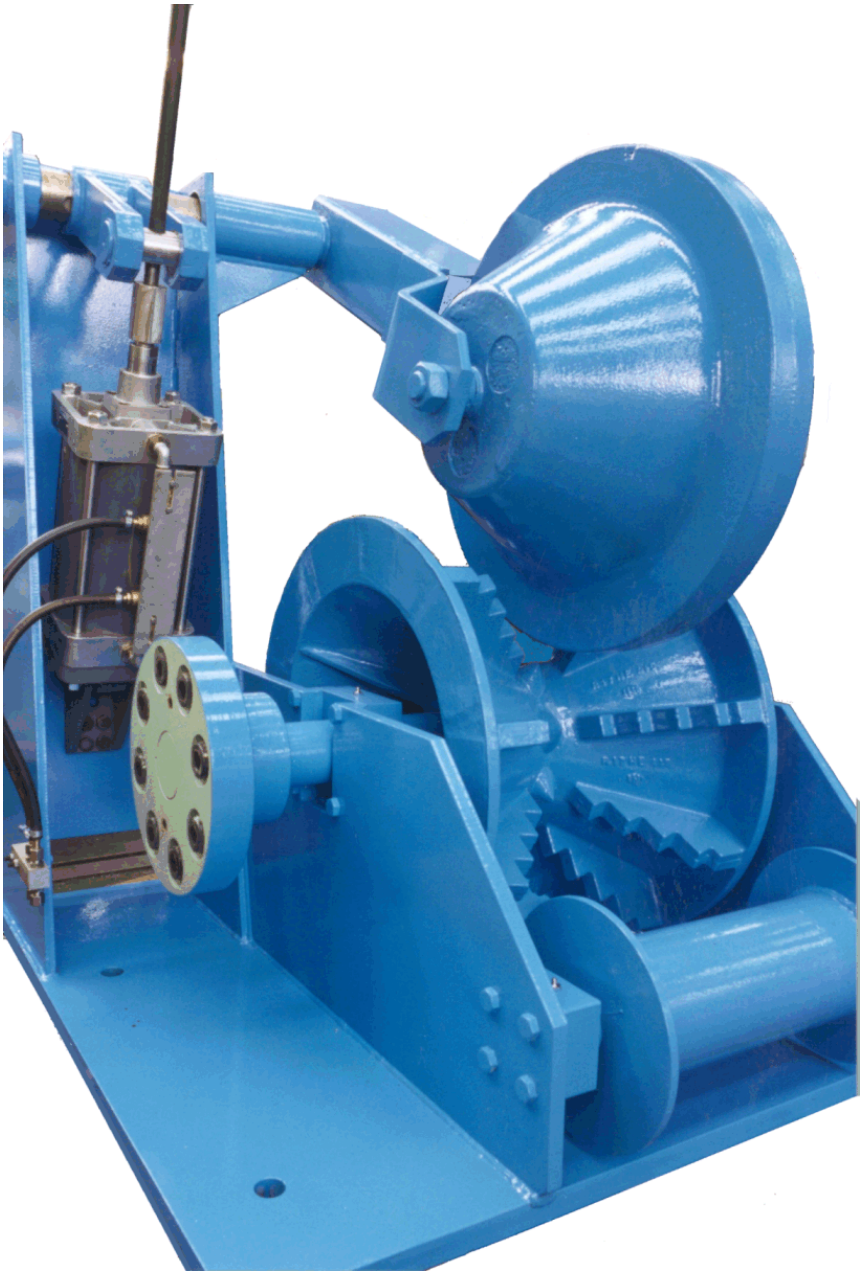

Erection Work, Operating and Maintenance Instructions

Machine: **RagPull RP1C**

Machine No.: 132206528
Year of construction:2013

Order code: Dong Tien Paper,Vietnam
Order no.: PPF 40025865

ORIGINAL LANGUAGE:german

Issued by:	PPF/Zhang Wenna, 2013-08	Revision:
Checked:	PPF/Ren xiaojiang, 2013-07	Checked:

TABLE OF CONTENTS

1 INTRODUCTION

This manual is part of the ANDRITZ technical documentation for the plant. It is intended as a supplement to the training provided, to supply the basic knowledge required for proper, safe and economical use of the equipment delivered by ANDRITZ. Observing these instructions helps avoid hazards and reduce repair and downtime costs, as well as increasing the reliability and useful life of the machines.

1.1 Use

Target group

This operating manual is intended for users with a knowledge of mechanical engineering and is for the exclusive use of the operating company and its personnel.

Personnel entrusted with work on the machine must have read and understood these operating instructions and comply with them. This refers in particular to the following tasks:

- Handling, starting and stopping
- Troubleshooting
- Maintenance and upkeep
- Transport
- Maintenance and disposal of process materials, cleaning of machine and the area around the machine

In particular, the following must be considered:

- The chapter on SAFETY
- The safety instructions contained in various other chapters

Supplementary instructions

The plant operating company shall complete this manual by adding national regulations on occupational health and safety, and on environmental protection.

Instructions on any special operational conditions concerning work organization, sequence of work/operations and the personnel assigned to the job shall also be added. This includes instructions regarding obligatory supervision and notification requirements.

Safekeeping

Keep the entire operating manual near the place where the machine is installed and within easy reach.

1.2 Standards and guidelines

The machine/plant has been built in accordance with state-of-the-art standards and the recognized safety rules. The equipment conforms to the equivalent appropriate standards.

The CE declaration of conformity or the declaration of incorporation confirms compliance with essential health and safety requirements of the EC Directive 2006/42/EC.

1.3 Use of manual

Presentation

- Chapter and paragraph headings are printed in capitals in the body text:

  Chapter SAFETY

- Designations for display and operating elements are written in inverted commas in the body text:

  Operate switch "xxx"

- Lists without numbering do not require operations to be carried out in a certain order.

Pictograms

The following pictograms are used in the operating instructions:

Warning signs

Warning signs are shown with an explanation of the type of hazard.

The meanings of the different graduations of hazards are described in the Chapter on SAFETY.

Marks an instruction on handling of the machine or system.

Marks a useful piece of information

Marks a cross-reference to another Chapter with absolute path indication.

e.g.  /MACHINE/SAFETY

Work steps

Work steps are presented in tables. Work steps are numbered and must be carried out in the order specified.

Numbering of pages, tables and figures

Pages:	Consecutive numbering of chapters	2-1
Tables	Tab.+ Consecutive numbering in Chapters	Tab.2-1
Figures	Fig. + Consecutive numbering in Chapters	Fig.2-1

Abbreviations

Tab.	Table
Fig.	Figure

Illustrations and graphics

The figures and graphics show the basic design of the machine. This need not necessarily correspond exactly to the version supplied.

Detailed information on the equipment supplied

➨ /PARTS BOOK

➨ /SUB-SUPPLIER DOCUMENTATION

1.4 Warranty and liability

The ANDRITZ general terms of delivery and sale shall apply.

Guarantee and liability claims towards ANDRITZ shall become void if personal injury or material damage is caused by one or several of the following:

- Use of the machine/system for any purpose other than its designated use.
- Non-conformity of erection work, start-up and handling of the machine/system
- Non-observance of the safety instructions in the manual.
- Non-authorised structural changes to the machine/system.
- Non-observance of the maintenance and upkeep instructions.

In the event of a claim for repair under guarantee, ANDRITZ reserves the right to assess the damage to the machine/system.

1.5 Name and address of the manufacturer

Manufacturer

ANDRITZ Technologies Ltd.
9 Tianbao Road, West City Industry Zone, Chancheng District,
Chancheng District
Foshan 528000
China

Service

The following SERVICE DEPARTMENTS are at your disposal:

China (AC):

Tel.: +86 757 8296 9272
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Europe (ANDRITZ AG):

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Fax: +43/316-6902-424
e-mail: paper.service@andritz.com

1.6 Copyright

2 SAFETY

2.1 General safety regulations

The Safety Chapter contains general safety regulations that must be observed when working with/on the machine/plant.

The regulations are supplemented by additional safety instructions for individual activities and which are provided in the relevant chapters of the manual. These inst ructions are highlighted in the text with special warning signs.

Safety instructions on components not supplied by ANDRITZ are contained in the descriptions of the components provided by sub-suppliers.

.../SUB-SUPPLIER DOCUMENTATION

These safety instructions supplement the ANDRITZ operating instructions.

All safety instructions must be observed. Non-observance of the safety instructions can lead to personal injury, damage to the environment, and/or material damage.

ANDRITZ requires the operating company to provide the following:

- The operating company has compiled a comprehensive, general safety program. Anyone working at or in the vicinity of the machine must have received training for working on plants of this type and on the process running there, including where to mount barriers and markings.

2.2 Danger and warning signs

The entire SAFETY chapter is of extreme importance and relevant to safety. Thus, the information in this chapter is not marked with special danger symbols.

In the Chapters on ERECTION WORK, START-UP, OPERATION, and MAINTENANCE in this Manual, warnings are marked by a pictogram. The following warning signs are used:

DANGER

This symbol indicates that there may be a risk to life and limb.

Non-compliance with the warning signs may lead to serious health problems or even fatal injuries, and can cause extensive damage to property.

WARNING

This symbol indicates that there is an imminent health risk, as well as a risk of environmental pollution and of damage to property.

Non-compliance with the warning signs may cause moderate health problems and/or extensive environmental pollution and damage to property.

DANGER

This symbol gives warning of a dangerous situation

Non-observance of these signs may cause environmental pollution and damage to property.

Further symbols and pictograms used are described in the INTRODUCTION chapter.

2.3 Intended use

The machine should only be used according to the specifications forming part of the purchase order.

Using the machine/plant for other purposes is considered contrary to its designated use.

Any modifications to the scope of supply made without the agreement of ANDRITZ are considered contrary to the designated use.

The term designated use also covers adherence to the operating instructions, compliance with the operating, inspection and maintenance conditions and with the regulations on cleaning and upkeep.

The machine is designed for installation in a non-explosive atmosphere. Designated use provides for operation outside a zone according to ATEX directive 1999/92/EU.

The machine is intended for installation in a plant with a roof covering.

2.4 General remarks on machine/plant safety

The machine/plant has been built in accordance with state-of-the-art standards and the recognized safety rules. Nevertheless, its use may constitute a risk to life and limb of the user or of third parties, or cause damage to the machine/plant and to other material assets.

The machine/plant may only be operated when in perfect condition and with due consideration to safety and the risks involved. All protective devices and the EMERGENCY STOP equipment must be in place and fully functional.

Malfunctions and unforeseen changes to the machine/plant must be remedied immediately.

2.5 Hazardous applications

The machine was designed specially for the process specified in the sales contract. All changes to this process must be checked and approved because ANDRITZ does not know in detail the chemical and biological properties of the numerous materials that can be processed in this machine. The machine as-sold is not suitable for safe processing of hazardous materials unless additional precautions are taken.

Before processing materials that are already combustible, explosive, toxic, or hazardous in other ways or which can become hazardous in a reaction, the operating company must conduct a thorough hazard analysis and risk evaluation of the entire process. This includes drawing up of contingency plans for handling process errors and faults.

In particular, the following must be observed:

1. If combustible or potentially explosive materials are to be processed, all electric motors, cabling and operating elements MUST be explosion-proof. Furthermore, maintenance work on the plant MUST be performed using non-sparking tools. Smoking is forbidden.
2. If the material processed is toxic, appropriate safety measures MUST be implemented.

2.6 Operating company's obligations

Intended use

The company operating the machine is responsible for its designated use.

Work instructions

In addition to the operating instructions, the applicable legal regulations in the user countries and other rules governing safety at work, health and environmental protection must be observed and personnel instructed in these matters.

Qualification of personnel assigned

The machine/plant may only be operated, maintained and serviced by authorized, skilled personnel with hands-on training.

The minimum legal age must be taken into account.

Any person undergoing training; in apprenticeship, or under instruction may only work on the machine/plant after receiving instruction on the theory and only under the supervision of an experienced person.

Instruction

The operating and maintenance personnel of the operating company must be instructed by qualified persons after completion of the installation work.

The user undertakes to have new, additional operating and maintenance personnel instructed in machine/plant operation and maintenance to the same extent and applying the same care, and with due consideration to the safety instructions.

Workers entrusted with the transportation, erection work, start-up, operation, and maintenance of the machine/plant must have read and understood the operating instructions, especially the Safety Chapter, the safety instructions concerning a certain activity, as well as the safety instructions issued by sub-suppliers.

Definition of areas of responsibility

The operating company is responsible for:

- definition of the machine operator's responsibility and his right to give instructions,
- definition of the contents and of responsibility for keeping the records on functioning and any failure of the monitoring equipment (log book),
- personnel areas of responsibility in terms of operating, tooling, maintenance and upkeep.

Inspections and tests

The operating company must:

- check regularly whether the safety instructions and regulations are observed when working on the machine/plant.
- carry out regular training to confirm the level of knowledge of the operating and maintenance personnel.

Attachment of safety features

The operating company shall ensure that the following equipment, regulations, symbols and instructions are mounted in the production area:

- Markings on the floor for vehicle routes, protective fencing and danger areas (yellow)
- Barriers and covers
- Handrails (foot, center and chest height)
- Emergency lighting
- Lockable maintenance switch (shut-off device for power to the drive motor)
- Information signs – fire prevention equipment
- Information signs – emergency phone number
- Direction signs – exits
- Direction signs – escape routes
- Information signs (first-aid post)
- Fire-fighting equipment as required by national regulations

2.7 General obligations of personnel

To avoid personal injury and material damage, all persons working on the plant shall observe the following safety instructions:

- The safety instructions in the manual and attached to the machine must be observed.
- In the event of a safety-relevant functional disorder, stop and secure the part of the plant affected. Report disorders and have them repaired immediately.
- All safety-critical modes of operation are prohibited.
- Use only the machine accesses, paths and passages intended for this purpose.
- Do not touch moving and rotating parts and/or reach out beyond them.
- Keep the machine and the workplace clean. Do not place tools and other objects on the machine/plant.
- Do not wear any garments/pieces of jewelry that might get caught on moving machine/plant parts. This includes ties, scarves, rings and necklaces.
- Do not wear long hair loose.
- Familiarise yourself with the function and any failure of machine monitoring equipment (log book) before starting work.
- No smoking in the vicinity of the machine/plant.
- Wear personal protective apparel when working on the machine/plant.

2.8 Safety devices

The machine/plant must not be operated without effective safety equipment.

Safety equipment must not be circumvented, dismantled or made unserviceable during operations. The safety equipment is there to protect operating personnel.

Safety equipment and access thereto must be kept clear.

Lockable switches

The keys for maintenance switches or operating mode switches for local machine settings must be removed from these switches and retained by the operator to prevent the setting being changed by any third parties and thus also prevent risks!

EMERGENCY STOP switch, safety shutdown

The operating company must provide an EMERGENCY STOP switch in the immediate vicinity of the machine to guarantee that it can be shut down by immediately cutting off the power supply to the drive elements of the machine.

Possible designs of EMERGENCY STOP switch, please refer to Fig. 2-1

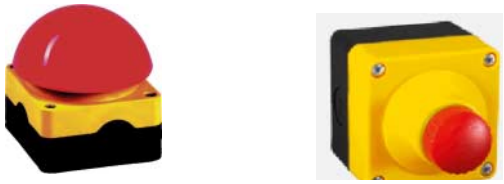

Fig. 2-1 EMERGENCY STOP switch

The EMERGENCY STOP device must not be installed more than 15 m away from the machine.

The EMERGENCY STOP switch and further units included in the EMERGENCY STOP safety equipment must be installed and implemented by the operator in accordance with the applicable standards, particularly EN ISO 13850 and EN 60204-1 (stop category 0).

Indicative, warning and prohibiting signs

Information, warning and prohibiting signs must be observed. They must be checked regularly for legibility and completeness and they must not be removed or obstructed.

The following indicative, warning and prohibiting signs are attached to the machine:

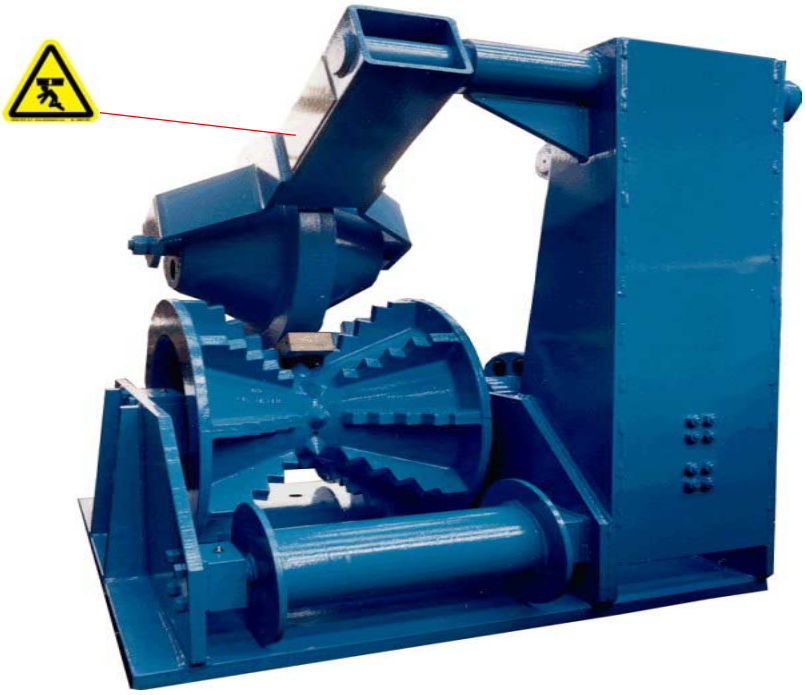

Fig. 2-2 Safety signs - Rag Pull RP1C

Warning: Machine components may swing downwards!

2.9 Personal protective apparel

General safety equipment

Use and always carry personal protective equipment in accordance with local regulations or those of the plant operating company.

It should be compulsory to wear hard-toed boots throughout the entire mill premises.

In addition to the regulations applying, we recommend using the following safety equipment for certain work:

Activity	Safety equipment		
Time spent in the immediate vicinity of the machine while it is running			
Taking pulp samples			
Installation and maintenance work where parts of the machine are disassembled or when entering the pulping chest			

Tab. 2-1 Recommended safety equipment for certain work

Key to symbols

	Protective clothing to prevent the pulp from coming into contact with the skin		Safety shoes as protection against foot injuries
	Gloves to prevent hand injuries		Ear protection to prevent damage to hearing
	Eye protection to prevent eye injuries		Standard hard hat as protection against head injuries

Tab. 2-2 Purpose of the safety equipment

2.10 Safety at the machine installation site

There is no permanent place of work at the machine. Working near the machine is only necessary during inspection and maintenance work. The equipment is operated at the DCS (process control system) located in a control room.

A suitably large, clear, and unconfined working area must be created on all sides of the machine. Pipework, ducting, etc. must be laid such as not to impede access to the machine.

All operating and maintenance areas of the machine must have adequate lighting and ventilation (industrial lighting).

The foundation must be sized to withstand the loads caused by the machine.

The area around the machine and the marked escapes are to be kept clear. The area around the machine must be marked as a danger zone. It must be possible to enter and leave the operating area unimpeded.

DANGER

A fall into the pulping chest can be fatal!
Climbing onto the housing or onto the hood or splash protection of the pulping chest, as well as on pipes, is strictly forbidden!

Make sure machine and surrounding area are kept clean. In particular, oil and grease on the floor and on machine elements may cause slipping. This is therefore a considerable source of injuries, as are tools that have not been put down in a safe place. The operating area must be clear of waste materials, tools and other extraneous objects.

The floor around the machine must be provided with a non-slip finish.

In order to prevent any falls from or damage to the machine, it is forbidden to climb onto machine elements or on the machine (except for the treading areas provided). Use ladders or similar equipment in accordance with recognized standards.

Ramps, platforms and lifts must be used to avoid injury or excessive physical effort.

2.11 Temperature

The operating company shall be responsible for taking the necessary safety measures (e.g. protective gloves, proper training, etc.).

No maintenance work should be carried out until the hot surface has cooled down.

2.12 Noise

Sound pressure from the machine (including the drive) within the specified operating range: 85 dB(A).

The total noise emissions from all machines in the production room can restrict spoken communication and impair hearing.

The machine is designed such that no operating personnel is required in the immediate vicinity of the machine during normal operation. Appropriate hearing protection should be worn throughout maintenance and adjusting work while the machine is running.

2.13 Electrical equipment

All work on the electrical equipment, without exception, must be carried out by skilled electricians.

Any form of contact with electrical equipment may cause fatal injuries.

Before beginning any maintenance or repair work, the operating company must disconnect the electric power supply to all drives securely. This can be achieved with a lockable maintenance switch, lockable racks in the MCC, or with other suitable measures that comply with the safety regulations applying.

If any work is necessary on live parts, it is essential to proceed according to the applicable standards.

Users of medical electronic equipment (e.g. pacemakers) must not enter the electric danger zone.

The machine must be grounded to avoid electrostatic loading or contact voltage. Machine, gears, tanks, and motors must be connected to the grounding system.

The operating company is responsible for the appropriate lightning protection measures, particularly if the equipment is installed in the open air.

2.14 Hydraulic and pneumatic equipment

Hydraulic and pneumatic systems operate at high pressure. Malfunctions in the hydraulic system may cause hazards to operating personnel, damage to property and environmental pollution.

The specified operating data and the prescribed revision and maintenance intervals must be observed at all times.

Systems must be depressurised before carrying out maintenance work.

Work on hydraulic and pneumatic equipment must not be carried out other than by skilled erection personnel with special training and experience in handling hydraulic and pneumatic equipment.

In order to avoid injuries (e.g. caused by whiplash), all pressurized flexible hoses and pipes must be tied or held together.

2.15 Welding work

In general, welding work is only permitted after consulting ANDRITZ. Any welding work that is described in detail in the maintenance instructions is excluded from this ruling.
When performing welding work, always observe the relevant safety rules and the appropriate safety regulations for work performed in enclosed and confined spaces.

DANGER

HOT WORK PERMIT REQUIRED!

Danger of fire and explosions!
There is a considerable risk of fire or explosion during welding work. Always take the appropriate fire precautions before beginning work, e.g. keep fire extinguishers at the ready.

All motors should be disconnected before carrying out electric welding work.

During arc welding work the ground should never be allowed to run over the rolling bearings. A grounding cable is to be connected up in the immediate vicinity of the welding area.

2.16 Fluids, (liquids, gases, vapour or smoke)

Unintended chemical reactions may take place in fiber pulps during a prolonged standstill and hazardous fumes may be produced.

The machine must be thoroughly cleaned after prolonged stoppages.

The area must be adequately ventilated.

Before beginning work on the machine, ensure that no liquids, gases, vapors or smoke can enter the working area from inlet pipes, discharge pipes or shafts.

If it is not possible to exclude reliably the risk of liquids, gases, vapors or smoke flowing in, all persons working in the danger zone must be equipped with a safety harness and a safety rope. Each worker must be monitored by a second person outside the danger zone.
It must always be possible to evacuate a worker from the danger zone without delay.

2.17 Oils and greases

The safety instructions for the products concerned must be observed when handling oil, grease and other chemical substances.

Suitable skin protection is required when handling aggressive media. See manufacturers' information for the type of skin protection required.

Also observe the relevant requirements for disposal.

3 TECHNICAL DATA

3.1 Data

	RagPull RP1C	
Main dimensions	Length	2037 mm
	Width	1475 mm
	Height	1900 mm
	Max. ragger rope diameter	700 mm
Gear motor	Manufacturer	SEW
	Type	R137 R77 DRS71 S4 BE 05/V
	Transmission ratio i	2993 : 1
	Model	M1
	Nominal speed n	1380 rpm
	Output speed	0.460 rpm
Pneumatic cylinder	Piston diameter	200 mm
	Stroke	350 mm
Weights	Total weight	approx. 1760 kg
	Load-weighted roller	approx. 654 kg
	Conveying roll	approx. 230 kg

4 DESCRIPTION

4.1 Field of application

The RagPull RP1C is used to pull spun impurities out of the pulper.

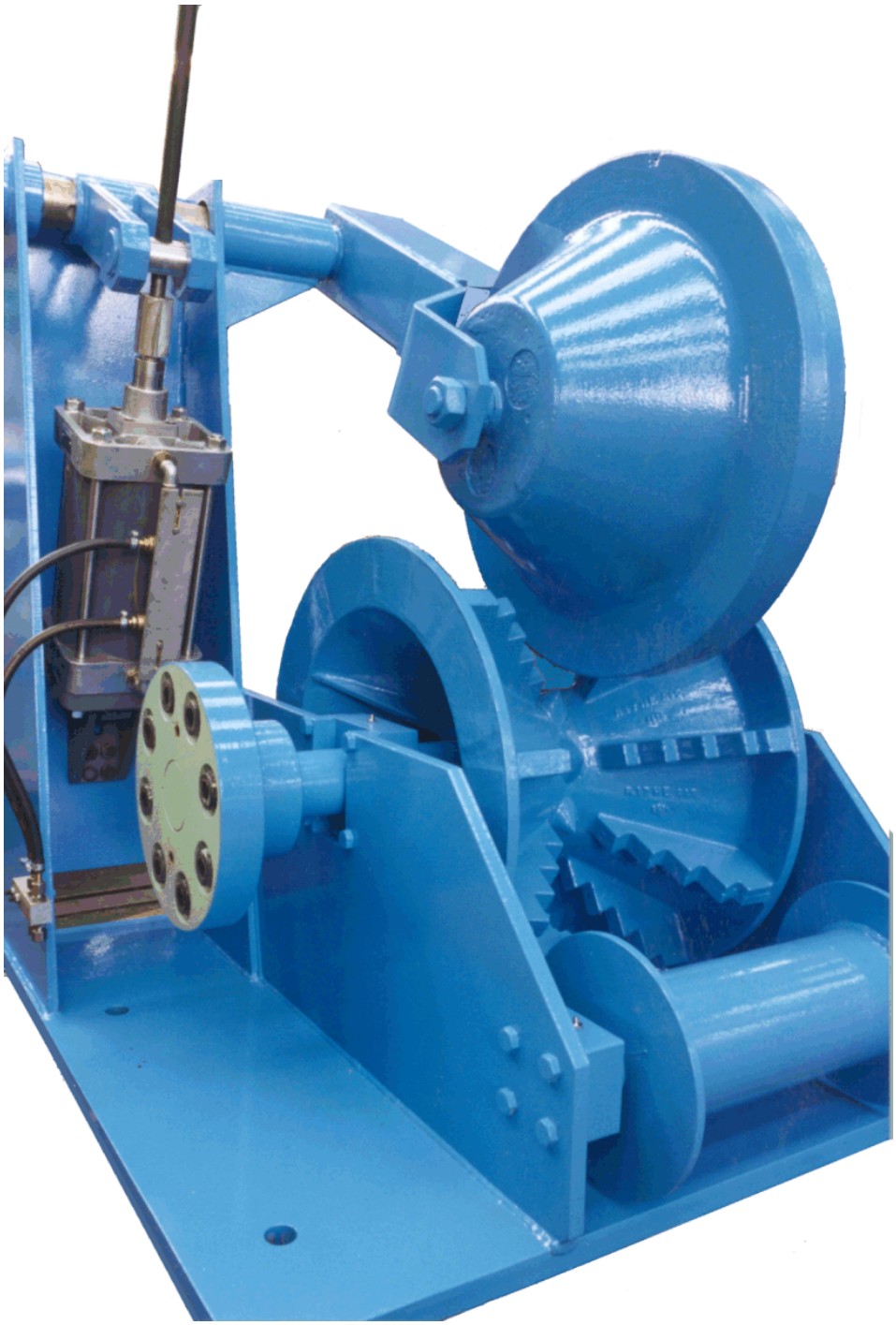

Fig. 4-1 RagPull RP1C

4.2 Main plant components

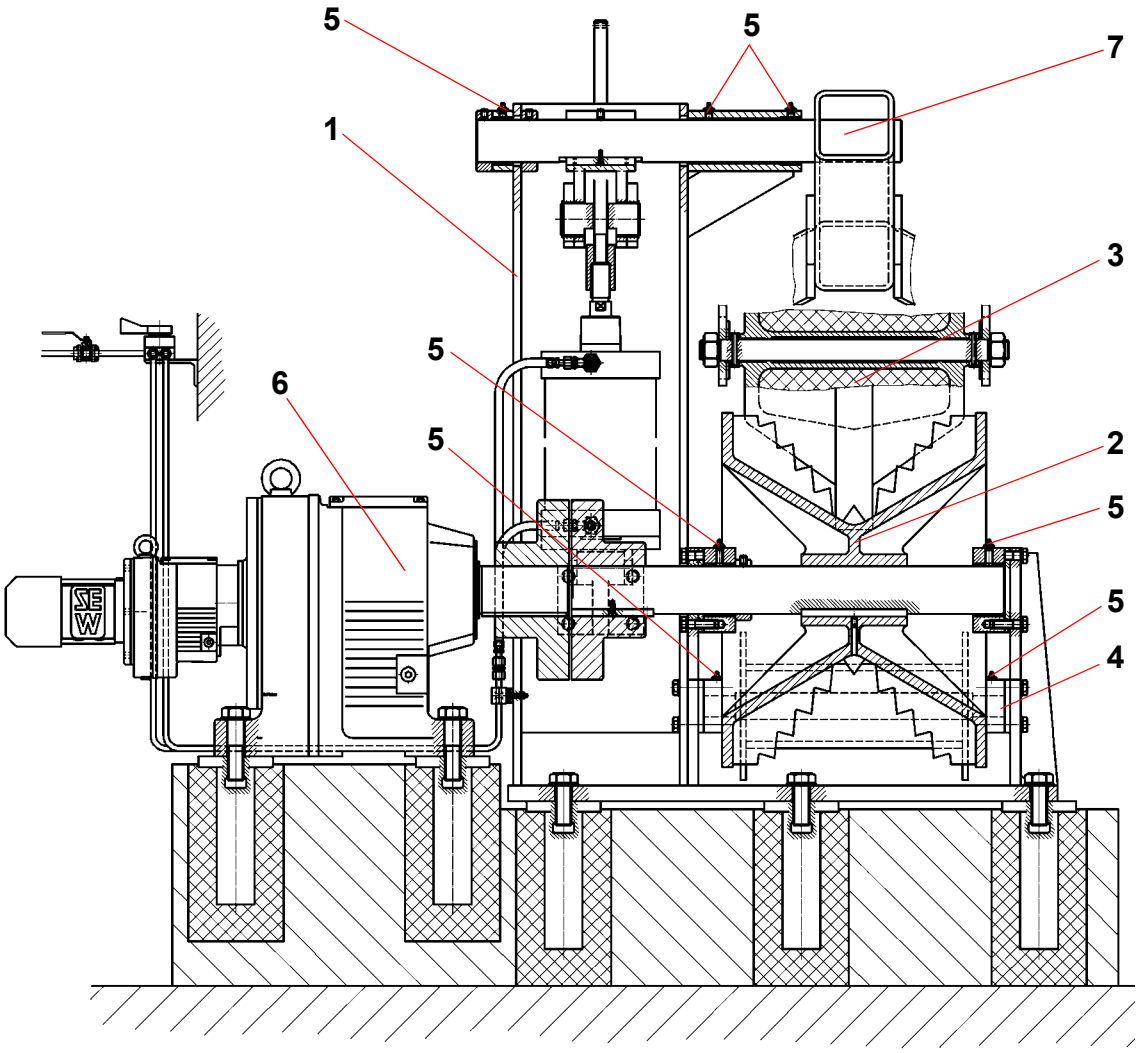

Fig. 4-2 RagPull RP1C

Item	Component	Item	Component
1	Frame	5	Bearings
2	Conveying roll	6	Drive
3	Load-weighted roller	7	Swing device
4	Deflection roller		

Frame (1)

Function: The frame is used to hold the machine components.

Design: Solid welded structure made of steel.

Conveying roll (2)

Function: Conveying the ragger rope forward.

Design: Single steel casting with deep profiling. The conveying roll is mounted on the drive shaft.

Load-weighted roller (3)

Function: The load-weighted roller applies its own weight to press the ragger rope against the profiling on the conveying roll.

Design: The load-weighted roller is cast in one piece and made of steel. During erection work the load-weighted roller is grouted in entirely with concrete.

Deflection rolls (4)

Function: The ragger rope is carried over the deflection rollers to the conveying roll, then guided away from it.

Design: Welded structure made of steel.

Bearing (5)

Function: Holds all moving parts of the machine.

Design: Plain bearing with grease lubrication

Drive (6)

Function: The drive activates the conveying roll of the RagPull.

Design: The spur gear motor is mounted on the foundation and connected via a coupling to the drive shaft of the conveying roll.

More detailed information:
➡ /SUPPLIER DOCUMENTATION/SEW

Swing device (7)

Function: The swing device is used to raise the load-weighted roller.

Design: The roller support connected to a shaft is swung upwards via a pneumatic cylinder.

4.3 Technological description

The ragger rope, made up of textiles, mesh, threads and the like, forming round the packing wires from the waste paper bales, is guided out off the pulper and over the deflection roll (**1**) to the conveying roll (**2**) and the load-weighted roller (**3**). Due to the rotating movement of the conveying roll, the ragger rope is carried forward, while the weight of the load-weighted roller applies the required nip loading to press the ragger rope onto the conveying roll. The load-weighted roller is either raised or lowered, depending on the diameter of the ragger rope. The rope is guided over the deflection roll (**4**) and into a chute, where it is then stored in a container.

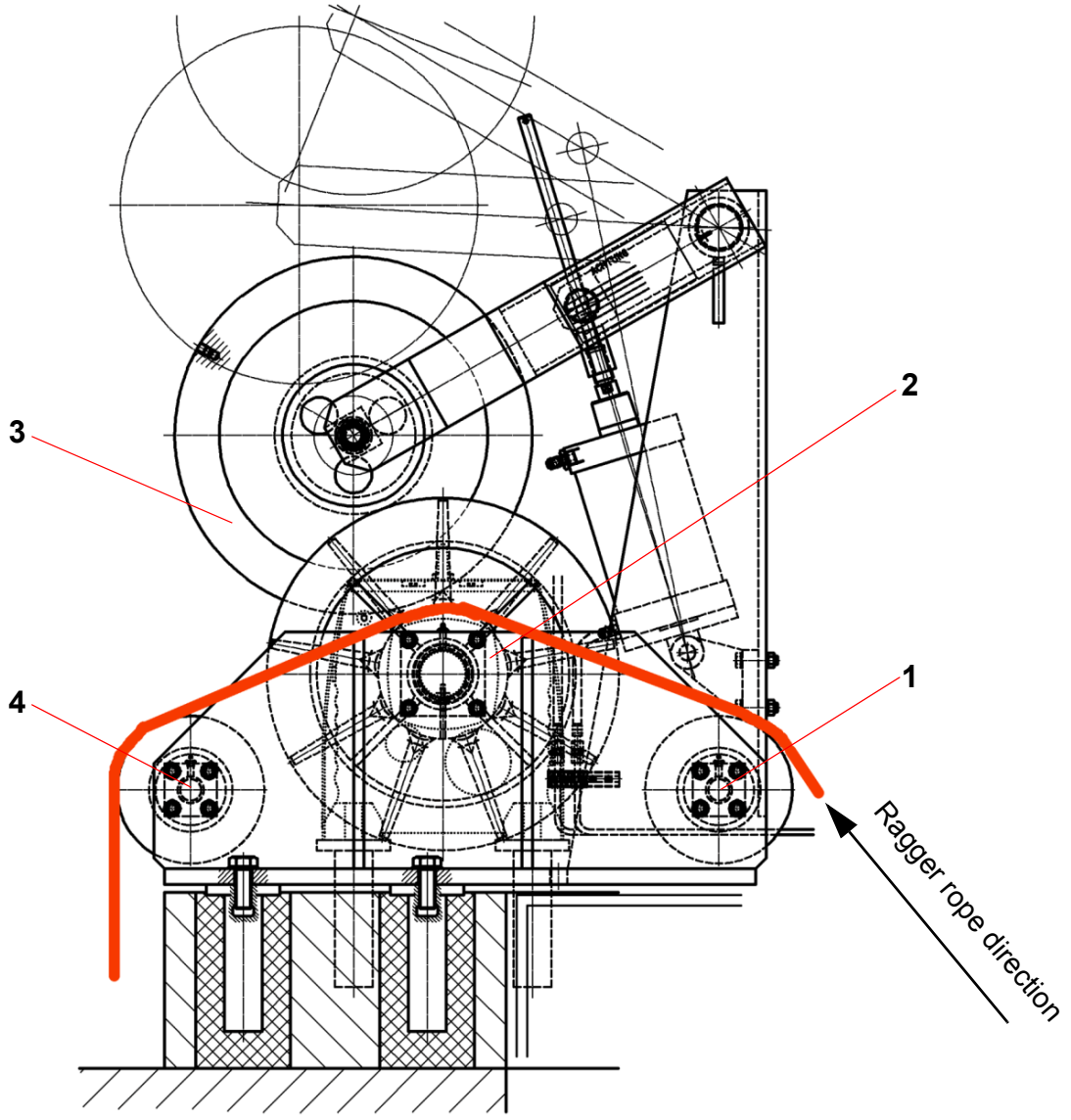

Fig. 4-3 RagPull RP1C

5 ERECTION WORK and TRANSPORT

5.1 General

This chapter describes certain steps for transport, storage and installation of the RagPullRP1C, which may be the responsibility of the machine operating company.

Activities which are carried out by ANDRITZ, including works assembly, are not the subject of this description.

5.2 Safety regulations

DANGER

Do not disregard the safety regulations.
If the safety regulations are disregarded, this may cause a risk to life and limb and damage to the machine or its components.
All safety instructions in this section must be strictly observed!

General safety regulations

All applicable accident prevention rules must be observed.

Potential risks caused by gases and vapours forming must be analysed in detail and the appropriate safety measures implementd.

Do not exceed permissible crane loads and weights on lifting gear and ropes/shackles. Secure loads against falling from a height.

Do not step or walk below suspended loads! Standing below suspended loads is dangerous and thus, strictly forbidden!

Jolts must be avoided. This refers especially to the handling of pre-assembled machines.

Qualification of personnel assigned

Transport and unloading of the machine are to be carried out by personnel specially familiar with such work.

Workers entrusted with lifting and conveying equipment must have the national qualifications required.

Erection work may only be carried out by trained, skilled personnel.

Personal protective apparel

The following protective equipment must be worn when carrying out start-up and erection work: (>> see Chap. 2.8)

5.3 Transport

DANGER

During transport or loading/unloading there is a risk to life and limb from falling machine components and also a danger that machine components may be damaged.

Do not lift machine and transport crates except at the points marked for lifting by crane or forklift!

If the entire machine is lifted and there are several different types of lifting lug available, personnel should only use suitable lugs (according to the transport sketch) for the work in hand.

Do not step or walk below suspended loads!

Delivery

The RagPull is supplied pre-assembled. The machine components and auxiliary materials are packed in crates.

Further information on transport sizes and weights are provided in the shipping documents.

See also .../ TECHNICAL DATA

Acceptance

- Check against shipping documents and packing lists whether the supply is complete and in perfect condition.
- In the event of transport damage or short supply, do not accept goods, but notify forwarder and the ANDRITZ shipping department accordingly.
- If there is a hidden loss or defect, notify the forwarder and the ANDRITZ shipping department within 15 days of receiving the goods.

Safekeeping

The following instructions must be observed if the system is not to be installed immediately:

- Please inform the ANDRITZ shipping department.
- Provide weather protection for stored machine components. In particular, avoid wide variations in temperature and ensure that the equipment is kept clean.
- Incidentals should be protected against damage and unauthorized withdrawal by storing in a lockable room.
- Packaging should not be removed until field installation work begins.

5.4 Installation

General

 WARNING	**Disregarding the sequence plan and the installation instructions may result in hazardous situations causing a danger to life and limb, as well as machine damage.** **The sequence of erection work is important and must be strictly observed!**

Completion of the various steps must be documented in the certificate of completion of erection work.

Required documentation at installation site

The following documentation must be available at the beginning of installation work:

- Foundation and arrangement drawing
- Documentation on electrical, measuring and control equipment
- Packing lists for each individual consignment

Preparations

Foundation

The foundation is laid in accordance with the product-related foundation diagrams.

The following preparations have to be made prior to placing the pulping tank on the foundation:

- Check the workmanship of the foundation before beginning erection work.

 DANGER	**Machines or machine components may fall during transport at installation site.** **Due to the uneven weight distribution the RagPull can tilt.** **Do not lift machine and transport crates except at the points marked for lifting by crane or forklift!** **Do not step or walk below suspended loads!**

 DANGER	**Parts of the body may be trapped or crushed during installation work.** **Do not place your hand below suspended loads!** **Wear your personal protective apparel!**

Installation the RagPulls

Prepare the foundation, position and adjust the RagPull according to the arrangement and foundation drawings:

DANGER	**Damage to the motor caused by the braking motor being connected up incorrectly.** **The brakes of the motor must be connected such that they release when the motor is switched on.**

5.5 Connecting up

Pneumatic pipework

All connections and connecting dimensions at the RagPull are shown in the arrangement drawing.

DANGER	**Errors in the installation of pipework and hoses may result in risks to life and limb and in damage to the machine.** **Mount all pipes stress-free and free of vibration!** **The pipework must be mounted such that it does not stress the machine during operation (e.g. by heat expansion of the pipes).**

Instruments

The instrumentation (instruments, actuators and control devices) of the machine is to be installed according to the flow sheet.

Electric

Complete electrical installations according to electrical documentation provided by ANDRITZ.

Safety devices

The following safety devices are to be provided by the operating company:

- EMERGENCY-STOP switch near the machine drive.
- Device for safe disconnecting of all drives from the power supply during maintenance and repair work. This can be achieved with a maintenance switch, lockable racks in the MCC, or with other suitable measures that comply with the safety regulations.

5.6 Inspections and remaining work

Other work

Other work to be completed:

- Clean the machine.
- Check sense of rotation of motor.
- Check the pneumatic swing device .

5.7 Cold test (preparation for initial start-up)

Prerequisites

The following utilities must be available:

- Electricity
- Compressed air

Lubrication

- Initial filling of lubricants according to lubricating schedule (bearings, etc.)

DANGER

Damage to machine due to use of wrong lubricants.
Only use lubricants with the properties listed in the lubrication schedules.

Cold test

The checks to be performed must be carried out according to the cold test protocol and ticked off after completion.

5.8 Disassembly and disposal

DANGER

The machine must be disconnected from the power source and secured to prevent switching on again before disassembly!
The machine may only be disassembled by qualified and authorized personnel.

If the machine/plant is to be shut down, the following must be taken into account for subsequent disposal:

Machine parts

- The machine components must be disassembled according to the various materials, lubricant fillings, and various forms of contamination.
- The materials must be disposed of in accordance with the applicable legislation on waste disposal.
- Proof must be brought of the properties and the disposal route of the various materials according to the applicable regulations on proof of recovery and disposal (e.g. statement and entry in register).
- Compile the necessary documents before disposal and dispose of the materials according to the regulations, observing the documents.

Plastic parts

WARNING

Synthetic components may be flammable!
Observe the local fire protection regulations. When separating the materials, do not work with welding devices or other equipment that generates sparks.

Additives

- Oil, utilities and cleaning agents must be disposed of according to the local provisions and in compliance with the appropriate manufacturer regulations.

Other material groups to be separated are:

- Surface-treated sheet steel, such as powder-coated or wet-painted doors, covers, etc.
- Surface-coated construction steel, such as rotating parts, gratings, bolts, etc.
- Copper (electrical grade copper or silver-coated electrical grade copper), such as busbars, connecting straps, connections pieces, etc.
- Cables
- Built-in units, electrical components and components generating radiation (radio-active probe), etc.

6 START-UP

6.1 General

This Chapter describes the preparations and steps required for initial start-up of the RagPullRP1C.

6.2 Safety regulations

DANGER

Do not disregard the safety regulations.
If safety regulations are disregarded, this may cause a risk to life and limb and damage to the machine or its components.
All safety instructions in this section must be strictly observed!

General safety regulations

All applicable accident prevention rules must be observed.

Potential risks caused by gases and vapors forming must be analyzed in detail. The appropriate safety measures must be implemented.

Qualification of personnel assigned

Start-up may only be carried out by skilled workers with the appropriate training.

Personal protective apparel

The following protective equipment must be worn when carrying out start-up and erection work: (>> see Chap. 2.8)

6.3 Prerequisites for start-up

The following must be checked before start-up:

- Erection work completed.
- Cold test completed.
- Installation site has been cleared and cleaned.
- Electricity supply is available.
- Compressed air available.
- First filling of lubricants (bearings, gears) provided.
- The sense of rotation of the drive has been checked.
- All electric interlocks are functional and checked.
- All control circuits have been installed and tested.
- Process control system (DCS) installed and tested.

6.4 Start-up

DANGER

Machine may be damaged if incorrect start-up procedures are used. All electric interlocks must be functional and checked.

Before start-up, the procedure must be defined together with ANDRITZ AG's start-up engineer. Start-up of the machine is performed as described in the start-up certificate.

During start-up, practical training will also be provided on the machine. Participants must receive instruction on the theory beforehand.

After start-up, the machine will be handed over to the mill operating company in a complete, reliable condition and ready for operation.

6.4.1 Start-up

Preparation

Prepare pulper leader rope provided and attach baling wire or ropes at the end of (**E**) the double swivel if needed. (see Fig. 6-2 and Fig. 6-3)

Fig. 6-1 Pulper leader rope

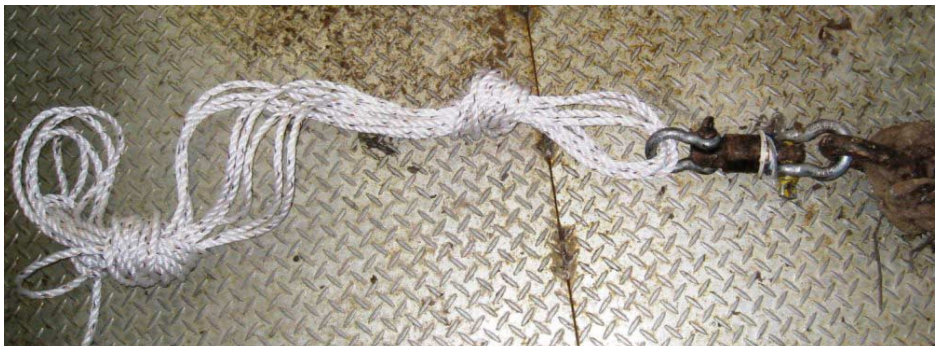

Fig. 6-2 Attaching ropes

DANGER

Hand injuries while attaching the wires.
Wear personal hand protection!

Fig. 6-3 Attaching wires

Start-up

Proceed according to the following table at start-up:

Step	Procedure
1	Start up the pulper and begin preparing the ragger rope after the machine has been running in stable operation for approximately 15 minutes.
2	Move the load-weighted roller (**1**) into the maximum open position. Activate the control valve (**2**) in order to do this.
3	Place the ragger rope with the unplaited end between the conveying roll and the load-weighted roller. The rag rope must be guided over the deflection roller (**3**).
4	Raise load-weighted roller again.
5	Attach the rag rope inside the pulper. When doing so, ensure that the anchor is as close as possible to the pulping element of the pulper.
6	Start up the pulper.
7	As soon as a ragger rope begins to form at the anchor, start up the RagPull. For instructions on setting the time relay, see: ➡ /OPERATION

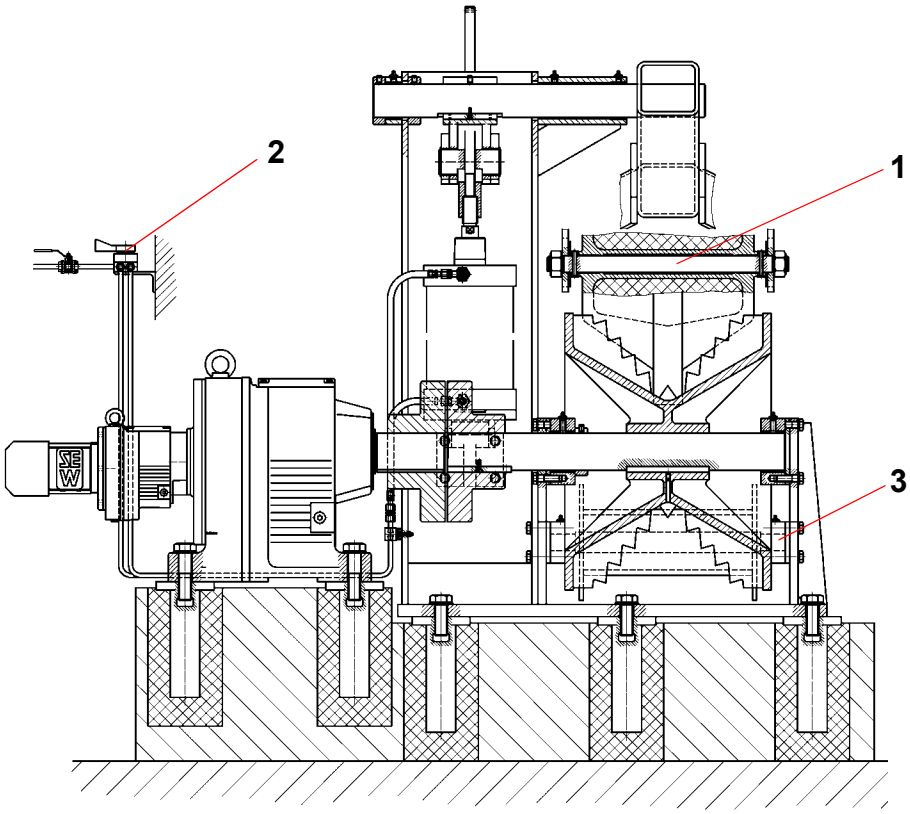

Fig. 6-4 Start-up of the RagPull

DANGER

As the RagPull must be operated without safety covers, an appropriate safety distance must be maintained towards the machine while the load-weighted roller is being swung downwards!

6.5 Certificates

The following certificates must be completed and signed after start-up:

- Start-up protocol
- Preliminary acceptance certificate

7 OPERATION

7.1 General

This chapter describes the activities required for starting, operating and stopping the RagPullRP1C. Possible malfunctions and troubleshooting methods are also presented.

7.2 Safety regulations

DANGER

Do not disregard the safety regulations.
If safety regulations are disregarded, this may cause a risk to life and limb and damage to the machine or its components.
All safety instructions in this section must be strictly observed!

General safety regulations

All applicable accident prevention rules must be observed. The regulations for work in containers and enclosed spaces must be observed.

Qualification of personnel assigned

The equipment may only be operated by trained and qualified personnel.

Operating personnel must know how to use and where the EMERGENCY STOP BUTTONS and the escape routes are located.

Operating personnel must be instructed in the function and possible failure of machine monitoring equipment, and in carrying out maintenance and inspection work (shift log book, maintenance inspection records).

Personal protective apparel

The following protective equipment must be worn when carrying out start-up and erection work: (>> see Chap. 2.8)

Safe operation

The ragger rope contains pointed and sharp objects. As the RagPull must be operated without safety covers, an appropriate safety distance must be maintained towards the machine during operation.

DANGER

The RagPull RP1C is operated without safety covers. For this reason, no work may be performed on the machine while it is running!

7.3 Control via DCS

The RagPull can be started up entirely from the DCS. The RagPull and all auxiliary units are started and stopped with the group start and stop function.

7.4 Control panel

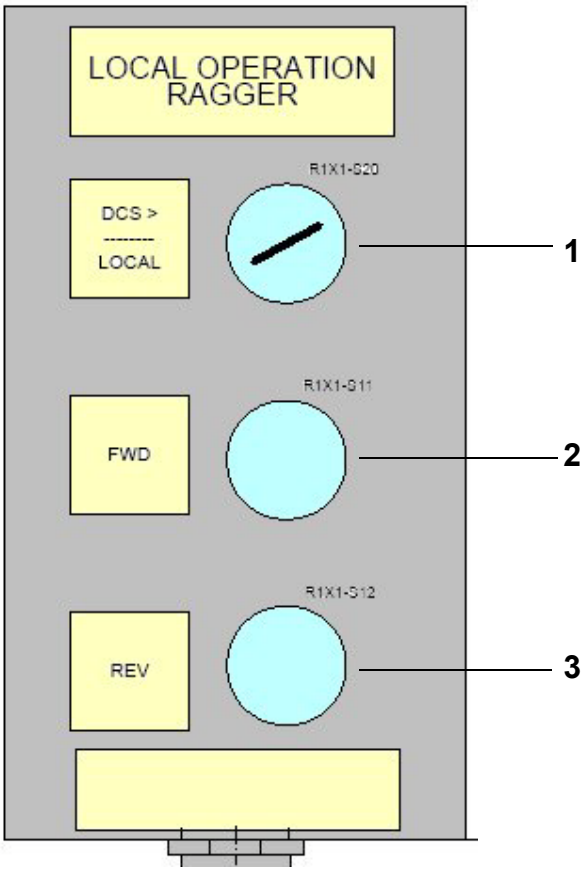

Fig. 7-1 Control panel

Item	Function
1	OPERATING MODE SELECTOR SWITCH - LOCAL/DCS
2	CONVEYING ROLL FORWARD
3	CONVEYING ROLL BACKWARDS

Tab. 7-1 Control panel – configuration of switches

7.5 Normal operation

During operation, operating personnel must make sure that data are recorded (in the shift log book and data recording sheets), and also carry out the following work:

Daily jobs and checks

The following work has to be performed in normal operation:

Component	Check and activity
Pneumatic system	Visual check on the pneumatic system for leaks.
Gear unit and motor	Check for unusual noises and overheating, check for leaks.
Ragging progress	Check ragging progress.

As the RagPull must be operated without safety covers, an appropriate safety distance must be maintained towards the machine during operation.

7.6 Starting

Prerequisites

Before starting the machine, ensure that the following requirements are met:

- Ensure that there is a ragger rope or a pulper leader rope between the conveying roll and the load-weighted roller.
- Check that the pulper is in operation.

Automatic starting

When using the group start, all of the steps required are implemented automatically by the DCS.

Manual start-up

Step	Activity
1	Set the switch (**1**, Fig. 7-1) at the local switch cabinet from DCS to LOCAL.
2	Run the ragger rope forwards or backwards as required. with the switches (**2, 3**, Fig. 7-1).

Tab. 7-2 Manual start-up

7.7 Shutdown

Automatic shutdown

When using the group stop, all necessary steps are carried out automatically by the DCS.

Manual shutdown

Set the switch (**1**) at the local switch cabinet from DCS to LOCAL.

NOTE

If the machine is only to be shut down briefly and the pulper is not to be emptied, the ragger rope must be run out manually by approximately 1m otherwise it may break when the pulper is switched on again.

7.8 Re-starting after rope break

Re-starting after rope break

Re-start the machine according to the following table:

DANGER

Risk of injury!
The ragger rope contains pointed and sharp objects.
Wear personal hand protection!

Step	Activity
1	Stop the feed conveyor to the pulper.
2	Set the switch (**1**, Fig. 7-1) at the local control panel from DCS to LOCAL.
3	Run the ragger rope backwards using the switch (**3**, Fig. 7-1).
4	If the end of the torn off ragger rope has sufficient wires/ropes protruding, it can be retracted until the usual pendulum motion begins and rotor contact is made (pulling on the pulper leader rope). When the torn off end of the ragger rope is caught, there is considerable twitching and pulling on the ragger rope and it must be run out quickly by hand. As soon as the correct length is found, control can be transferred to the DCS.
5	Start up the pulper again and move the switch (**1**, Fig. 7-1) at the local control panel from LOCAL to DCS.

Tab. 7-3 Re-starting

If the torn off ragger rope has a blunt end or is too short, operations must be started again with the pulper leader rope.

.../START-UP

DANGER

As the RagPull must be operated without safety covers, an appropriate safety distance must be maintained towards the machine while the load-weighted roller is being swung downwards!

7.9 Operating malfunctions and troubleshooting

Malfunction	Cause	Remedy
The RagPull does not start.	The brakes of the braking motor do not release.	Check the connections and replace any faulty components.
	Motor is faulty.	Replace or repair motor.
The load-weighted roller cannot be raised.	Inadequate supply of compressed air	Check pressure controller
	Leaks in the pneumatic system	Check the pneumatic system
	Pneumatic cylinder faulty	Check pneumatic cylinder and change if necessary.
	Control valve faulty	Replace control valve
Increased power consumption by drive.	Inadequate lubrication of the roll bearings.	Re-lubricate the bearings.
	Bearing of conveyor roll is worn.	Replace bearing.
	Ragger rope is too long or too thick	Increase speed.
The ragger rope is too thin.	Speed is too high.	Reduce speed.
	The proportion of rejects to be spun is too low or the production rate is too low (actual/nominal production).	Reduce speed. Increase production (STOP & GO operation).
The ragger rope is too thick.	Speed is too low.	Increase speed.
Unusual noises or vibrations	Loose parts	Secure any parts that have come loose.
	Loose/missing screws	Tighten screws. Replace missing fasteners.
	Gear damage	Repair damage
	Bearing of conveyor roll is worn.	Replace bearing.
Ragger rope breaks.	Speed is too low.	Increase speed.
	Not enough baling wires in the pulper.	Increase the proportion of baling wires.

Tab. 7-4 Operating malfunctions and troubleshooting

8 MAINTENANCE

8.1 General

This chapter describes the maintenance and upkeep of the RagPull, which is the responsibility of the machine operating company.

All activities mentioned in this chapter must be performed at the correct time.

The ANDRITZ service department is at your disposal for troubleshooting, as well as for extensive maintenance and repair work (➡/INTRODUCTION).

Repair work on the plant components may only be carried out at the supplier's works.

Workers trained and authorized by ANDRITZ may carry out repairs on site after obtaining consent from ANDRITZ.

8.2 Safety regulations

DANGER

Do not disregard the safety regulations.
If the safety regulations are disregarded, this may cause a risk to life and limb and damage to the machine or its components.
All safety instructions in this section must be strictly observed!

General safety regulations

All applicable accident prevention rules must be observed.

Sufficient space for maintenance work must be included right away in the arrangement drawing.

Potential risks caused by gases and vapours forming must be analyzed in detail. The appropriate safety measures must be implemented.

Sufficient space for maintenance work must be included right away in the arrangement drawing.

Maintenance and service work is not permitted while the machine is in operation.

Do not exceed permissible crane loads and weights on lifting gear and ropes/shackles. Secure loads against falling from a height.

Do not step or walk below suspended loads! Standing below suspended loads is dangerous and thus, strictly forbidden!

The machine must be thoroughly cleaned before carrying out any maintenance work.

Use only original spare parts.

When carrying out maintenance and repair work, use only new-value fixtures in perfect condition and new seals.

Safety devices

After completion of maintenance work, all required safety devices must be mounted again.

Power supply

Before beginning any maintenance or repair work, the operating company must disconnect the energy supply to all drives securely. This can be achieved with a maintenance switch, lockable racks in the MCC, or with other suitable measures that comply with the safety regulations.

Lighting

The operating company shall ensure that adequate lighting is provided (with extra-low voltage bulbs) during service and repair work.

Qualification of personnel assigned

Maintenance and upkeep must be carried out by specially trained, skilled personnel only.

All work on the electrical equipment, without exception, must be carried out by skilled electricians.

Personal protective apparel

The following protective equipment must be worn when carrying out start-up and erection work: (>> see Chap. 2.8)

Welding work

In general, welding work is only permitted after consulting ANDRITZ. When performing welding work, always observe the relevant safety rules and the appropriate safety regulations for work performed in enclosed and confined spaces.

DANGER

HOT WORK PERMIT REQUIRED!

Danger of fire and explosions!
There is a considerable risk of fire or explosion during welding work. Always take the appropriate fire precautions before beginning work, e.g. keep fire extinguishers at the ready.

All motors should be disconnected before carrying out electric welding work.

Gases, steam or smoke

Before beginning any service work, ensure that no gas, vapor or smoke can enter the working area from feed pipes, discharge pipes or shafts. If it is not possible to reliably exclude the risk of gas, steam or smoke flowing in, all persons working in the danger zone must be equipped with a safety harness and a safety rope. Each worker must be monitored by a second person outside the danger zone. It must always be possible to evacuate a worker from the danger zone without delay.

8.3 Regular maintenance

For machines operating continuously (24 hours/day, 7 days/week), a pre-scheduled maintenance period is recommended once a month. During these periods the machine should be shut down, thoroughly cleaned, and checked for wear.

General machine check

In the course of general machine checks, all additional units should also be checked to guarantee that the entire plant functions satisfactorily. For these checks, the attached maintenance and upkeep instructions provided by the manufacturer must be observed.

/SUB-SUPPLIER DOCUMENTATION

Malfunctions and inadmissible changes found during these checks must be rectified immediately.

Cleaning

Machine must be cleaned as follows before carrying out any maintenance work:

- Shut down the pulper and remove the ragger rope.
- Clean the machine.

DANGER

Risk of injury!
The ragger rope contains pointed and sharp objects.
Wear personal hand protection!

DANGER

Do not use caustic substances for cleaning purposes!
Make sure no water, steam or other cleaning medium enters electrical plant components.

8.4 Maintenance schedule

In addition to the work outlined below, maintenance has to be carried out in accordance with Section 8.3 and normal operation work.

Once a month

Component	Activity
Bearings	Check temperature and for noises.
Gear unit	Check oil level. Check temperature. Check for leaks. Check for unusual noises.
RagPull	Clean unit and remove any wires and cords that are caught up
Pneumatic system	Check for leaks and functioning.
Pneumatic cylinder	Check for leaks and functioning.

Tab. 8-1 Once a month

Quarterly

Component	Activity
Instruments	Check functioning.

Tab. 8-2 Quarterly

Annually

Component	Activity
Conveying roll and load-weighted roller	Check for wear and damage.
Screws/bolts	Check that screws are firm and tighten if necessary.
EMERGENCY STOP switch	Check function.
Grounding	Check
Foundation bolt connection	Check

Tab. 8-3 Annually

8.5 Fasteners

Fastener material

Bolts and screws are manufactured in several classes of material. The heads of these screws and bolts are marked to show the strength class. Damaged or lost fasteners should only be replaced with fasteners of the same material.

DANGER

The installation data apply to standard screwed/bolted connections at the machine and should only be used if no special installation data are stated in the assembly drawings!

The information in the following table applies to commercially available hexagon head and cheese head screws with metric ISO thread.

SET SCREWS

	Pre-stressing forces for erection work (kN)						μ	Tightening torques (Nm)					
	5.6	8.8	A4-50	A4-70	A4-80	C3-80		5.6	8.8	A4-50	A4-70	A4-80	C3-80
M8	7	15	5	11	14	15	0.1	8	17	6	12	16	17
							0.125	10	21	7	15	19	21
							0.14	11	23	7	16	21	23
M10	11	24	8	17	23	24	0.1	16	34	11	24	32	34
							0.125	19	41	13	29	38	41
							0.14	21	45	15	32	42	45
M12	16	35	12	25	33	35	0.1	27	58	19	41	54	58
							0.125	33	70	23	49	66	70
							0.14	36	77	25	54	72	77
M16	31	65	21	46	61	65	0.1	66	140	46	99	132	140
							0.125	80	170	56	120	160	170
							0.14	88	188	62	133	177	188
M20	48	102	33	72	95	102	0.1	129	275	90	193	258	275
							0.125	156	334	110	235	313	334
							0.14	173	369	121	259	346	369
M24	69	147	48	103	137	147	0.1	222	474	156	333	444	474
							0.125	269	575	189	404	539	575
							0.14	298	635	209	447	596	635
M30	109	233	77	109	219	233	0.1	443	945	310	443	-	945
							0.125	538	1149	377	538	-	1149
							0.14	596	1271	417	596	-	1271
M36	159	340	111	159	319	340	0.1	767	1637	537	767	-	1637
							0.125	934	1992	654	934	-	1992
							0.14	1034	2205	724	1034	-	2205
M42	219	466	153	328	437	466	0.1	1223	2609	-	-	-	2609
							0.125	1490	3178	-	-	-	3178
							0.14	1650	3520	-	-	-	3520
M48	287	612	201	431	574	612	0.1	1841	3928	-	-	-	3928
							0.125	2245	4789	-	-	-	4789
							0.14	2487	5305	-	-	-	5305

Tab. 8-4 Installation data for set screws

Coefficients of friction and lubrication

The coefficient of friction depending on the lubrication can be found in the following table:

μ	Lubrication	
	5.6 / 8.8 / C3-80	A4-50 / A4-70 / A4-80
0.1	MoS2	Chlorinated paraffin or MoS2
0.125	dry or oiled	
0.14		Anti-seize compounds

Tab. 8-5 Recommended lubrication and friction coefficients

If the special lubricants mentioned here are not used, please follow the respective manufacturer's instructions.

The manufacturer's instructions should be observed for sub-supplies pertaining to the machine.

DANGER

Incorrect torque tightening may cause machine damage and hazards leading to personal injury.
Please apply the tightening torques as shown in the drawings and table (Tab. 8-4)!

8.6 Lubrication

Before start-up, check whether all lubrication points, in particular the bearings, have been filled with the appropriate lubricants.

Details on lubrication are also included in the descriptions from component suppliers.

➡ /SUB-SUPPLIER DOCUMENTATION

Please also observe maintenance instructions on the maintenance signs and rating plates attached to the machine and components .

DANGER

Incorrect disposal of waste oil creates an environmental risk!
Do not add foreign matter such as solvents, brake fluid or cooling liquid.
Collect leaking oil and dispose of properly without causing environmental pollution.
Oil containing plant-based raw materials should always be collected and disposed of separately.

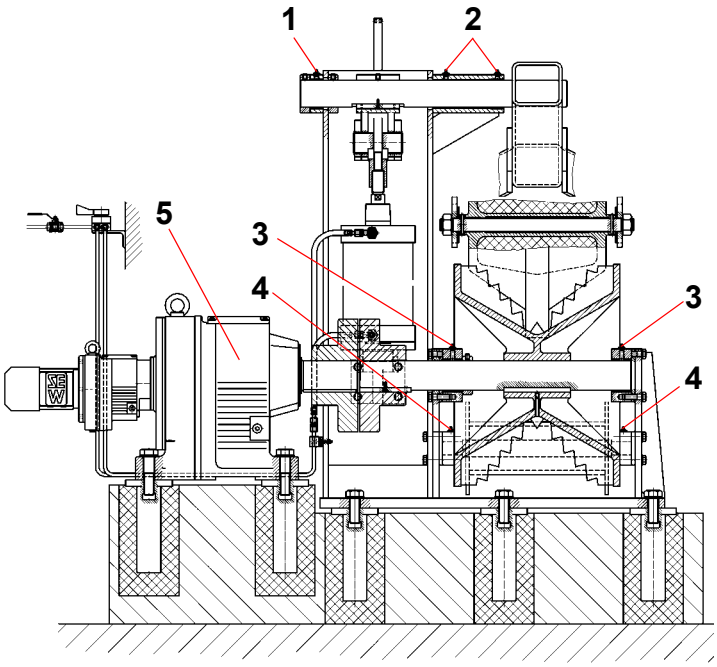

Fig. 8-1 RagPull RP1C

		Lubricating point			Quantity/Liters		Intervals / Operating hours	
Item	**Structural component**	**No.**	**Designation**	**Recommended lubricant**	**First filling**	**Refill**	**Refill**	**Oil change**
1	Bearing with conveying roll	1	Bearing f. swing device	NLGI - Class 2 DIN 51818 (Mobilux EP2)	20 g	10 g	600 h	
2	Bearing with conveying roll	2	Bearing f. swing device	NLGI - Class 2 DIN 51818 (Mobilux EP2)	20 g	10 g	600 h	
3	Bearing with conveying roll	2	Bearing f. con-veying roll	NLGI - Class 2 DIN 51818 (Mobilux EP2)	20 g	10 g	600 h	
4	Bearing with conveying roll	4	Bearing f. deflec-tion roll	NLGI - Class 2 DIN 51818 (Mobilux EP2)	20 g	10 g	600 h	
5	Drive	1	Gear unit	/SUPPLIER DOCUMENTATION/SEW				

8.7 Spare Parts

A list of the spare parts required for the RagPull can be found in the parts book.

➨ /PARTS BOOK

Details on spare parts from sub-suppliers are also included in specifications from component suppliers.

➨ /SUB-SUPPLIER DOCUMENTATION

8.8 Changing the pneumatic cylinder

Removing the pneumatic cylinder

Proceed according to the following table when removing the pneumatic cylinder:

Step	Procedure
1	Clean the machine.
2	Move the load-weighted roller (**1**) into the maximum open position. Activate the control valve (**2**) in order to do this.
3	Secure the load-weighted roller with a crane in a suitable way.
4	Run pneumatic cylinder (**3**) right in.
5	Relieve pneumatic cylinder pressure. In order to do so, close the ball valve (**4**).
6	Shut down all drives at all poles and secure against accidental start.
7	Shut off pneumatic connections (**5**).
8	Detach nut (**6**).
9	Unscrew the guide rod (**7**) from the nut and pull upwards out of the guide.
10	Suspend the pneumatic cylinder from a crane.
11	Detach bolts (**8**) and lift out hydraulic cylinder.
12	Remove fastening element (**9**). ➡ /SUB-SUPPLIER DOCUMENTATION

Tab. 8-6 Removing the pneumatic cylinder

DANGER

During maintenance work!
Risk to life and limb and risk of damaging the machine or its components.
During maintenance work the pneumatic system must be depressurized and secured against pressurization.

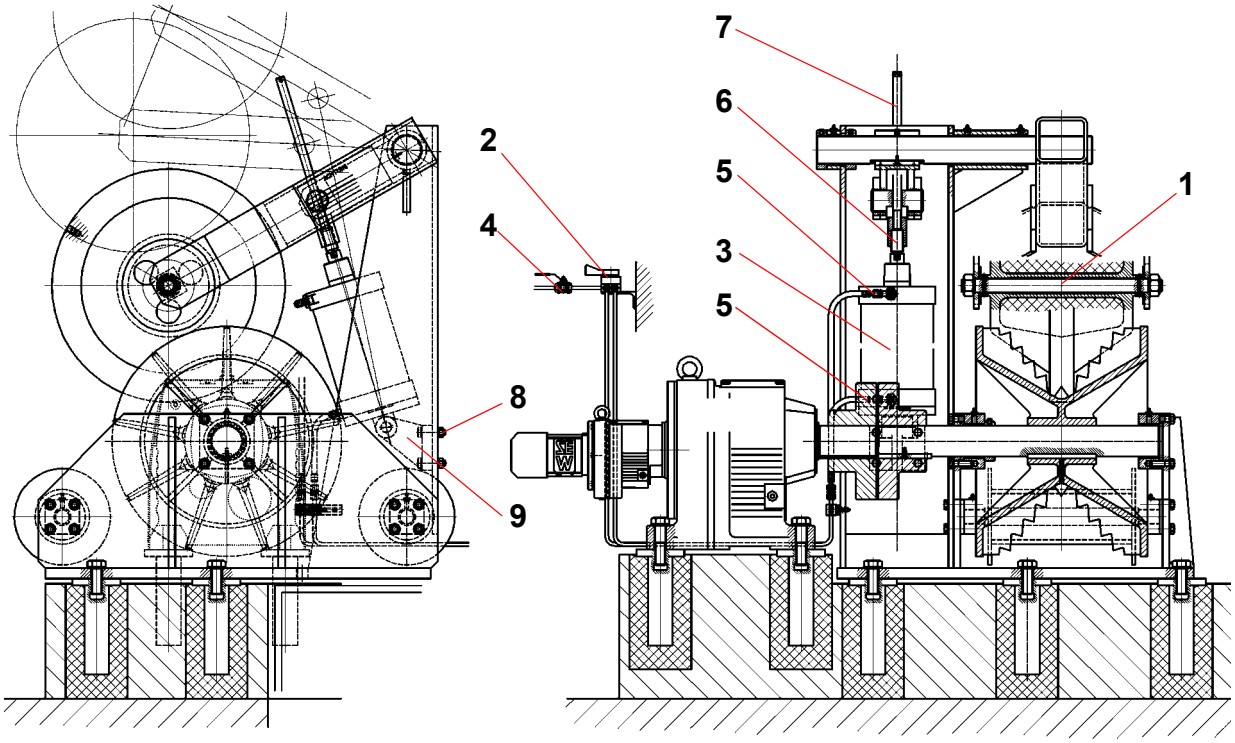

Fig. 8-2 Removing the pneumatic cylinder

Installing the pneumatic cylinder

The pneumatic cylinder is installed in reverse order to the above.

9 SUB-SUPPLIER DOCUMENTATION

9.1 Drive

9.1.1 Gear motor

Name of company SEW

Technical data

Type R137 R77 DV100M4/BMG
Transmission ratio i . . . . . 399 : 1
Model M1
Nominal speed n . . . . . 1410 rpm
Output speed 4.15rpm

9.1.2 Coupling

Name of company NINGBO WEILONG

Technical data

Type JM12-00

9.2 Pneumatic controls

9.2.1 4/3 - way valve

Name of company NORGREN

Technical data

Type M/805/187
Connection . . . . . .G 1/4"
Operating pressure. . . . . .10 bar

9.2.2 Silencer

Name of company NORGREN

Technical data

Type T40C2800
Connection . . . . . .G 1/4"

9.2.3 Flow control valve

Name of company STASTO

Technical data Type. MV17-00-14-C

9.2.4 Non-return valve

Name of company STASTO

Technical data Type. . . . . HRP 22
Connection . . . . . G 1/4"

9.3 Pneumatic cylinder

9.3.1 Pneumatic cylinder

Name of company NORGREN

Technical data Type. RA/8200/200
Piston diameter . . . . . 200 mm
Stroke 200mm