1 INTRODUCTION

These operating instructions must be observed before the installation and during the operation of THIELE plow chains.

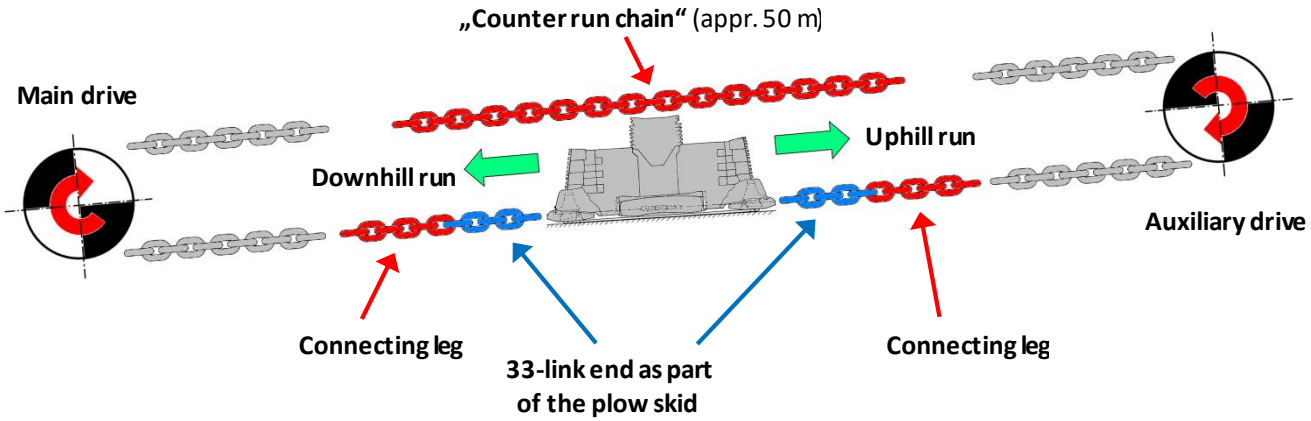
It is essential that you also observe the operating and repair instructions of the machines and systems in which the chains are installed.

For information on the detailed configuration of the delivered chain strands, please refer to the delivery documents.

2 DESCRIPTION AND INTENDED USE

The plough chain provides the driving force for the coal plough as it runs along the chain scraper conveyor on stripping winning coal faces. The chain travels inside tubular guides that run either on the face side (Gleithobel-System) or on the goaf side (Reisshaken-System). The plough chain is a high-tensile, round-link steel.

The following sketch shows the basic structure of the Gleithobel plough system:



One special chain leg each is directly attached to both ends of the plow skid. This chain leg comprises double-pitch links, swivel elements, scraper wedge as well as a 33-link chain section (shown blue). The wire diameter of the special chain leg links is larger, for example with plow chain 38x137 mm the special chain links are of size 42x146 mm. 3 links behind the swivel elements the dimension changes to the standard size of the plow chain (e.g. 38x137 mm) including the 33-link section. Following this, the first plow chain connector is arranged which serves to hook up the 50-m long connecting leg (shown red) on each side.

If the plow is drawn up to the end stop, the chain links subjected to peak loads are located between sprocket and plow. Since the chain connectors shall not be exposed to these extreme loads during this operating phase the 33-link chain legs enable the first connector to be positioned in the top chain run so that the connector will only have to take the loads exerted by the second driver.

The top chain section arranged opposite the plow carriage is also known as „counter-run chain“.

The instructions and notes given here shall be observed to make sure THIELE plow chains are used in the best possible way.

Basically, a coal plow can be operated in two different modes:

- including reverse travel
  To start a new cutting operation at the coal-face end the plow is initially retracted a few meters away from the coal-face end and then reversed to the original position after the shields have been advanced in the coal-face end area. Following this the plow traverses to the opposite coal-face end.
  This operating mode offers advantages in that the cutting depth and thus the forces acting on the chain will not increase. Disadvantages associated with this mode are that reverse travel runs become necessary so that certain chain segments will run over the sprockets twice as often leading to higher wear of the link joints. This is especially true for the connecting legs and segments of the counter-run chain (shown red).

- excluding reverse travel
  In the coal-face end area the cutting depth is doubled by suitably increasing the step width of the shield support. However, this results in higher forces acting on the chain. Since in this case the reversing operation is omitted the mining efficiency will improve. To achieve this, the cutting depth must be adjustable as necessary.
  To create a smooth transition, the cutting depth adjusting area at the coal-face end should as a minimum be 15 shields long.

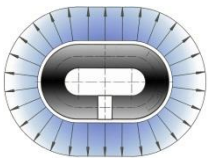
3 SAFETY NOTES

- All activities with or on plow chains and associated systems may only be carried out by trained and qualified persons.
- Always observe the safety instructions of the mine, the local accident prevention and industrial safety regulations and the operating instructions of the conveyor system and any other connected machinery!
- Always wear personal protective equipment!
- Do not wear loose clothing, jewellery or rings when working on the equipment as such items can become caught up in the machinery.
- It is strictly forbidden to work on the equipment if under the influence of drugs or alcohol (including residual) or if taking medication likely to impair performance!
- Operators must inspect the safety devices before each use and, if necessary, carry out a functional test.
- The equipment and machinery must only be operated when they are in perfect technical condition.
- Ensure that all safety devices fitted to equipment and machines are present and fully functional.
- Immediately rectify any malfunctions that could affect the safety of persons or machinery.

- Access to the plow chain system, e.g. for inspection, is only permitted when
  - the plow chain system has been shut down
  - the plow chain system has been secured against unintentional start-up
  - the roof zone is protected by shield supports or canopies
  - there is no danger of sudden coal bursts from the face
- Plow chains must not be used as lifting attachments or slings or for carrying, towing or securing equipment, as there is no working load limit assigned to them.
- After-welding of chain links can significantly reduce their technical capabilities. Welding is only permitted after prior consultation with and on written approval from THIELE.

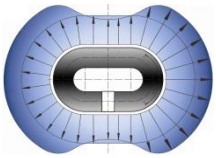
4 QUALITY GRADES

- **THD chains – homogenously quenched and tempered**
  (max. hardness 375 HBW)



Used with short headings when frequent disturbances/blockages are expected, when the proportion of surround rock is higher.

- **TSC chains – high-quality tempered link joints**
  (max. hardness in crown 414 HBW)



Used with longer headings where disturbances and blockages are hardly expected.

Selecting the right chain for the envisaged application has a decisive influence on the achievable chain service life. With a view to minimizing the wear of the link joints the strength of the plow chains in the crown area is increased.

5 STORAGE AND HANDLING PRIOR TO FIRST USE

The chains must be stored in a dry location to ensure they protected against corrosion.

Unloading or reloading has to be done by adopting suitable methods ruling out removal or damage of the identifying marks.
Do not drag or haul chain runs or legs over the ground.
Handle chains very carefully at temperatures below minus 20° C because in that case they are particularly sensitive to shock or impacts and may suffer incipient damage resulting in premature chain failure.

6 ASSEMBLY

During assembly of the plow troughs a pull-in rope must be arranged in the upper plow chain guide system by means of which the plow chain can be drawn in later on.

7 FITING CHAINS

Fitting chains serve the purpose of adjusting the plow chain leg to the actual conveying length, e.g. enable legs to be shortened if an excessively slack chain has formed.

8 PLOW CHAIN SPROCKETS

It is to be checked on a daily basis whether the chain runs properly over the sprocket.

9 CHAIN CONNECTORS

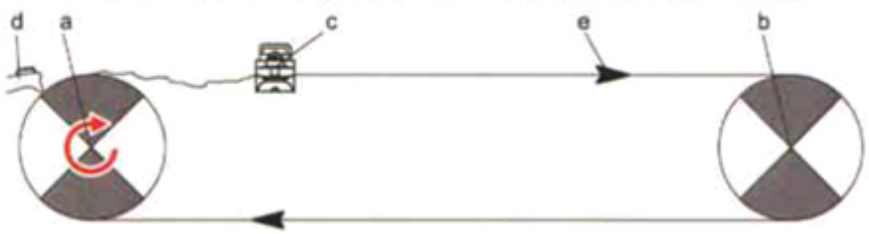
The individual chain sections are joined by means of chain connectors.

When mounting the connectors always make sure to use new roll pins (also after opening during operation / upon reuse). The reuse of dowel pins is expressly not permitted.

The operating instructions of the chain locks must be observed.

10 PLOW CHAIN TENSIONING

Making use of a retaining pawl and safety catch the plow chain can be tightened with the help of a suitable chain tensioning device.
Note that too less pretensioning force will result in a slack chain system where the risk of kinking is higher. On the other hand, too high pretensioning force will cause increased wear and may result in frictional vibration in the system. Based on your specific operating parameters our service personnel will be pleased to prepare a proposal tailored to your system.



a) Main drive b) Auxiliary drive c) Retaining pawl on main drive d) Safety latch
e) Plow running direction during chain tensioning

For chain tensioning purposes make sure to strictly observe relevant the instructions issued by the coal plow manufacturer.
If so requested our service staff will provide further assistance in this matter.

When in continuous use the chain heats up and elongates so that during retensioning some links may even have to be removed.

It is to be noted that during downtimes (e.g. due to malfunctions) the chain will cool down and again contract to some degree. This results in the chain pretensioning force to increase which must be corrected by taking appropriate action to avoid chain failures due to overloads, especially when the system is restarted.
It may even be necessary in this context to add some of the links.
Using a hydraulic tensioning device is definitely considered advantageous.

11 START-UP OF THE COAL PLOW

When starting up the plow system make sure nobody is staying in the hazardous area.
Other than during normal operation danger may be imminent when commissioning the system, e.g. due to assembly faults etc.
Always keep a safe distance to the plow equipment.

Prior to coal plow start-up the following work has to be carried out,

- align the coal plow system properly.
- remove all tools, auxiliary items etc. from the conveyor and plow area.
- make sure the maximum drive force exerted when starting against a blocked plow system does not exceed the test force.

12 TRIAL RUN

To rule out plow chain and chain sprocket run dry a film of oil shall be applied to the chain. Basically, we recommend that chain lubrication systems be used.

Environmental protection provisions must be strictly observed.
Since this is a loss lubrication system only use vegetable oils of water pollution hazard class 0 that is biologically degradable.

After installation of the plow a trial run must be conducted without advancing ram thrust. Make sure the plow chain runs without twisting and the plow chain swivels arranged on both ends of the plow body function correctly.

If the chain runs properly in the chain ducts and passes without twisting over the drive sprockets of the main and auxiliary drive the advancing rams moving the plow system can be pressurized.
Having again checked the plow chain pretension the plow operation may now be started, preferably using a low cutter feed setting first.

During the trial run check the following characteristics:

- Uniform and equally high power consumption of the motors
- Chain rolling behavior on the sprockets
- Slack chain formation
- Heating and smooth running of the gearboxes as well as proper functioning of the overload clutch

13 MAINTENANCE / INSPECTION

THIELE plow chains must be checked for damage at regular intervals (daily). During the checks elongated or damaged chain elements must be replaced. The sprockets must be checked for damage. Also check the correct functioning of the chain deflector.

At least once per month, check the THIELE plow chain in cold condition for elongation/lengthening using a suitable chain elongation gauge.

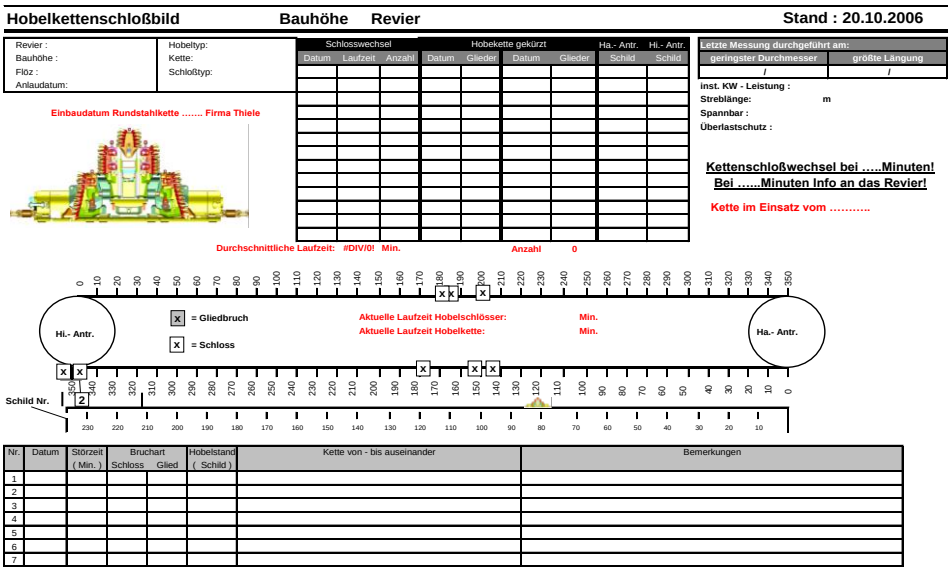
Alternatively, suitable chain sections (7 links, no fitting chains) may be submitted to THIELE for inspection/examination.

The chain samples submitted must have been operated for the same time as the remaining chain system.

To make sure the remaining service life can be reached it is recommended that suitable chain samples be checked by the manufacturer.

14 DOCUMENTATION

For chain checking purposes a data sheet similar to the one shown here should be maintained to document all relevant data.



Hobelkettenschloßbild **Bauhöhe** **Revier** **Stand : 20.10.2006**

Revier :
Bauhöhe :
Flöz :
Anlaudatum:

Hobeltyp:
Kette:
Schloßtyp:

Schlosswechsel: Datum | Laufzeit | Anzahl
Hobekette gekürzt: Datum | Glieder | Datum | Glieder
Ha.- Antr. Schild | Hi.- Antr. Schild

Letzte Messung durchgeführt am:
geringster Durchmesser / größte Längung

inst. KW - Leistung :
Streblänge: m
Spannbar :
Überlastschutz :

Einbaudatum Rundstahlkette ..... Firma Thiele

Kettenschloßwechsel bei .....Minuten!
Bei .....Minuten Info an das Revier!

Kette im Einsatz vom .....

Durchschnittliche Laufzeit: #DIV/0! Min. Anzahl 0

Hi.- Antr. | Ha.- Antr.
= Gliedbruch
= Schloss
Aktuelle Laufzeit Hobelschlösser: Min.
Aktuelle Laufzeit Hobelkette: Min.
Schild Nr.

Nr.	Datum	Störzeit (Min.)	Bruchart Schloss	Bruchart Glied	Hobelstand (Schild)	Kette von - bis auseinander	Bemerkungen
1							
2							
3							
4							
5							
6							
7							

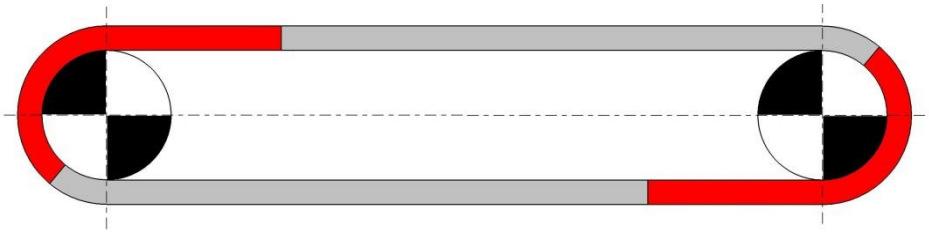
15 CHAIN EXCHANGE

The operating life of a plough chain will be determined by the stress levels applied by the power delivery of the drives and by the geological conditions on the face being ploughed. In case higher amounts of encasing rock need to be cut the chain service life will be shorter than with soft coal being cut.
The connecting chains at the plough body and the corresponding counter-chains will be particularly stressed as they have to pass over the sprocket twice as frequently as the rest of the plough chain when the drives are being moved over (reversing). This will reduce their service life accordingly.
General experience has shown that the connecting chains and counter-chains achieve half as long an operating life as the other sections of chain, which easily deliver runtimes of 60 000 minutes. However because of the many different ways in which the actual on-face conditions affect the wear behaviour of the chain assembly this figure must only be seen as a rough guide and should not be considered as a product characteristic of the chain.
The residual load cycles provide a more useful indication of how much operating life remains in the chain.

16 SIMULTANEOUS USE OF NEW AND USED CHAIN LENGTHS

Used chains may occasionally have to be run alongside new chain strands, for example when a new face is being started up. This should not present any problems, provided the face length remains unchanged and the individual chain sections are installed into the overall assembly as before.
In case of shorter face length take care for a symetrical shortening of the chain.
When the new face is longer than the previous installation **THIELE generally advises against mixing used chain sections with new chains**.

Where this is unavoidable it has to be ensured that only new or old chain sections passing simultaneously over the main and auxiliary drives at the same time.



17 INTERIM STORAGE

For interim storage, e.g. after finishing a longwall face or for further use (e.g. face relocation), the chain assembly must be cleaned directly afterwards (e.g. by sandblasting) and then corrosion protected.

We recommend dipping in Tectyl or alternatively applying a coating of viscous oil (as new, no used oil). Interim storage should not take place underground.

18 TEMPORARY STOPPAGES

When operation at a workplace or longwall face is temporarily down for several days the chain assembly should be moved at least once per day for half an hour to prevent corrosion. If necessary, protect the chain and connectors from corrosion by starting up the assembly briefly and applying a coating of oil.
After a longer period of downtime (i.e. in case of a fire) it is absolutely essential to use a new chain. If this is not done there is a very high risk of chain failure.

19 ENVIRONMENT

Ensure appropriate and environmentally friendly use of lubricants.

Dispose of worn out steel components and accessories for scrapping in accordance with local regulations.

Dispose of packaging in accordance with local regulations.

20 THIELE MOUNTING AND OPERATING INSTRUCTIONS

Actual mounting and operating instructions are available as PDF download on the THIELE homepage.

21 IMPRINT

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