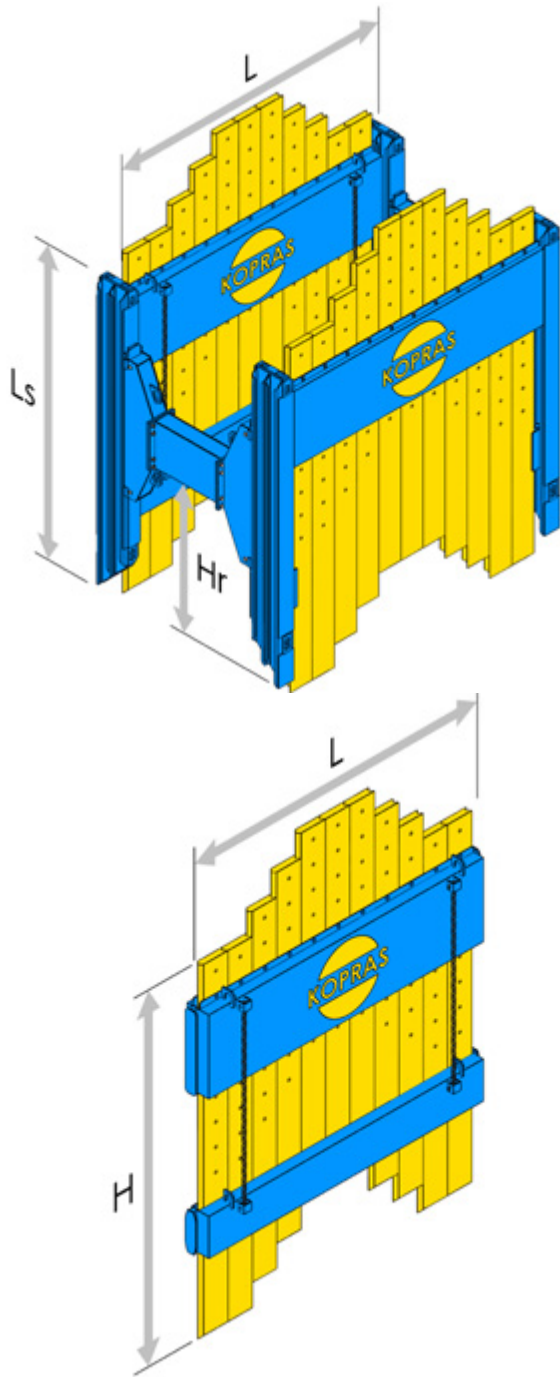


We manufacture rail constructions (dimensions of the fin and rail guide) in any variant 160 mm or 120 mm



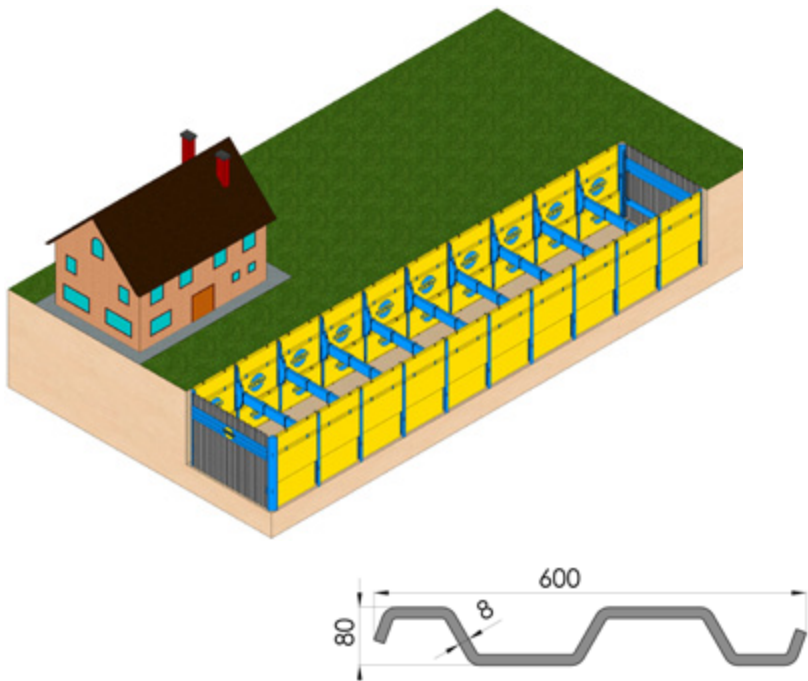
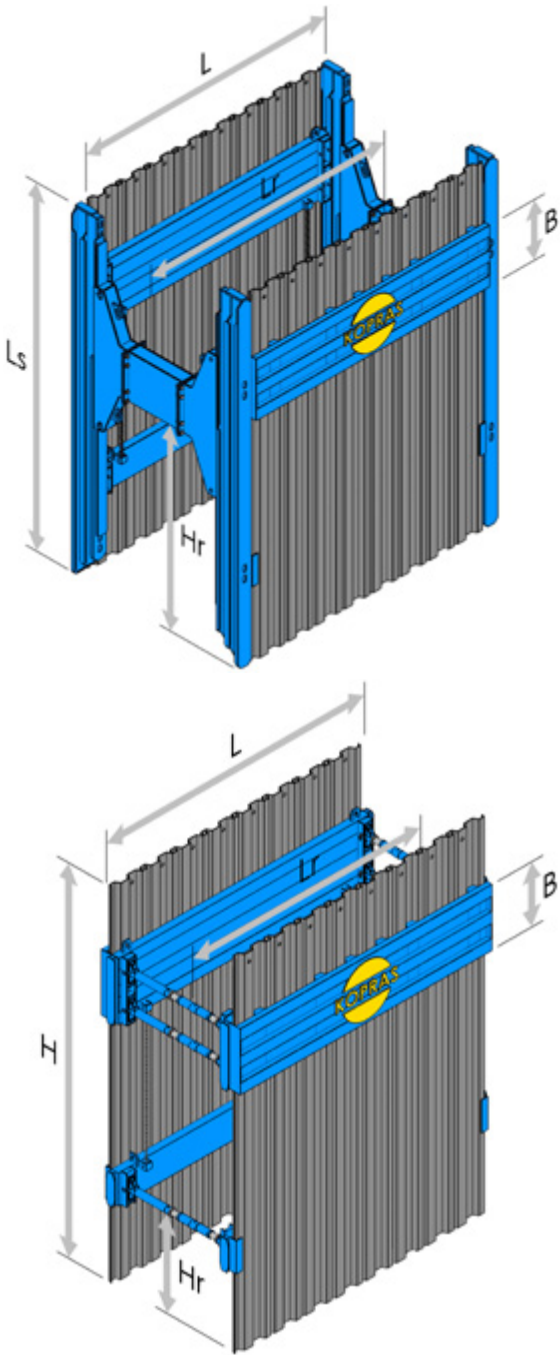
SEGMENT WALL FOR TRENCH  
AND PIT EXCAVATIONS

Our segment walls are the best product of this type available on the market. The special construction allows for reliable and trouble-free securing of excavations wherever there is a collision or it is required to lead the pipeline out of the area of the protected excavation. The dovetail has been the best and most popular combination of sheet piles for years.



SEGMENT WALL FOR TRENCH AND PIT EXCAVATIONS			
Wall length L [mm]	Wall height H [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Weight [kg]
2100	4500	60	1985
2700	4500	60	2520
3100	4500	60	3280
3400	4500	60	3470
3920	4500	60	3898
4100	4500	60	4400
5100	4500	60	5270

SEGMENT WALL FROM KD 6/8 PROFILES  
FOR TRENCH AND PIT EXCAVATIONS



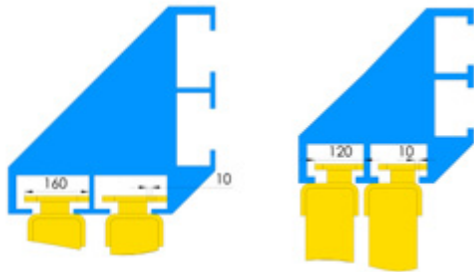
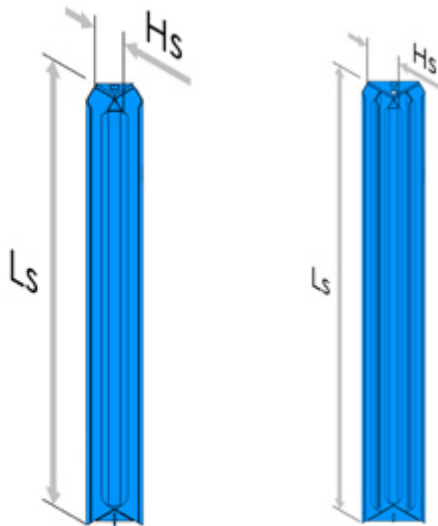
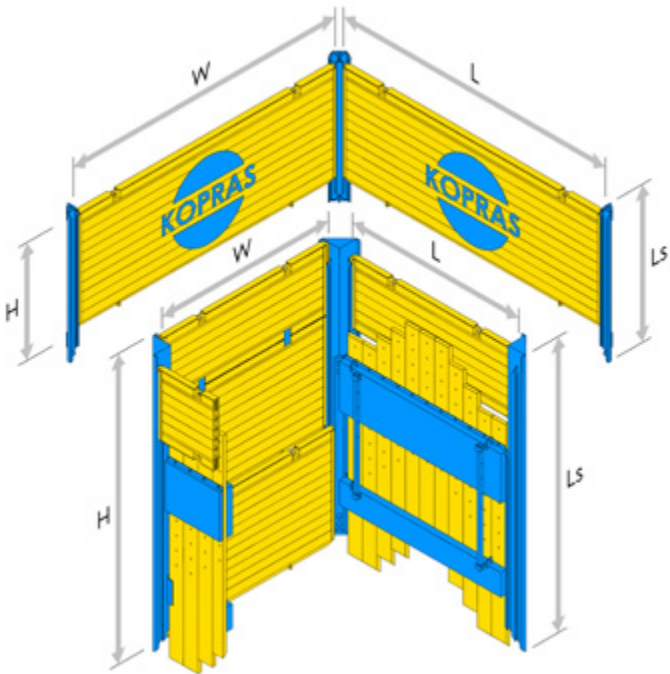
The KD 6/8 profile is in line with PN-EN 10249-1:2000

SEGMENT WALL FROM KD 6/8 PROFILES FOR TRENCH AND PIT EXCAVATIONS				
Wall length L [mm]	Frame height B [mm]	Working length Lr [mm]	Number of KD profiles 6/8	Weight [kg]
1994	1000	1606	3	535
2584	1000	2196	4	650
3174	1000	2786	5	785
3764	1000	3376	6	948
4354	1000	3966	7	1126
4994	1000	4556	8	1250
5534	1000	5146	9	1397
8160	1000	8000	14	3150
9100	1000	8940	15	3520

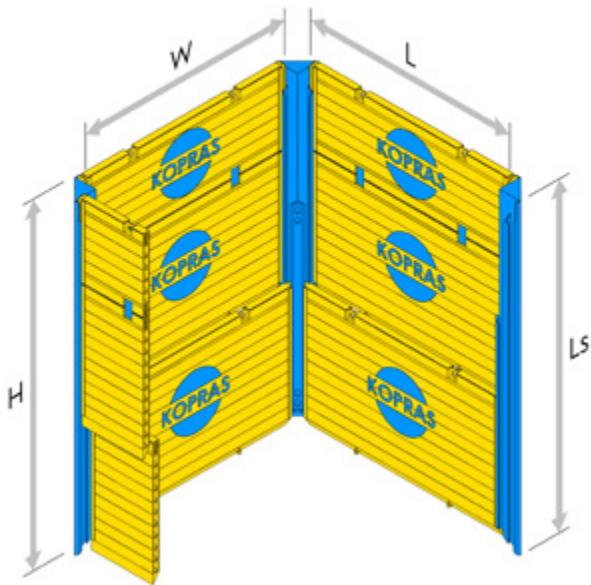


RAIL SHORING FOR PIT EXCAVATIONS

We have been producing rail shoring for 20 years, and thanks to our extensive experience we can apply increasingly bold solutions. Segment walls, 7 m long boards and telescopic chambers are reliable solutions.

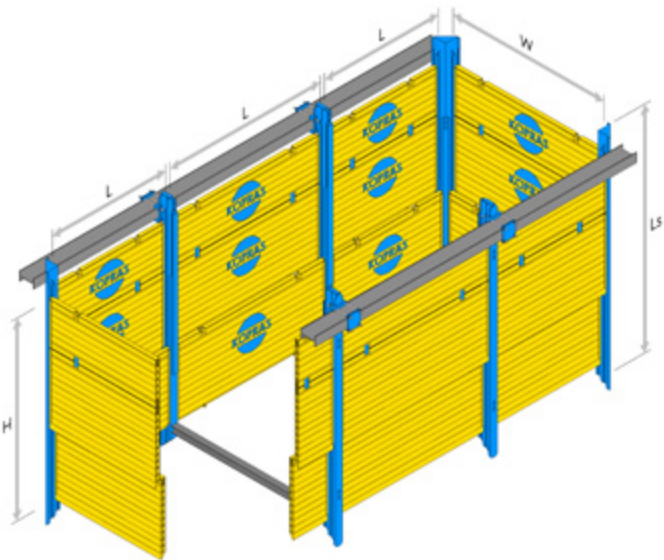
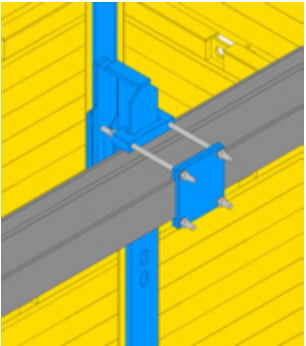
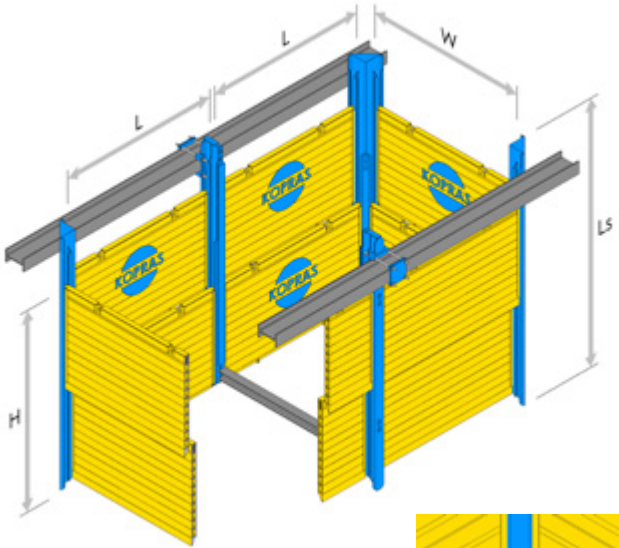
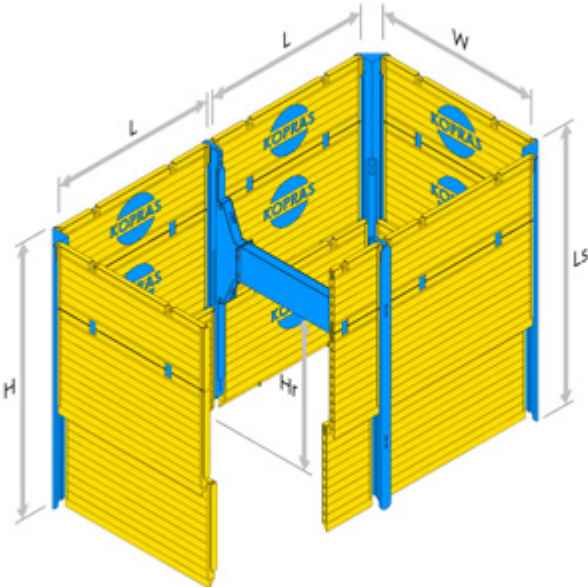


CORNER RAILS			
Name	Rail length Ls [mm]	Rail height Hs [mm]	Weight [kg]
N1P	3000	275	229
N1P	3500	275	266
N1P	4000	275	303
N2P	4000	473	633
N2P	4500	473	698
N2P	5000	473	774
N2P	5500	473	851
N2P	6000	473	928
N2P	6500	473	1004
N2P	7000	473	1317



RAIL SHORING FOR PIT EXCAVATIONS

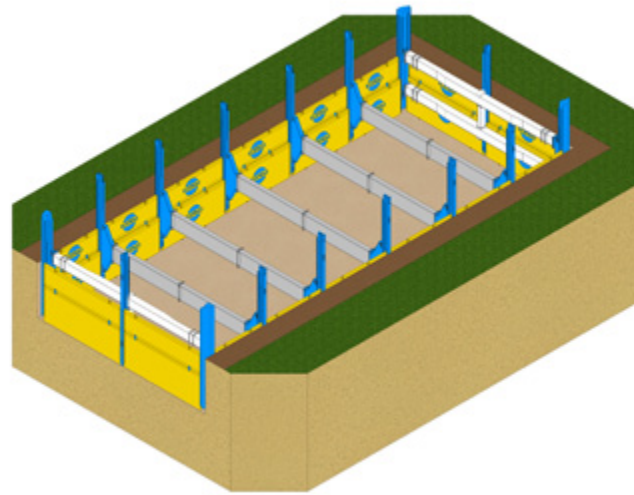
Pit rail shoring with disassembled struts is another step in the development of this type of construction. It has been tested on many construction sites where prefabricated tanks are installed and a large space is needed without unnecessary struts.



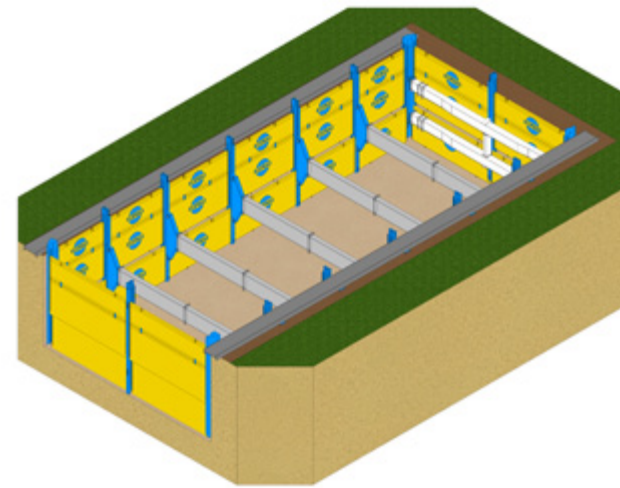


## RAIL SYSTEMS FOR WIDE-SPACE EXCAVATIONS

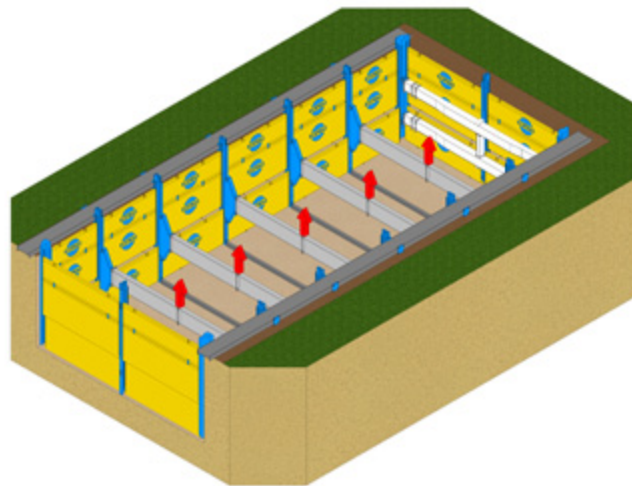
If it is required to secure e.g. a temporary trench with dimensions of 12 x 30 m, and you do not want to use vibratory hammers, we suggest chambers with removable struts. The sequence of works during assembly is presented below.



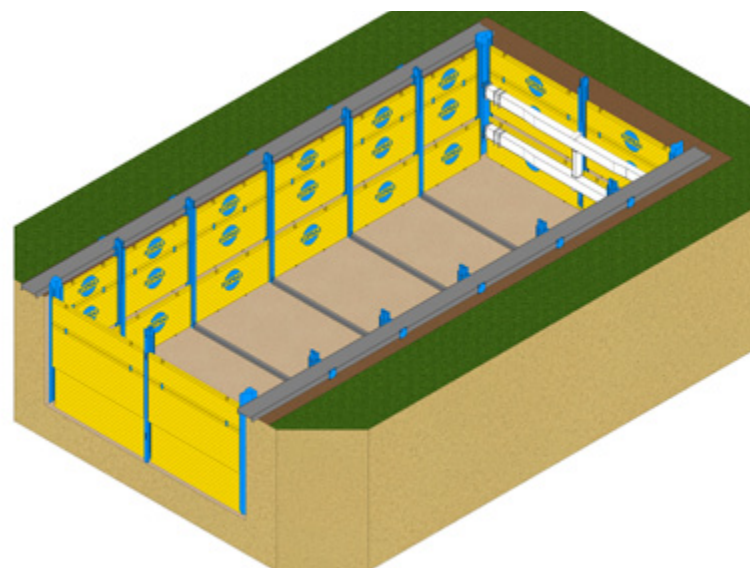
Deployment of the shoring with struts



Assembling the frames around the shoring



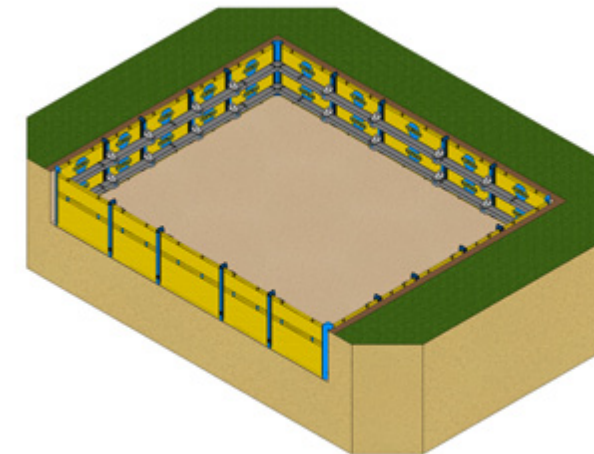
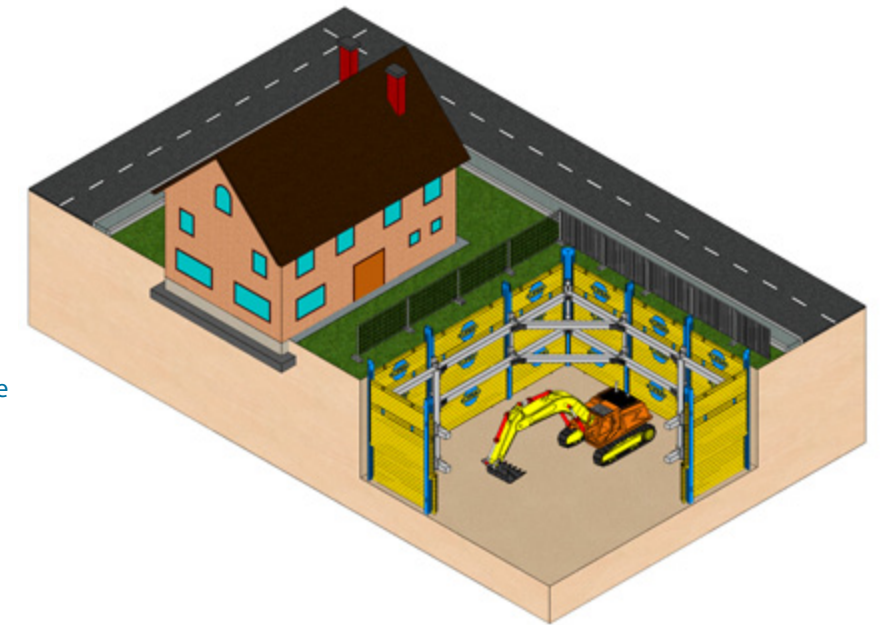
Dismantling of the struts



The secured trench is ready, installation works can begin

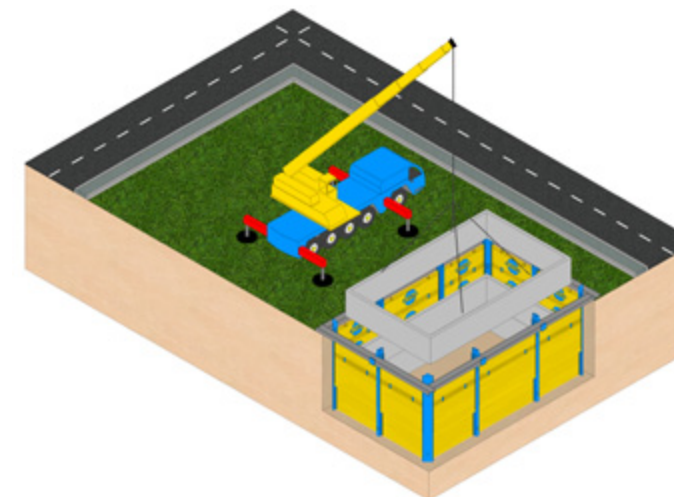
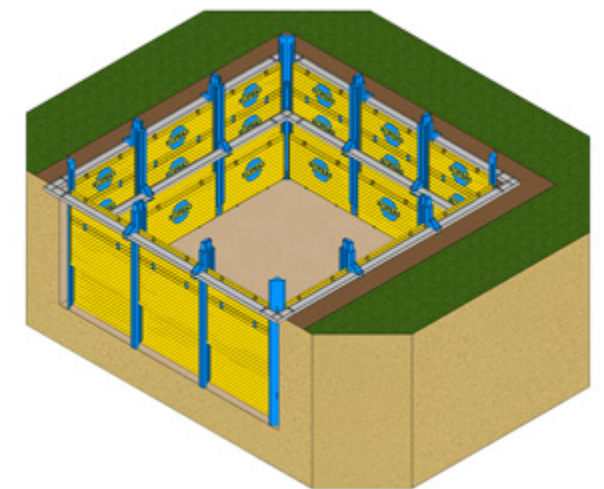
## SHORING OF WIDE-SPACED EXCAVATIONS WITHOUT THE NEED FOR USING STRUTS

Excavation shoring system with struts in the corners. The use of these struts depends on the ground pressure and the dimensions of the shoring. Below is a wide-spaced pit shoring without the use of struts in the corners



Another possible solution for the trench shoring

After analysing the pressure distribution and the place of the resultant force (we perform the calculations for you), the solution combines the use of the outer frame with the inside frame being lowered during digging

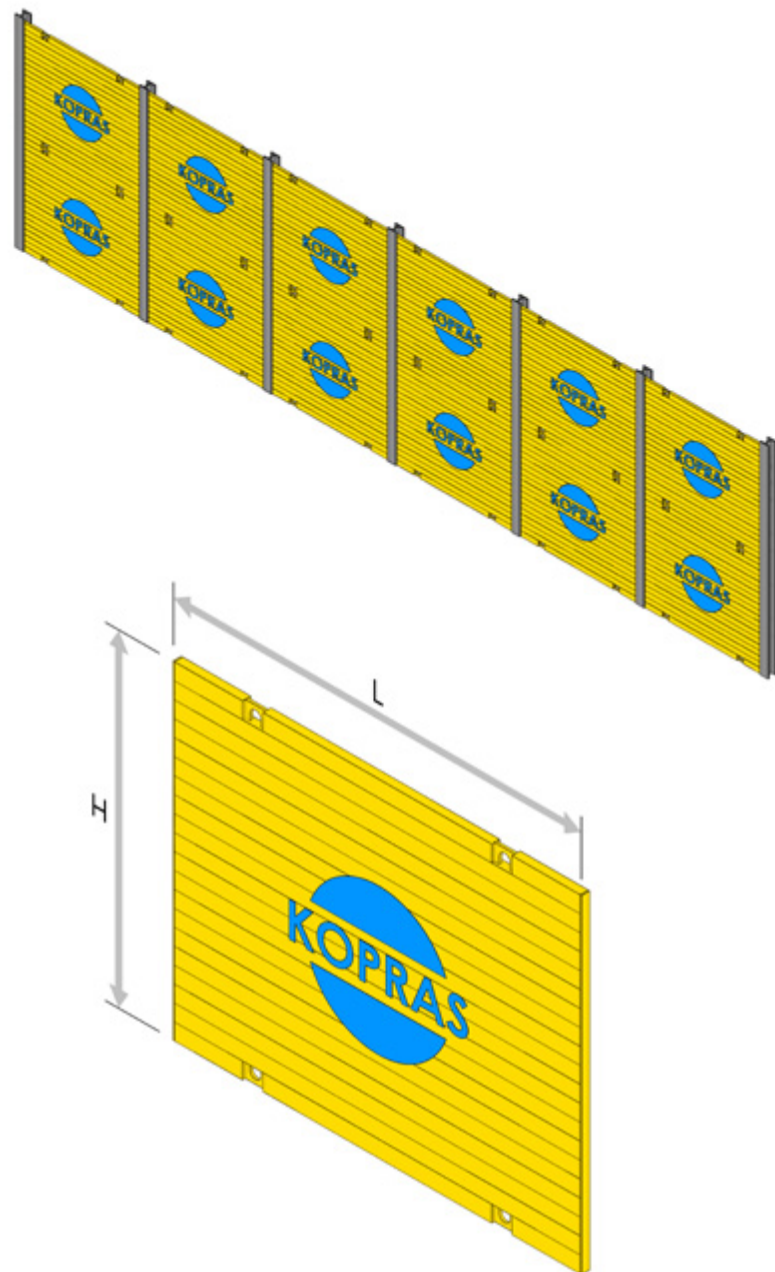


After the construction of the tank or foundations, we dismantle the shoring in accordance with the guidelines of standards and regulations, in stages from the bottom of the trench. It is not necessary to assemble the struts again



Fast, cheap and safe

Examples of the possibilities of using a Kopras wall



Wide-area excavation for a building



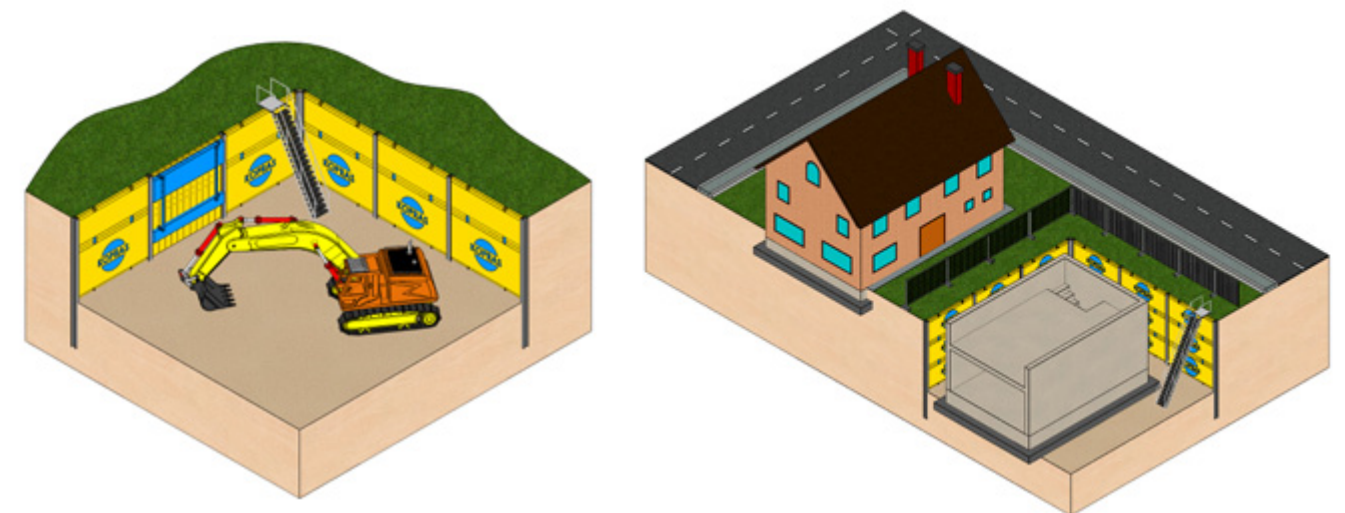
Renovation of buildings and tenement houses, replacement of insulation, drying



Many kilometres of securing excavations in the construction of e.g. gas pipelines

BERLIN WALL				
Plate length L [mm]	Plate height H [mm]	Plate thickness [mm]	Permissible ground pressure [kN/m <sup>2</sup> ]	Plate weight [kg]
1500	2400	60	97	175
2000	2400	60	54	230
2500	2400	60	36,3	285
3000	2400	60	24,3	339

Retaining wall in the KOPRAS system



We offer retaining walls securing wide excavations for buildings, structures, pipelines, and tracks. This system consists in using the technology of placing HEB or HEM profiles in the ground with the use of vibratory hammers or concreting them in drilled holes. The profiles can be placed depending on the type of soil every 2, 3, 4 or even up to 7 metres.

This depends on the depth of the excavation and the type of soil. At a great depth or high pressure, the pile distribution must be larger, even every 2 metres. A small depth of 2 or 3 metres allows the use of longer plates. Each project should be considered individually.

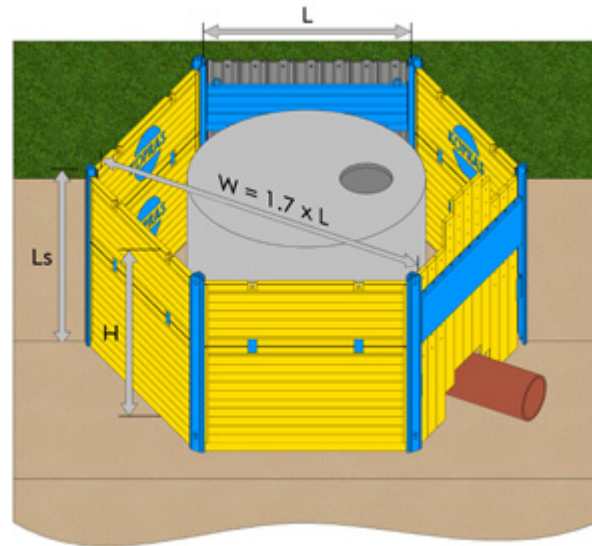
Kopras shoring plates are equipped with places for hooking, and the mounting is carried out mechanically with an excavator which performs the excavation. Simple mechanical mounting allows for cheap and quick wall construction. We offer the rental of profiles, Kopras plates, as well as the rental of vibratory hammers. Alternatively, the production of piles, punching profiles, wall mounting. The service can be comprehensive or partial. Please provide a wall design or excavation dimensions and a geological profile, and we will suggest a solution and specify the price.



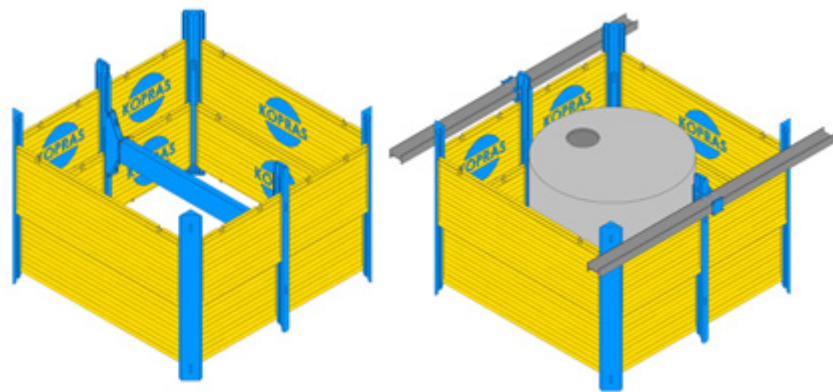


## RAIL SHORING FOR PIT EXCAVATIONS HEXAGONAL CHAMBER

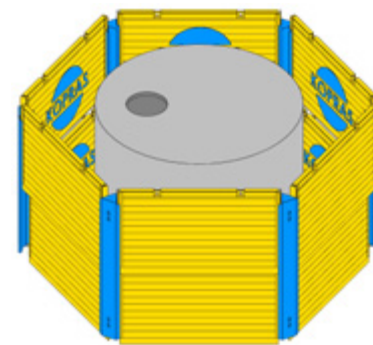
Hexagonal shoring is specially designed to protect the walls of temporary excavations where we intend to build round tanks or pumping stations. This is possible with the use of special rails with an angle of 60 degrees. This ensures enormous savings in the costs of rental, purchase, operation of equipment and transport. The use of typical Kopras plates facilitates access to this construction and provides a wide range of building options. Examples of rental costs and comparisons of different types of shoring.



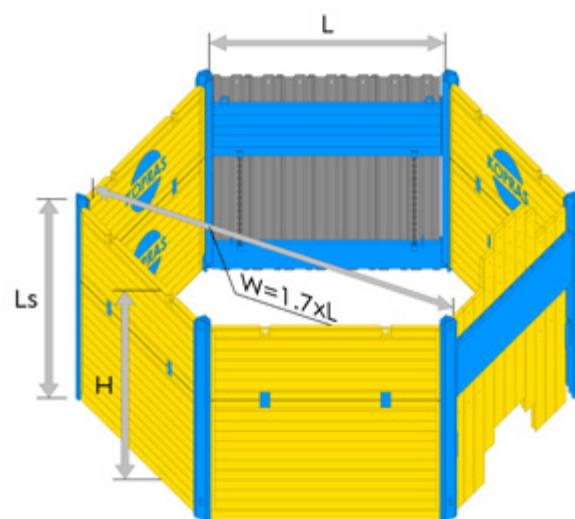
Solution No. 1  
7000 x 7000 x 4800 mm chamber Weight: 26,500 kg



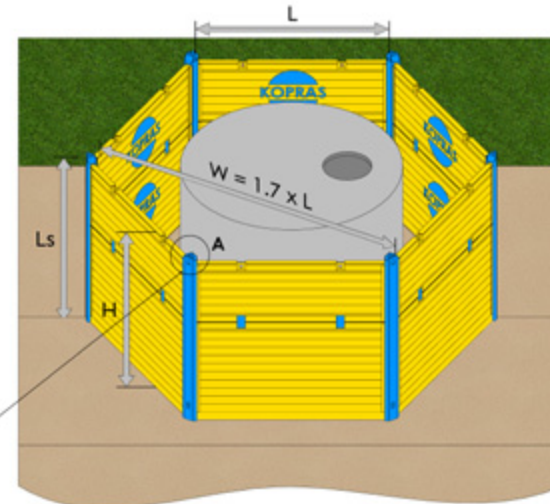
Solution No. 2  
7000 x 7000 (3500 + 3500) x 4800 mm chamber  
with an OWS 7 intermediate rail Weight: 26,050 kg



Solution No. 3  
Hexagonal chamber made of L = 4000 mm plates  
up to a depth of 4800 mm Weight: 18,420 kg  
Rental cost lower than solution 1 by 70%  
Rental cost lower than solution 2 by 60%



Detail A  
- top view



## KOPRAS IS THE BEST TECHNICAL ADVISOR TRAINING COURSES

### ONLINE TRAINING



In response to our Clients' needs, we have prepared a special individual training programme on the correct use of shoring systems. When visiting our Clients on construction sites, we sometimes encounter the improper use of shoring systems, which shortens their lifetime, causes numerous and irreversible damage, and may even threaten the safety of employees who make mistakes. In order to minimize damage and improve the quality of work, we recommend a short, one-day practical training course, conducted at the Client's location by our experienced engineering staff.

### INVITE A SPECIALIST OR VISIT US IN WRONKI!

We would like to invite you to visit our exhibition of shoring systems. Our employees are at your disposal from 8 am to 4 pm and will explain the details of the exhibition and individual products. The exhibition includes the latest construction solutions, new products shown at the Intermasz trade fair in Poznań last year, and typical, reliable constructions, the latest generation of aluminium shoring, segment walls, and new constructions of rails for linear shoring.

We will advise you on what shoring systems to choose depending on the depth and ground conditions. You will receive catalogues and training materials, as well as advice on how to buy shoring systems with 90% co-financing by ZUS [the Polish Social Insurance Institution]. For larger, organised groups, we conduct training on the safety of using these types of shoring systems and assembly technology, multimedia presentations, and offer the opportunity of visiting the production department.







## CONTACT

KOPRAS Sp. z o.o.  
Szklarnia 7, 64-510 Wronki  
tel. +48 67 254 11 96  
fax +48 67 254 11 26  
mobile phone +48 509 393 552  
mobile phone +48 509 393 556  
marketing@kopras.pl

*I confirm the quality  
and reliability of our solutions  
Marek Kopras*



[www.kopras-shoring.com](http://www.kopras-shoring.com)