

Drilling Rig  
**LB 45**

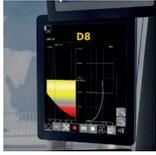
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LB 2005.07



**LIEBHERR**

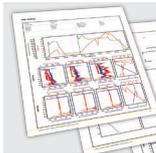
# Concept and characteristics



**PDE**<sup>®</sup>  
Process Data Recording



Kelly  
Visualization



**PDR2**  
Process Data Reporting



Ground  
Pressure  
Visualization



**LIPOS**<sup>®</sup>  
Positioning System



Radio remote  
control



**LiDAT**<sup>®</sup>  
Data Transmission



Concrete  
pump



## The robust universal machine for a wide variety of applications:

- Kelly drilling
- Continuous flight auger drilling
- Full displacement drilling
- Double rotary drilling
- Down-the-hole drilling
- Soil mixing

## Assistance systems:

- Cruise Control for all main functions
- Joystick control for all machine functions
- Automatic shake-off function for working tools
- Kelly Visualization
- Ground Pressure Visualization
- Radio remote control
- Radio remote control for concrete pump
- Drilling assistant (single-pass process)
- Leader inclination memory
- Display of auger filling level
- Kelly winch with freewheeling and with slack rope monitoring and prevention

# Technical data

## Engine

Power rating according to ISO 9249, 390 kW (523 hp) at 1700 rpm  
 Engine type Liebherr D 946 A7-05 or  
 Liebherr D 946 A7-04  
 Fuel tank 700 l with continuous level  
 indicator and reserve warning  
 Diesel engine complies with 2016/1628 Stage V or NRMM exhaust  
 certification EPA/CARB Tier 4f.

## Hydraulic system

The main pumps are operated by a distributor gearbox.  
 Axial piston variable displacement pumps work in open circuits supplying  
 oil only when needed (flow control on demand). To minimize peak  
 pressure an automatic working pressure cut-off is integrated in the pump.  
 This spares pumps and saves fuel.  
 Pumps for working tools 2x 350 l/min  
 Separate pump for kinematics 180 l/min  
 Hydraulic oil tank 800 l  
 Max. working pressure 385 bar  
 A system of electronically monitored pressure and return filters cleans the  
 hydraulic oil. Any clogging is displayed in the cabin. The use of synthetic  
 environmentally friendly oil is also possible.

## Crawlers

Propulsion through axial piston motor, hydraulically released multi-disc  
 brake, maintenance-free crawler tracks, hydraulic chain tensioning device.  
 Drive speed 0-1.6 km/h  
 Track force 745 kN  
 Width of 3-web grousers 1000 mm  
 Option:  
 Width of 3-web grousers 900 mm  
 Transport width 3500 mm

## Noise emission

Noise emissions correspond with 2000/14/EC directive.  
 Emission sound pressure level  $L_{PA}$  in the cabin 75.4 dB(A)  
 Guaranteed sound power level  $L_{WA}$  110 dB(A)  
 Option: Eco-Silent Mode  
 Guaranteed sound power level  $L_{WA}$  108 dB(A)  
 Vibration transmitted to the hand-arm system of the  
 machine operator  $< 8.20 \text{ ft/s}^2$   
 Vibration transmitted to the whole body of the  
 machine operator  $< 1.64 \text{ ft/s}^2$

### Remarks:

- Illustrations showing the types of application (e.g. Kelly drilling, continuous flight auger drilling etc.)  
 are examples only.
- Weights can vary with the final configuration of the machine. The figures in this brochure may include options  
 which are not within the standard scope of supply of the machine.

## Swing

Consists of triple-row roller bearing with external teeth and two swing  
 drives, fixed axial piston hydraulic motor, hydraulically released multi-disc  
 holding brake, planetary gearbox and pinion. Selector for 3 speed ranges  
 to increase swing precision.  
 Swing speed from 0-2 rpm continuously variable.

## Control

The control system – developed and manufactured by Liebherr – is  
 designed to withstand extreme temperatures and the many heavy-  
 duty construction tasks for which this machine has been designed.  
 Complete machine operating data are displayed on a high resolution  
 monitor screen. A GSM/GPRS telematics module allows for remote  
 inquiry of machine data and operational conditions. To ensure clarity of  
 the information on display, different levels of data are shown in enlarged  
 lettering and symbols.  
 Control and monitoring of the sensors are also handled by this high  
 technology system. Error indications are automatically displayed on the  
 monitor in clear text. Electro-hydraulic continuous proportional control  
 allows all movements to be performed simultaneously. Two joysticks are  
 required for operation. Pedal control can be converted to hand control.  
 Options:  
 PDE®: Process data recording

## Kelly winch with freewheeling

Line pull effective (1 <sup>st</sup> layer)	420 kN
Rope diameter	38 mm
Rope speed	0-64 m/min

## Auxiliary winch

Line pull effective (1 <sup>st</sup> layer)	100 kN
Rope diameter	20 mm
Rope speed	0-89 m/min

## Rope crowd system

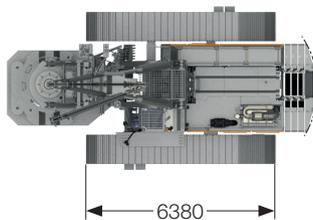
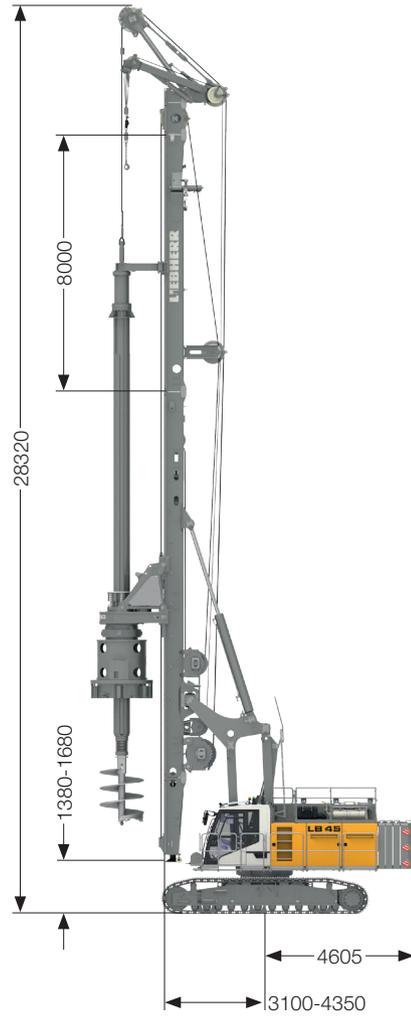
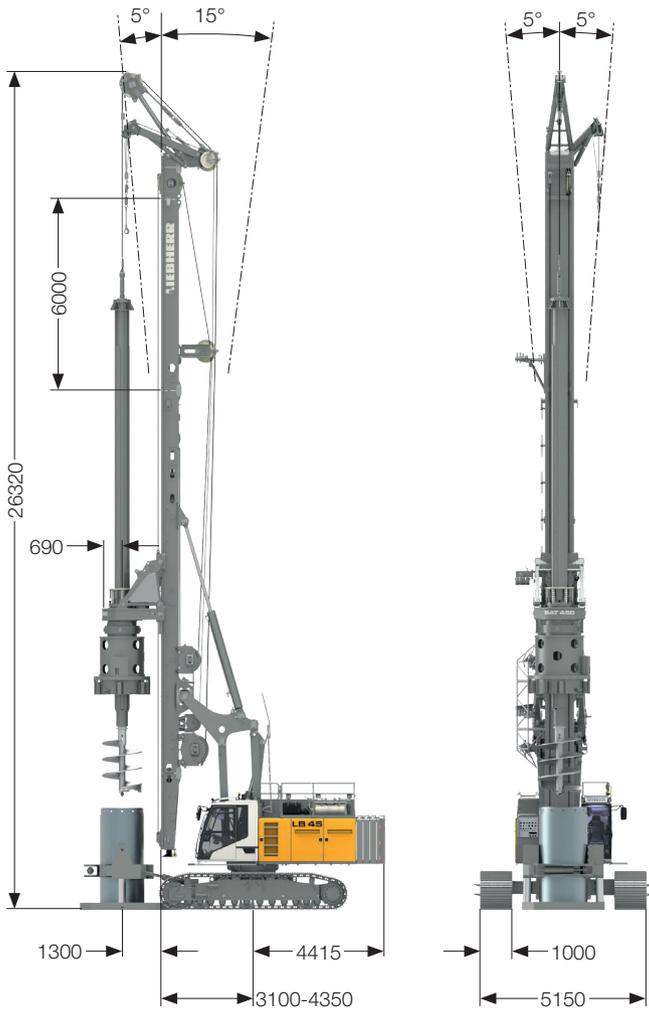
Crowd force (push/pull)	400/400 kN
Line pull (effective)	200 kN
Rope diameter	28 mm
Travel with standard leader between mechanical limit stops	17.8 m
Rope speed	0-70 m/min

The winches are outstanding in their compact design and easy assembly.  
 Propulsion is via a maintenance-free planetary gearbox in oil bath.  
 Load support by the hydraulic system; additional safety factor provided by  
 a spring-loaded, multi-disc holding brake. All line pull values are effective  
 values. The efficiency factor of approx. 25 % has already been deducted.

# Dimensions

Standard leader

Folding leader



- R 4485 (20 t)
- R 4675 (23 t)
- R 4985 (23 t + rear support unit)

## Operating weight

Total weight with 900 mm 3-web grousers	115.3 t
Total weight with 1000 mm 3-web grousers	116.0 t

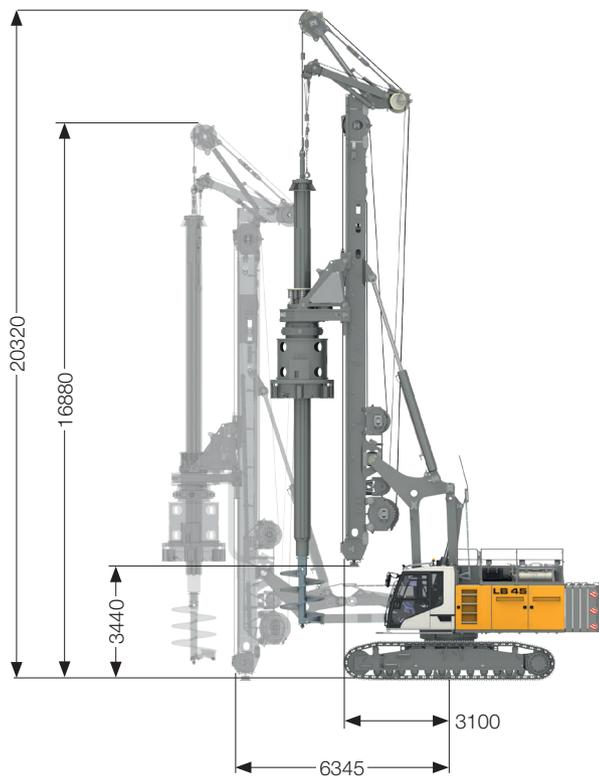
The operating weight includes the basic machine LB 45 with rotary and Kelly bar MD 36/3/36, 20t counterweight and equipment for casing oscillator.

## Operating weight

Total weight with 900 mm 3-web grousers	121.3 t
Total weight with 1000 mm 3-web grousers	122.0 t

The operating weight includes the basic machine LB 45 with rotary, Kelly bar MD 36/4/48 and 23t counterweight. Equipment for casing oscillator not included.

## Low Head



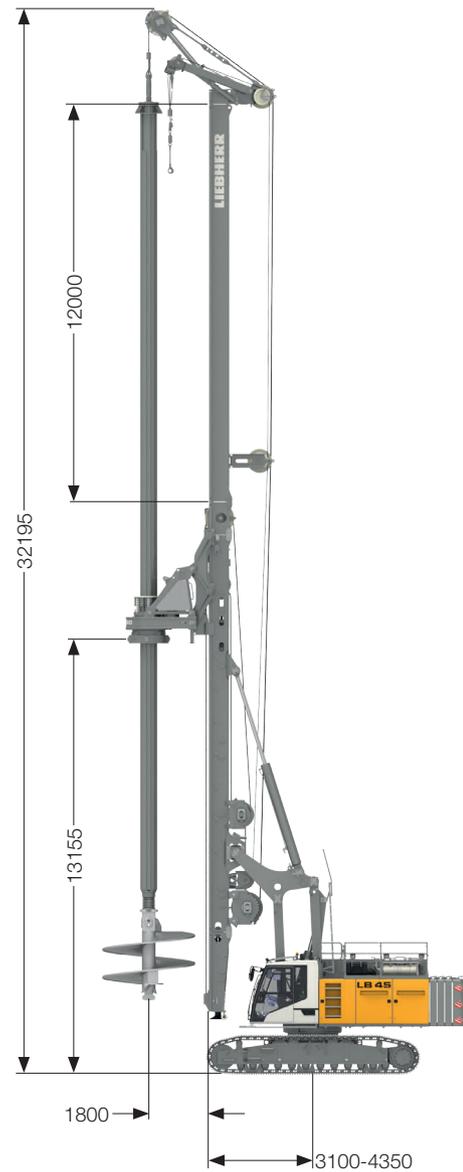
### Operating weight

Total weight with 900 mm 3-web grousers	112.4 t
Total weight with 1000 mm 3-web grousers	113.1 t

The operating weight includes the basic machine LB 45 with rotary, Kelly bar MD 36/4/30 and 23 t counterweight. Equipment for casing oscillator not included.

The line pull of the Kelly winch is reduced to 250 kN when working at a radius exceeding 4350 mm.

## Kelly Only

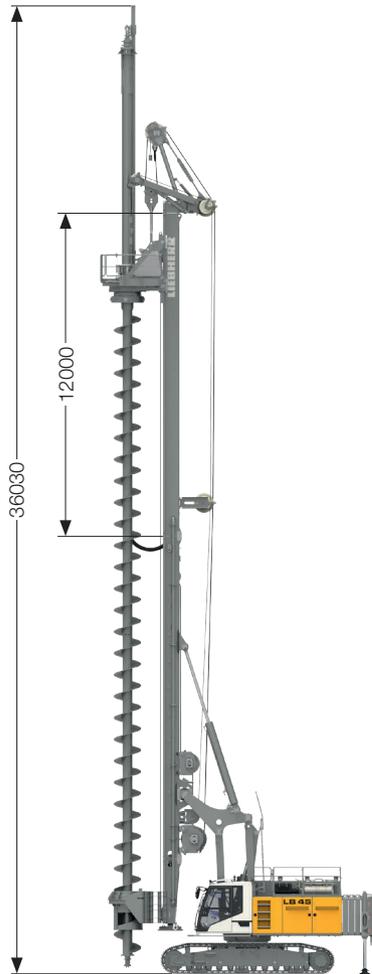


### Operating weight

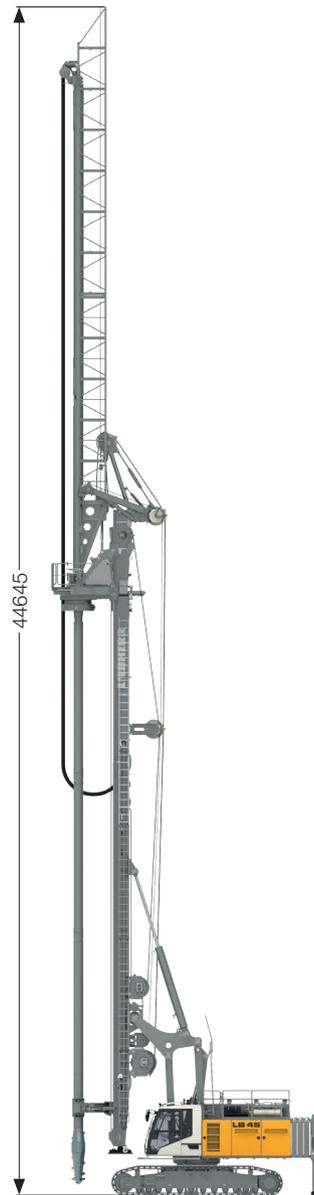
Total weight with 900 mm 3-web grousers	131.0 t
Total weight with 1000 mm 3-web grousers	131.7 t

The operating weight includes the basic machine LB 45 with rotary, Kelly bar MD 36/4/93 and 23 t counterweight. Equipment for casing oscillator not included.

## Single-Pass



## Lattice boom extension



### Operating weight

Total weight with 900 mm 3-web grousers	122.4 t
Total weight with 1000 mm 3-web grousers	123.1 t

The operating weight includes the basic machine LB 45 with rotary, 8 m Kelly extension, auger cleaner Ø 1000 mm and 23 t counterweight. Equipment for casing oscillator not included.

### Operating weight

Total weight with 900 mm 3-web grousers	131.0 t
Total weight with 1000 mm 3-web grousers	131.7 t

The operating weight includes the basic machine LB 45 with rotary, 18 m Kelly extension, drill rod 21 m and 23 t counterweight. Equipment for casing oscillator not included.

# Combined applications

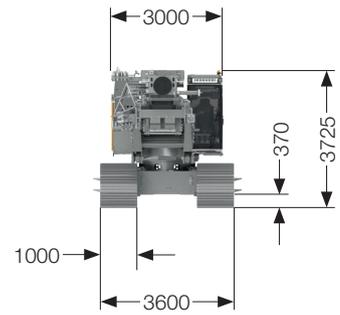
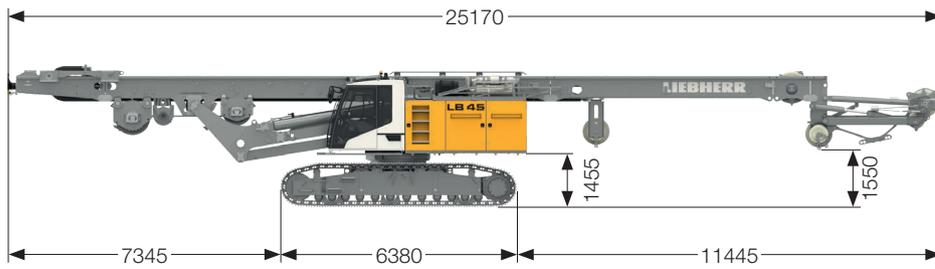
## Combined applications

							
	Long crowd distance	Short crowd distance	Drilling axis 1300 mm*	Drilling axis 1800 mm*	Lattice boom extension	Short leader lower part	Standard leader lower part
 Standard leader	Kelly CFA FDD CCFA DTH WSM	Kelly	Kelly CFA FDD CCFA DTH WSM	Kelly	FDD WSM (BAT)	Kelly WSM	Kelly CFA FDD CCFA DTH WSM
 Folding leader	Kelly CFA FDD CCFA DTH WSM	Kelly	Kelly CFA FDD CCFA DTH WSM	Kelly	FDD WSM (BAT)	Kelly WSM	Kelly CFA FDD CCFA DTH WSM
 Low Head	Kelly CFA FDD CCFA DTH WSM		Kelly CFA FDD CCFA DTH WSM	Kelly		Kelly WSM	Kelly CFA FDD CCFA DTH WSM
 Kelly Only		Kelly	Kelly	Kelly		Kelly	Kelly
 Single-Pass	CFA FDD WSM		CFA FDD WSM			WSM	CFA FDD WSM

\* Distance from drilling axis to front edge of leader

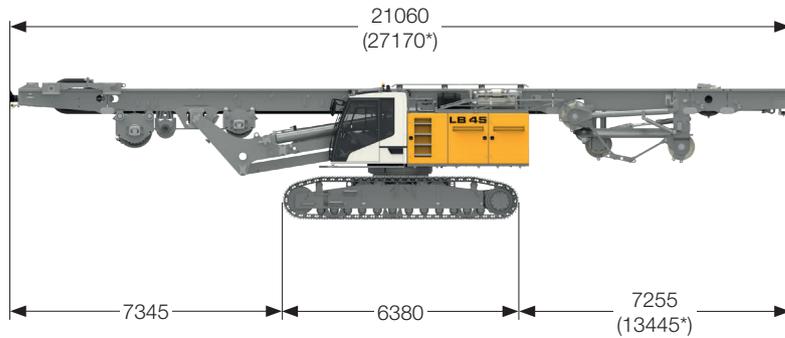
Kelly Kelly drilling  
 CFA Continuous flight auger drilling  
 FDD Full displacement drilling  
 CCFA Double rotary drilling  
 DTH Down-the-hole drilling  
 WSM Wet Soil Mixing

# Transport and weights



## Standard leader (6m leader upper part)

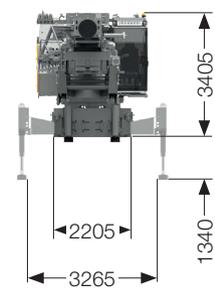
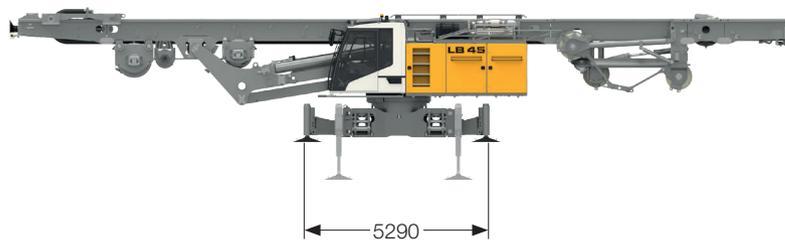
includes the basic machine (fully tanked and ready for operation) with leader, without attachments (such as rotary, Kelly bar etc.) and without counterweight. 77.5 t



## Folding leader (8 m leader upper part)

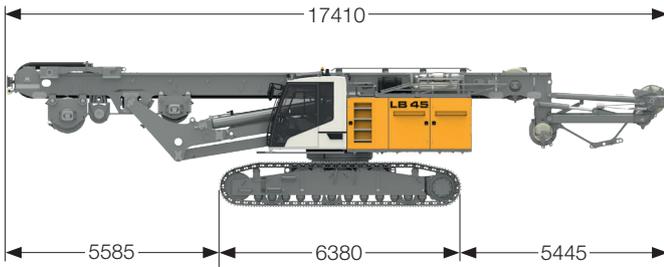
includes the basic machine (fully tanked and ready for operation) with leader, without attachments (such as rotary, Kelly bar etc.) and without counterweight. 78.7 t

\* Transport length leader not folded



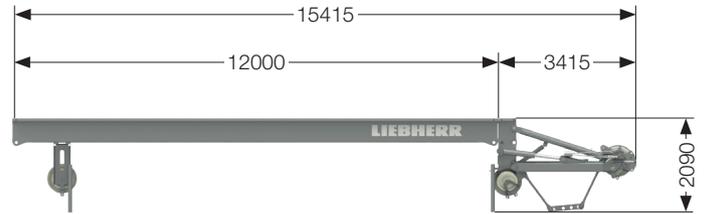
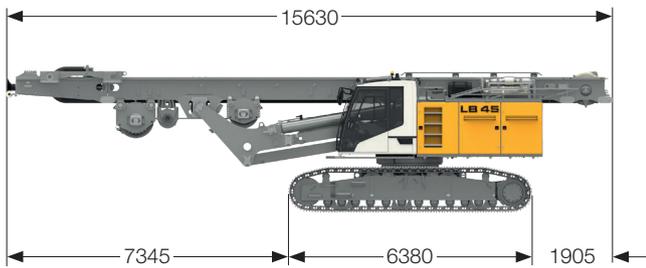
## Folding leader without crawlers

includes the basic machine (fully tanked and ready for operation) with leader, jack-up system and adapter for casing oscillator without attachments (such as rotary, Kelly bar etc.), without counterweight and without crawlers. 61.7 t



### Low Head

includes the basic machine (fully tanked and ready for operation) with leader, without attachments (such as rotary, Kelly bar etc.) and without counterweight. 74.2 t

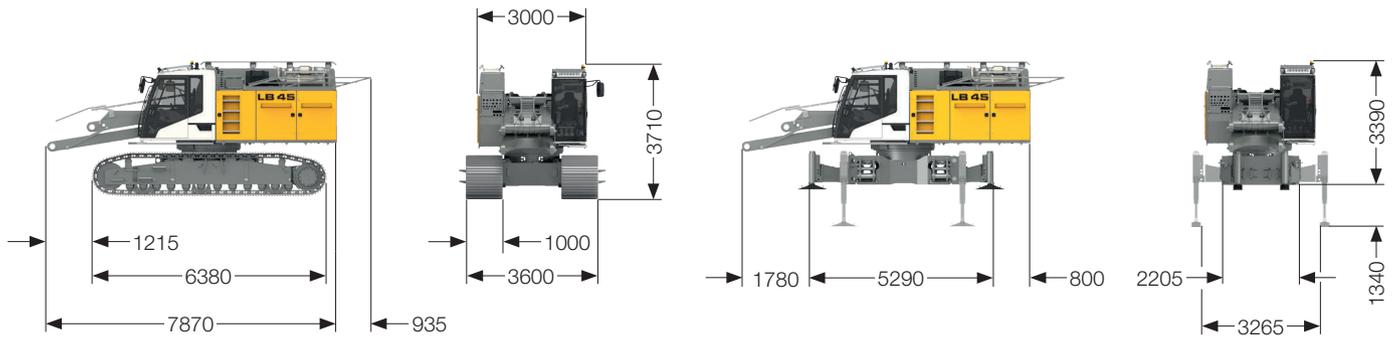


### Kelly Only and Single-Pass

Kelly Only without 12 m leader extension and leader top 73.3 t  
includes the basic machine (fully tanked and ready for operation) with leader, without attachments (such as rotary, Kelly bar etc.) and without counterweight

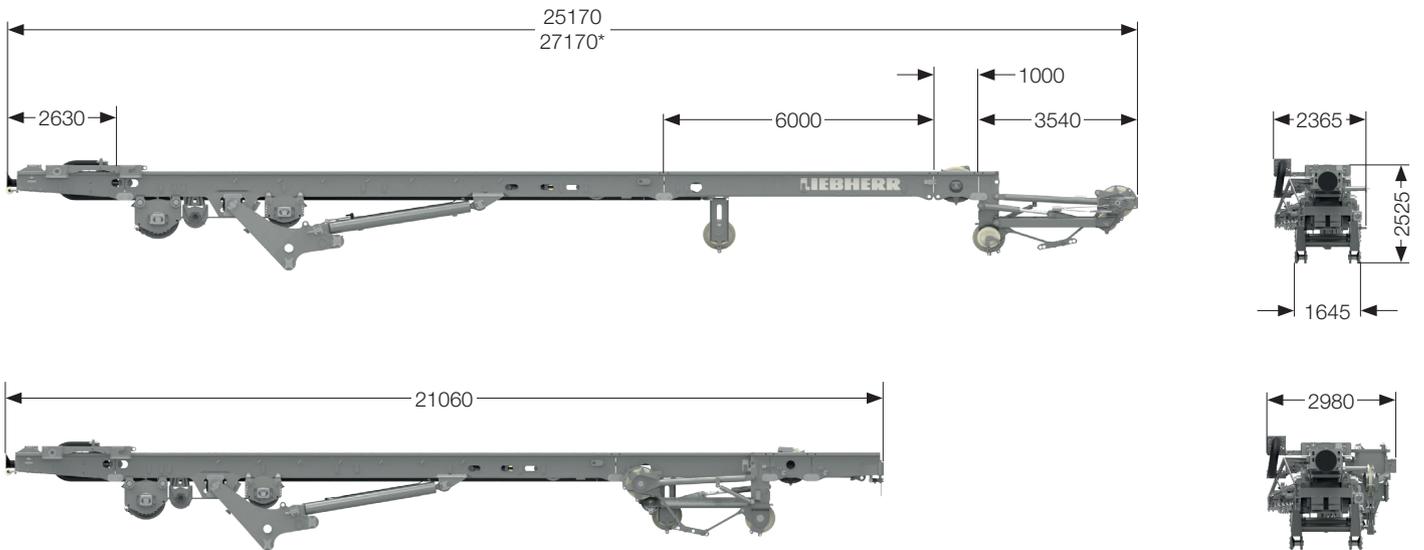
Single-Pass without 12 m leader extension and leader top 72.5 t  
includes the basic machine (fully tanked and ready for operation) with leader, without attachments (such as rotary, Kelly bar etc.) and without counterweight

12 m leader extension with leader top 5.7 t



### Carrier machine versions

without jack-up system, counterweight and adapter for casing oscillator	51.4 t
with jack-up system and adapter for casing oscillator, without counterweight and crawlers	34.4 t



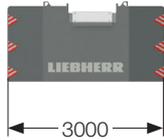
### Leader versions

Standard leader	26.1 t
Folding leader	27.3 t
Standard leader lower part	1.5 t
6m leader extension	2.3 t
8m leader extension	3.4 t
12m leader extension	3.8 t
Leader top	1.9 t
1 m leader extension with pulley support	0.8 t
Short leader lower part	0.5 t

### Options

Jack-up system	2.2 t
Adapter for casing oscillator	1.1 t
Concrete supply line	0.5 t
All round platform with railings	0.2 t

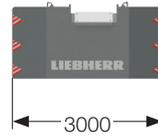
\* Transport length folding leader



**Rear counterweight**

Weight

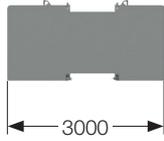
5 t



**Rear counterweight**

Weight

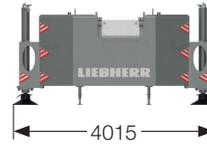
8 t



**Intermediate counterweight**

Weight

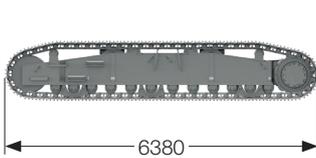
5 t



**Rear counterweight with rear support unit**

Weight

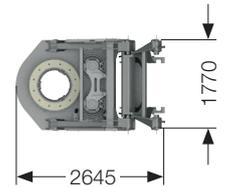
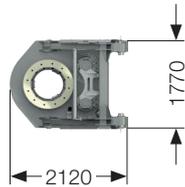
8 t



**Crawler**

Left / right

10.3 t



**BAT 450**

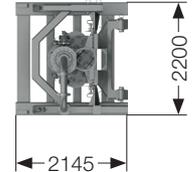
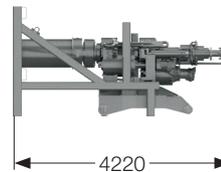
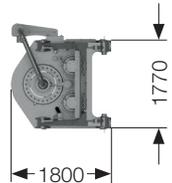
Transport weight

8.8 t

**BAT 450 with adapter for drilling axis 1800 mm**

Transport weight

10.2 t



**MAT 120**

Transport weight

6.0 t

**DBA 200**

Transport weight with 1.6t transport frame

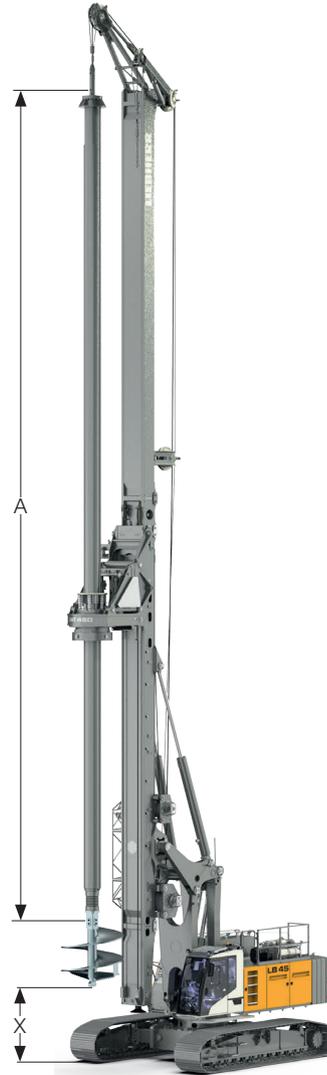
8.7 t

Weights can vary with the final configuration of the machine. The figures in this brochure may include options which are not within the standard scope of supply of the machine.

# Kelly drilling

Standard leader with short leader lower part

Kelly Only with 1800 mm drilling axis



## Performance data

Rotary drive – torque	452 kNm		
Rotary drive – speed	37 rpm		
	Drilling axis 1300 mm	Drilling axis 1800 mm	
Max. drilling diameter cased*	2000 mm	2800 mm	
Max. drilling diameter uncased	2300 mm	3200 mm	
Max. drilling diameter uncased with short leader lower part	3800 mm	4500 mm	

Above applications are sample illustrations. Other drilling diameters available on request.

\* Depending on casing driver configuration.

## Drilling depths for Kelly drilling

### Technical data Kelly bars

### Drilling depths

Model	Length [mm]	Weight [t]	Low Head		Standard leader		Folding leader		Kelly Only									
			X = [m]	Depth [m]	X = [m]	Depth [m]	X = [m]	Depth [m]	X = [m]	Depth [m]								
MD 36/3/30 SD	11900	7.6	3.8	3.7	28.3	28.9	9.8	9.7	28.3	28.9	11.8	11.7	28.3	28.9	12.0	11.1	28.3	28.9
MD 36/3/36 SD	13900	9.2	1.8 <sup>1/2</sup>	1.7 <sup>1</sup>	34.2 <sup>1/2</sup>	34.9 <sup>1</sup>	7.8	7.7	34.3	34.9	9.8	9.7	34.3	34.9	12.0	11.1	34.3	34.9
MD 36/4/30 SD	9950	8.5	5.8	5.7	28.3	28.9	11.8	11.7	28.3	28.9	13.8	13.7	28.3	28.9	12.0	11.1	28.3	28.9
MD 36/4/42 SD	12950	10.9	2.8 <sup>1</sup>	2.7 <sup>1</sup>	40.4 <sup>1</sup>	41.0 <sup>1</sup>	8.8	8.7	40.4	41.0	10.8	10.7	40.4	41.0	12.0	11.1	40.4	41.0
MD 36/4/48 SD	14950	12.1	1.3 <sup>1/2</sup>	1.2 <sup>1</sup>	46.4 <sup>1/2</sup>	47.0 <sup>1</sup>	7.3	7.2	46.4	47.0	9.3	9.2	46.4	47.0	12.0	11.1	46.4	47.0
MD 36/4/54 SD	15950	13.0	-	-	-	-	5.8	5.7	52.4	53.0	7.8	7.7	52.4	53.0	11.8	11.1	52.4	53.0
MD 36/4/60 SD	17450	14.1	-	-	-	-	4.3	4.2	58.4	59.0	6.3	6.2	58.4	59.0	10.3	10.2	58.4	59.0
MD 36/4/66 SD	18950	15.3	-	-	-	-	2.8 <sup>1</sup>	2.7 <sup>1</sup>	64.4 <sup>1</sup>	64.9 <sup>1</sup>	4.8	4.7	64.4	65.0	8.8	8.7	64.4	65.0
MD 36/4/72 SD	20450	16.4	-	-	-	-	1.3 <sup>1/2</sup>	1.2 <sup>1</sup>	70.4 <sup>1/2</sup>	71.0 <sup>1</sup>	3.3 <sup>1</sup>	3.2	70.4 <sup>1</sup>	71.0	7.3	7.2	70.4	71.0
MD 36/4/78 SD	21950	18.0	-	-	-	-	-	-	-	-	1.8 <sup>1/2</sup>	1.7 <sup>1</sup>	76.4 <sup>1/2</sup>	77.0 <sup>1</sup>	5.8	5.7	76.4	77.0
MD 36/4/84 SD	23450	19.2	-	-	-	-	-	-	-	-	0.3 <sup>1/2</sup>	0.2 <sup>1/2</sup>	82.4 <sup>1/2</sup>	83.0 <sup>1/2</sup>	4.3	4.2	82.4	83.0
MD 36/4/90 SD	24950	20.7	-	-	-	-	-	-	-	-	-	-	-	-	2.8 <sup>1</sup>	2.7 <sup>1</sup>	88.4 <sup>1</sup>	89.0 <sup>1</sup>
MD 36/4/93 SD	25750	21.1	-	-	-	-	-	-	-	-	-	-	-	-	2.0 <sup>1</sup>	1.9 <sup>1</sup>	91.3 <sup>1</sup>	91.9 <sup>1</sup>
MD 36/4/96 SD	26450	21.5	-	-	-	-	-	-	-	-	-	-	-	-	1.3 <sup>1/2</sup>	1.2 <sup>1</sup>	94.4 <sup>1/2</sup>	95.0 <sup>1</sup>

<sup>1</sup> When using a short leader lower part an assist crane is required for installation.

Drilling axis 1300

Drilling axis 1800

<sup>2</sup> Installation only possible with assist crane

Other Kelly bars available on request.

When using a casing oscillator, value X has to be reduced by 1600mm.

When using a Kelly bar guide, value X has to be reduced by 1100mm.

When using a short leader lower part the drilling depth is reduced by 1750 mm for a drilling axis of 1300mm, and by 2320mm for a drilling axis of 1800mm.

Length of drilling tool 1900mm

# Continuous flight auger drilling

Folding leader

Single-Pass



## Performance data

Rotary drive – torque	410 kNm
Rotary drive – speed	37 rpm
Max. drilling diameter*	1200 mm

	Low Head	Standard leader	Folding leader	Single-Pass
Drilling depth without Kelly extension	10.6m	16.6m	18.6m	22.6m
Drilling depth with 8 m Kelly extension	18.6m	24.6m	26.6m	30.6m
Max. pull force	1000kN	1000kN	1000kN	840kN

Above drilling depths take into account that an auger cleaner is used and the cardan joint has been removed.

Above drilling depths are valid for the use of standard tools and for an X value of 230mm (see above illustration).

\* Other drilling diameters available on request

# Full displacement drilling

Folding leader

Lattice boom extension



## Performance data

Rotary drive – torque	410 kNm				
Rotary drive – speed	37 rpm				
Max. drilling diameter*	800 mm				
	Low Head	Standard leader	Folding leader	Single-Pass	
Drilling depth without Kelly extension	11.3m	17.3m	19.3m	23.3m	
Drilling depth with 8m Kelly extension	19.3m	25.3m	27.3m	31.3m	
Drilling depth with 18m lattice boom extension	-	35.3m	37.3m	-	
Max. pull force	1000kN	1000kN	1000kN	840kN	

Above drilling depths are valid for standard tools and for an X value of 450 mm (see above illustration).

\* Other drilling diameters available on request

# Double rotary drilling

DBA 200



## Performance data

Rotary drive I – torque	0-210 kNm
Rotary drive I – speed	0-17 rpm
Rotary drive II – torque	0-105 kNm
Rotary drive II – speed	0-37 rpm
Max. drilling diameter*	900 mm

	Low Head	Standard leader	Folding leader
Drilling depth**	10.8m	16.8m	18.8m
Max. pull force	820kN	820kN	820kN

Above drilling depths are valid for the use of standard tools and for an X value of 900mm (see above illustration).

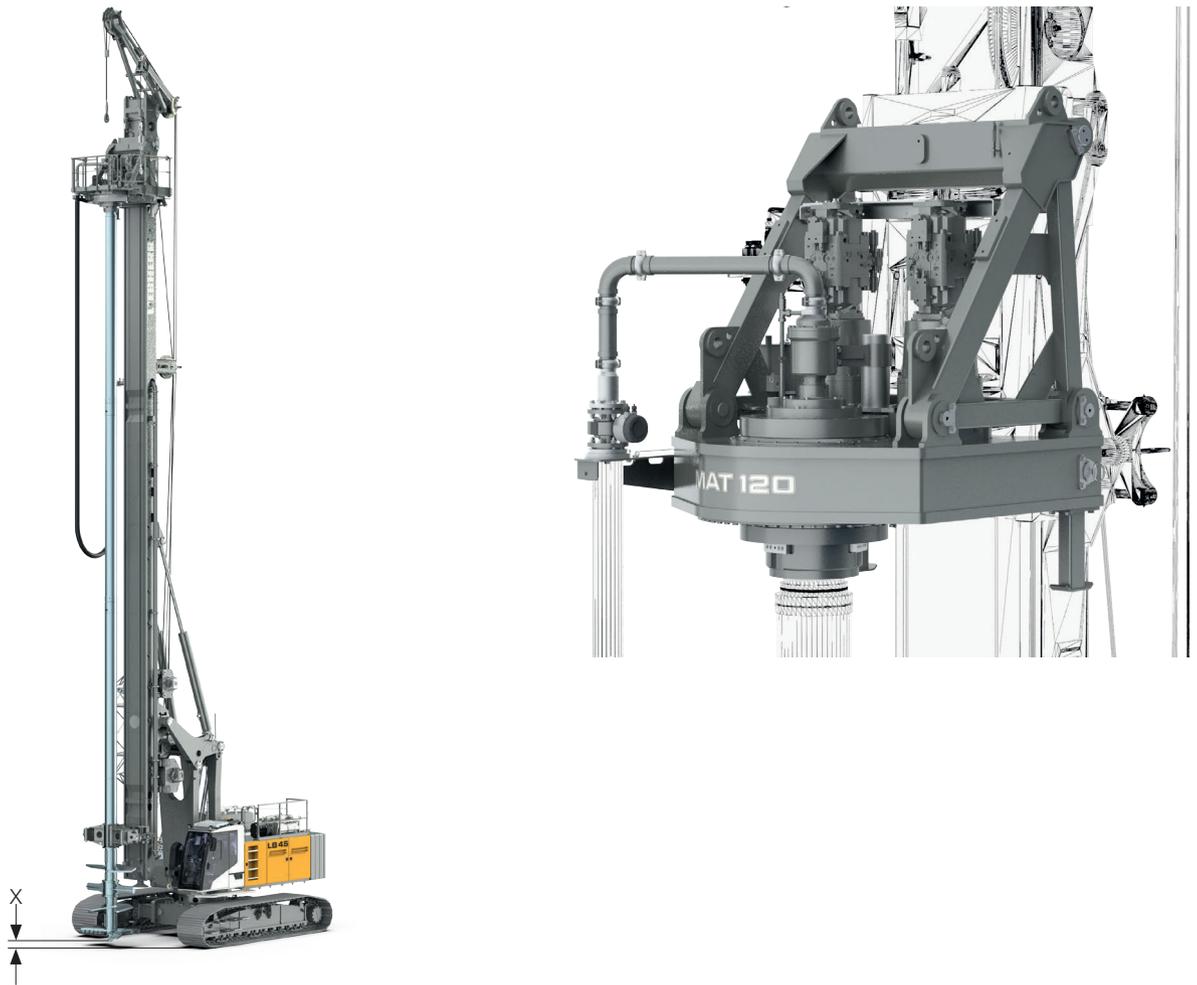
Due to differences in the max. admissible load capacities, the combinations of drilling depth and drilling diameter may be limited.

\* Other drilling diameters available on request

\*\* When using a protective hose, the maximum drilling depth has to be reduced by 720mm.

# Soil mixing

MAT 120 / BAT 450



## Performance data MAT 120

Rotary drive – torque	115 kNm
Rotary drive – speed	100 rpm
Max. mixing diameter*	1500 mm

	Low Head	Standard leader	Folding leader	Single-Pass
Mixing depth	11.6m	17.6m	19.6m	23.6m
Max. pull force	400kN	400kN	400kN	840kN

## Performance data BAT 450

Rotary drive – torque	410 kNm
Rotary drive – speed	37 rpm
Max. mixing diameter*	2300 mm

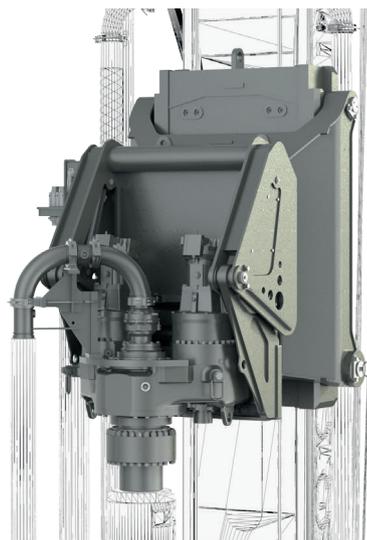
	Low Head	Standard leader	Folding leader	Single-Pass
Mixing depth	11.1m	17.1m	19.1m	23.1m
Mixing depth with 8m Kelly extension	19.1m	25.1m	27.1m	31.1m
Mixing depth with 18m lattice boom extension	-	35.1m	37.1m	-
Max. pull force	1000kN	1000kN	1000kN	840kN

Above mixing depths are valid for the use of standard tools and for an X value of 130mm for MAT 120, and 610mm for BAT 450 (see above illustration).

\* Other mixing diameters available on request

# Down-the-hole drilling

RHP 10



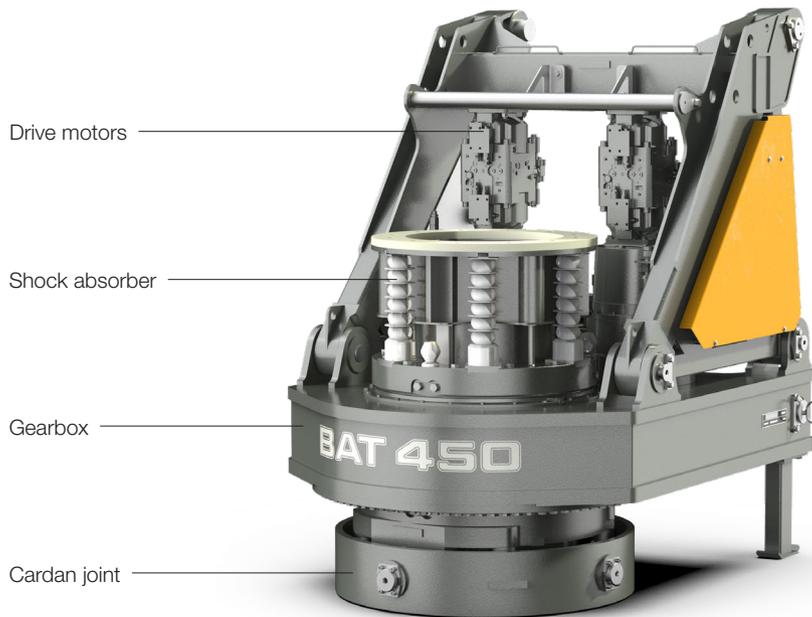
## Performance data

Rotary drive – torque	1 <sup>st</sup> gear	106 kNm		
Rotary drive – speed	1 <sup>st</sup> gear	25 rpm		
Rotary drive – torque	2 <sup>nd</sup> gear	53 kNm		
Rotary drive – speed	2 <sup>nd</sup> gear	50 rpm		
Max. drilling diameter*		820 mm		
			Low Head	Standard leader
Drilling depth			11.2m	17.2m
Max. pull force			400kN	400kN
				Folding leader
				19.2m
				400kN

Above drilling depths are valid for standard tools and for an X value of 500mm (see above illustration).

\* Other drilling diameters available on request

# BAT 450



## Kelly shock absorber:

- Newly developed Kelly shock absorber for highest demands
- Possibility of adjusting the strength of the Kelly shock absorber for different Kelly bar weights

## Highest availability through easy set-up:

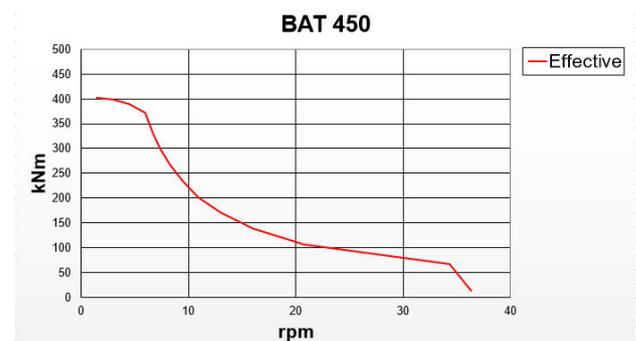
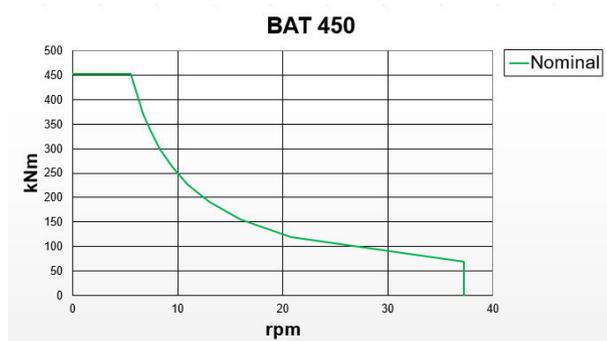
- No mechanical shift gearbox
- Less maintenance required

## Automatic gearbox for best operating comfort:

- No stopping required to change gears
- No interruption of the drilling process
- Continuous optimization of speed
- No interruption of the drilling process

## Flexibility through modular design:

- Exchangeable cardan joint for other casing drivers
- Exchangeable drive adapters for use of other Kelly bars
- Quickly exchangeable equipment for other methods of operation



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