



MN-PV-CIS-033

Rotofan Competency Manual

**MN-PV-CIS-033 – Rotofan Competency Manual
Rev 1**

Updated: December 1, 2021

This document and the information contained herein are of a confidential nature and remain the exclusive property of CEDA. Reproduction, use or disclosure without written permission is not permitted.



Table of Contents

Table of Contents.....	0
Training Expectations Letter	2
Acknowledgement	3
Objective	4
General Overview	6
Equipment Overview	8
Rotofan Components	9
Procedural Guidelines.....	20
Safety Considerations.....	22
Maintenance	24
Technical Quiz	26
Comptency Assessment	28



Training Expectation Letter

It is required that this document is completed prior to the Employee starting training on a Rotofan. This document will serve as formal record that all parties have reviewed and understand the expectations for training on the Rotofan.

Trainee Name:

Date of Discussion:

Expectations of Supervisor/Leader

- Ensuring trainee has scheduled time for training.
- Ensure trainee has reviewed and understand the technical documentation
- Verify field competency sign offs once completed
- Provide support for the assessor, mentor, trainer and trainee whenever possible.
- Ensure training documentation is sent to CEDA Training Department

Expectations of Trainer, Mentor, assessor

- Must be qualified in the position for which he/she is training.
- Educate and support trainee with technical review package.
- Review trainee's technical knowledge and verify acceptable understanding
- Educate and support trainee with field tasks identified in the competency check sheet
- Verify trainee has the ability to perform tasks identified in the competency check sheet
- Communicate to Supervisor that the technical review and field competency is complete

Expectations of Trainee

- Complete all prerequisites outlined within the training program.
- Understand the training process outlined in this document.
- Understanding systems and spending time in the field.
- Ensure all lessons and tasks are signed off by the appropriate personnel as indicated on the training documents.
- Inform Supervisor/Leader on progress of training through face to face meetings.
- Will utilize all the materials provided to ensure a comprehensive training program is followed.
- Provide feedback on the training process and any updates that are required to the training material.
- Inform Supervisor/Leader of any training barriers that may exist during the training process.

Training Expectation Acceptance Agreement

I, _____ understand the expectations of me as a trainee as outlined in this document

(Operator Name)

Operator\Trainee

Name

Signature

Date (MM/DD/YY)

Supervisor/Leader

Name

Signature

Date (MM/DD/YY)

Acknowledgement

This manual has been developed using information and knowledge obtained from manufacturer's documentation and input from experienced Operators. Additionally, this manual has been validated by numerous Subject Matter Experts at CEDA. We welcome any comments or suggestions pertaining to this manual and its contents.

Many thanks to those who have demonstrated a clear dedication to CEDA and our values by participating in the creation of this program.

Jeremy Hanrahan (Fort McMurray)

Tate Regular (Fort McMurray)

Dave Crowley (Fort McMurray)

Daniel Oakley (Fort McMurray)

Jerry Noble (Fort McMurray)





Objective

Welcome to Rotofan Training

This program is designed to provide you with the training necessary to carry out your job in a manner that safeguards yourself, those around you and our environment. Upon Completion of this Module you will be able to:

- Describe purpose of Rotofan operation.
- Describe/ locate major equipment and components.
- Describe/ locate operator controls.
- Identify principles of operation.
- Understanding of operating limits and Safety Considerations
- Operate CEDA Rotofan

Employee(s) will demonstrate knowledge & skill in the proper application of equipment through practical application.

Instructions

All material must be completed in the order presented to ensure that prerequisites are met.

Employees will demonstrate knowledge and skill in the proper application of equipment through practical demonstration and application.

NOTE: All forms and procedures included are those required by CEDA. Work must be performed in accordance with these standards. On Client work sites, there may be additional standards and modified work procedures that will also have to be met.

Description: This is a knowledge and practical skill that requires written material to be reviewed along with the completion of an on-the-job demonstration prior to the test being written.

Whenever possible, the on-the-job demonstration should be completed at a job site or the shop under controlled conditions.

Arrange a time with your Mentor/Supervisor/Trainer to complete the On-the-Job Demonstration, where you will observe the proper operation of the Rotofan unit and its components.

Assessment of Competency: Successful completion of this competency requires:

- A score of 100% on the written examination.
- A successful demonstration by trainee requiring a sign-off from Trainer.



Prerequisites

- CEDA Orientation
- HP Water Blasting Practice
- HP Theory Training
- Specific work location Orientation
- High Volume Pump Training

Below is a list of the learning resources that are included and others you must obtain the most recent version from your Supervisor.

- Rotofan Operations Procedures
- Rotofan Operators Manual
 - o Super Hurricane Operating Manual
 - o Aquamaxit Operating Manual
 - o Gullco Operating Manual
- Rotofan Daily Pre-Job Checklist
- CEDA Pre-Trip Inspection (Vehicle Inspection Report)
- Site specific documentation
- Job Hazard Analysis for the work
- CEDA FLHA
- Other CEDA procedures and practices that pertain to the job being completed

NOTE: All forms and procedures included are those required by CEDA. Work must be performed in accordance with these standards and can be found in CEDA Health, Safety and Environment Management System (HSEMS) or be requested from your Leader. On Client work sites, there may be additional standards and modified work procedures that will also have to be met.



General Overview

Federal & Provincial Legislation

All work must be completed in accordance with applicable Municipal, Provincial, & Federal Acts & Regulations, including but not limited to:

Transportation of Dangerous Goods (TDG)

- Vehicle must be DOT Approved and be equipped with appropriate safety devices
- DOT approved vehicles will have sticker on side of unit
- Operator must place appropriate placards on side of vehicle
- Operator must prepare bill of lading prior to transporting materials

The Workplaces Hazardous Materials Information System (WHMIS)

- All CEDA field employees working with or around equipment will have WHMIS and TDG training prior to starting work.

Occupational Health & Safety (OH&S)

Seat Belts

Anytime a vehicle (CEDA owned or personal) is being operated during business hours for business use, or on CEDA property, the occupants must be wearing seatbelts.



Personal Protective Equipment (PPE)

To operate the Rotofan, employees must have and utilize the following personal protective equipment (PPE):

- CSA Certified Hard Hat
- CSA Certified Safety Boots (Boot Grips when required)
- Fire Retardant Coveralls
- Hearing Protection (plugs or muffs)
- Approved Gloves for the Site/Task
- Safety Glasses with Side Shields.
- Rain Gear as Required

For hot materials, the following additional personal protective equipment may also be required:

- Rubber gloves

- 
- Steel-toed rubber boots
 - Face shield

Workplace Organization

CEDA's goal is to reduce waste (time, energy and materials) by maintaining an orderly and clean workplace, including our trucks and equipment. We ask that you take pride in the equipment you operate; treat it as if it were your own. A clean and organized vehicle/workspace is a safer vehicle/workspace. There are many ways to eliminate waste:

Allocation & Utilization of Resources: Have the right people and equipment in the right place, at the right time. Use equipment and resources on tasks and activities that are required and add value to our business.

Improve Productivity: Eliminate redundant or unnecessary steps/tasks without negative impact to the safety or quality of our products and services.

Use of Materials: Ensure equipment is stocked with required supplies (filter bags, duct tape etc.) before leaving for jobsite – replace the materials you have used during the shift to ensure that the next crew is adequately stocked. Use the correct materials in the quantities required to do the job safely & correctly.

Preventative Maintenance: Tools and equipment should be assessed as per the performance maintenance schedule to ensure safe operation. Regular maintenance will reduce costly breakdowns in the field.

There are steps we can take to improve our current state and move towards a more productive, organized and safe work environment. Improving workplace organization will reduce costs, improve morale and create a safer work environment. The following steps outline how best to achieve an organized workplace:

Sort, organize and eliminate unnecessary items from the workplace to eliminate clutter. Keep only essential items.

- Tools and equipment that are not utilized for day-to-day operations should be repurposed within the organization or discarded.
- Garbage or loose items should be removed or properly stored.

Prioritize tools, parts and materials based on usage and keep them in easily-accessible places.

- A place for everything and everything in its place.

Create storage areas that are easy to access and clearly laid out:

- Tools and equipment should be stored clean and ready for use.
- Storage areas and stored items should be properly identified using signage, labels or a visual outline.

Set clear standards for workplace organization:



- Hold yourself and others accountable for keeping the work areas clean and safe. Make workplace organization a standard work rule in your area.
- Clean general work areas and equipment after each shift.
- Put clean tools away in the proper place.
- Note any spills, leaks or other messes – clean and report if equipment requires maintenance
- Inspect the area(s) regularly and immediately record and correct any infractions. Handle deviations from work rules in a timely manner.
- Review processes and procedures regularly and adjust as required.

Equipment Overview

What is a Roto Fan?

A roto-fan is a specialized piece of high pressure water cleaning equipment that is used for the removal of blockages, restrictions, scale or layers that form on the inside surfaces of tubes and pipes. Various diameters of pipe ranging from 2 – 120 inches can be cleaned using this system. All types of pipe can be cleaned including PVC, stainless steel and ceramics. One of the major advantages of this system is that pipes can be cleaned without extensive dismantling and up to 500 meters of pipe with multiple elbows can be cleaned from one access point. The position of the pipe will not impact the effectiveness of the roto fan system.

How is Cleaning Performed?

A rigid mounting bracket is used to direct a flexible high pressure hose into the pipe. The high pressure hose is rotated at a fixed speed and is safely guided into the pipe with a feed mechanism. The rotation of the hose is provided by the roto fan twister device that is pneumatically powered. All cleaning parameters such as rotating speed, forward speed, pressure, etc. are manually controlled.

Basic Components of the Roto Fan System

The roto fan system is made up of the following components:

1. High Pressure Pump
2. Water Inlet Hose and Coupler
3. Roto Fan “Twister”
4. Roto Fan High Pressure Hose
5. Nozzle
6. Feed Mechanism
7. Mounting Bracket and Shroud
8. Air Hose

Roto Fan Components

High Pressure Pump

The Roto Fan cleaning system requires a great deal of water and pressure to be effective. Depending on the work scope, one to two pumps can be used to optimize cleaning efficiency. The pump can be mounted to a truck body, tow trailer, or skid unit

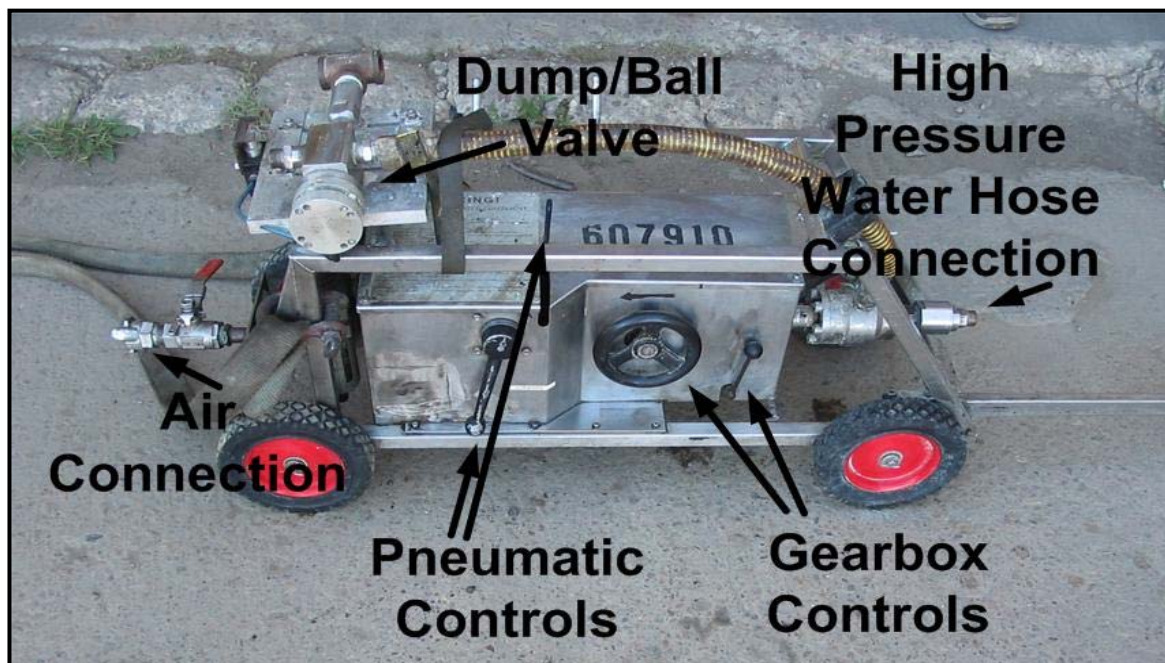


One Pump in a dual pump system

Roto Fan “Twister”

The roto fan “Twister” is the component that rotates the high pressure hose at a constant speed and in normal operation will rotate in one direction only (clockwise). The rotation speed, together with the feed mechanism and nozzle selection helps determine the cleaning rate.

A pneumatic motor provides the necessary rotation to the high pressure water hose. A gearbox also helps control the speed of rotation. Both the motor and gearbox are controlled by levers on the outside of the unit.

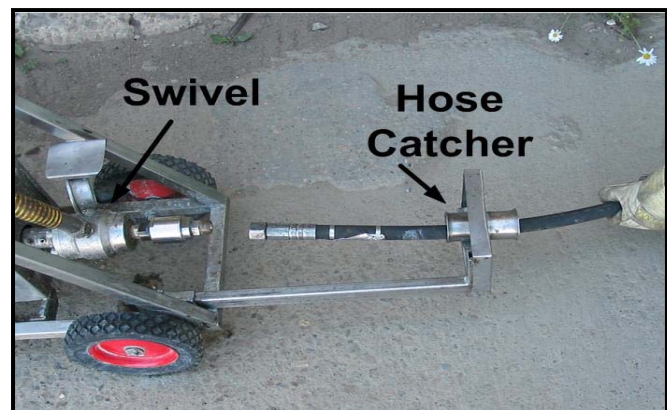


Rotofan Unit

Different Types of Rotofans



The technician will connect the high pressure hose feeding it through a hose catcher at the front of the unit.



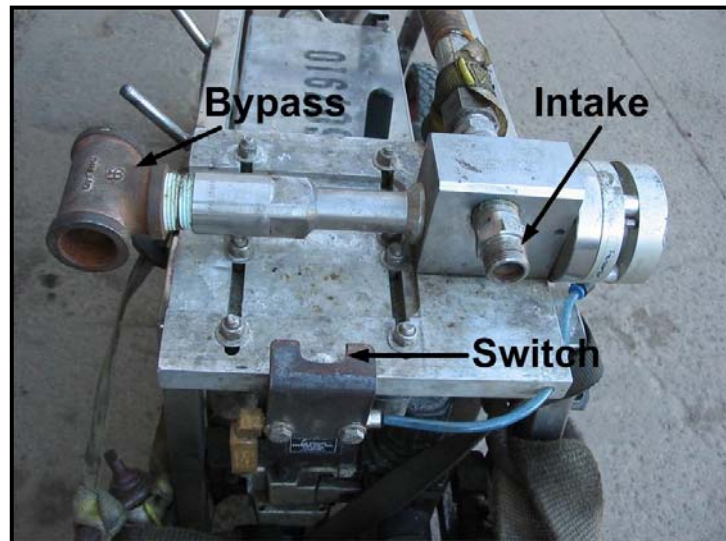
Feeding Pressure Hose through Hose Catcher

A gauge on the top of the swivel measures the water pressure during normal operations



Pressure Gauge

On the back of the unit is the pneumatically controlled dump/valve. This is the intake for the high pressure water hose. A switch mounted behind the valve is used by the operator to “dump” the high pressure



Dump/Ball Valve

The air hose connect, moisture trap/Oiler assembly are located at the rear of the unit.



Moisture Trap / Oiler Assembly



Technician Attaching Air Hose



Roto Fan Pressure Hose

The Roto Fan pressure hose is a specifically designed hose manufactured by Manuli. Due to the nature of the constant rotation encountered by this hose, it must be able to withstand a great deal of pressure and physical abuse.

The hose is manufactured with steel reinforced braids wrapped in a spiral fashion around the lining of the hose. As the Roto Fan rotates the hose in a “Clockwise” manner, the braids are tightened against the lining of the hose.



High pressure “manuli” Hose with steel braid exposed

The green arrow indicates the rotation direction of the hose during normal operations. As the hose rotates clockwise, the braids tighten against the hose allowing the hose to withstand the tremendous forces encountered during normal operations while rotated inside the pipe.

The most common size diameter of hoses used are 1/4”, 3/8” and 1/2”. The size of hose used is determined by the pipe size and the type of debris lining the pipe



Coupler

Hoses also come in a variety of lengths, when connecting lengths of hose, Couplers are used to join them.

Under certain conditions a “Stringer” can be added to the end of cleaning line. The Stringer is normally constructed of PVC piping and secured to the cleaning line with stainless steel clamps. It is



important to note that the stringer has no structural or safety benefits but rather installed for operational efficiencies



Nozzles

There are two types of nozzles used on the high pressure lines; cleaning and pulling. Cleaning nozzles are designed to remove debris from inside the line. Pulling nozzles are designed to direct spray opposite the direction of hose travel which helps pull the pressure hose down the pipe. Nozzles are available in different sizes, depending on the size of the high pressure hose used.



Cleaning and Pulling Nozzles. From left to right – ½", 3/8" and ¼"

Cleaning Nozzles

The correct cleaning nozzle selection is critical to performing effective cleaning. Cleaning nozzles direct the high pressure spray out the sides of the nozzle tip. There are several styles of cleaning nozzles available and the spray configuration varies for different nozzle styles



Cleaning Nozzle



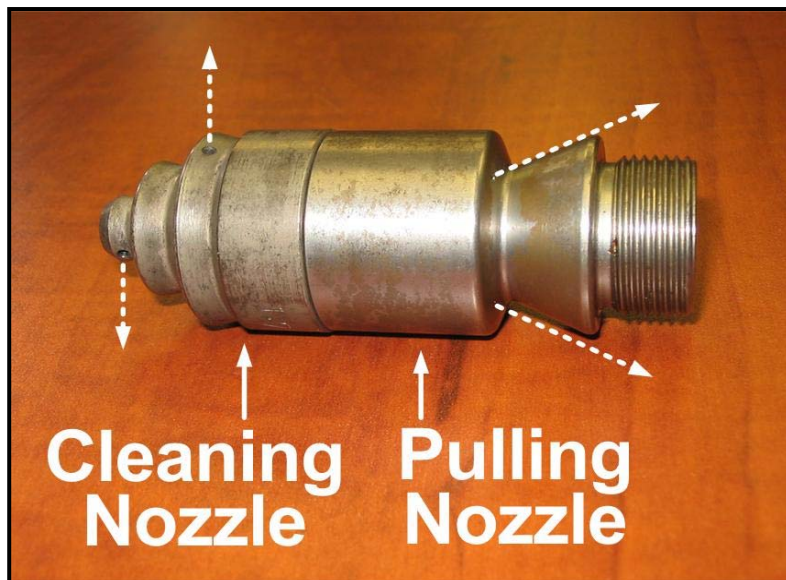
Cleaning Nozzle



Pulling Nozzles

Pulling nozzles are designed to help pull or advance the line down the pipe during cleaning. High pressure spray is directed in the opposite direction of line travel. The pulling nozzles are threaded and can be connected to the cleaning nozzle. If a long section of pipe requires cleaning, more than one pulling nozzle may be used to help pull the line down the pipe.

The dashed line indicates the flow direction from each nozzle. Notice the steep angle of the spray from the pulling nozzle. This direction of the flow helps to pull the high pressure line down the pipe during Roto Fan Cleaning Operations



Cleaning and Pulling Nozzles



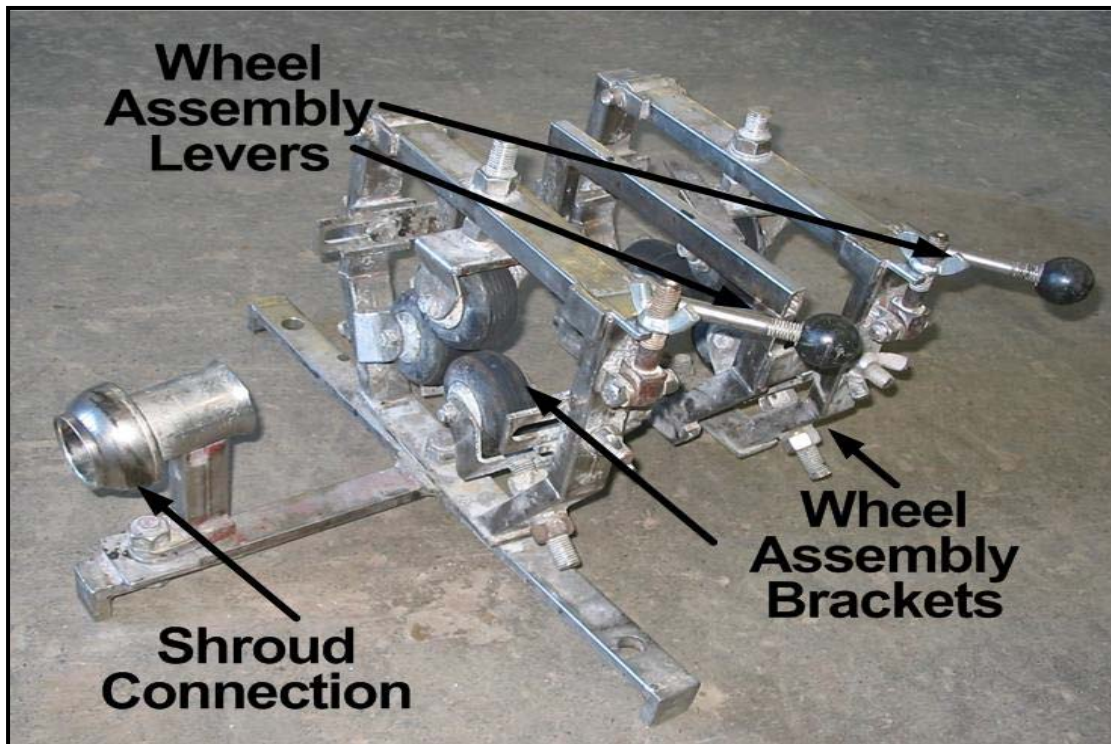
Technician Attaching a Nozzle to a high pressure hose

Once the nozzles have been assembled, they can be threaded onto the high pressure line. The technician simply tightens the assembly to the end of the line. Be sure to rotate the swivel nut to ensure no damage is inflicted on the fittings O-ring.

Feed Mechanism

The feed mechanism is used to advance and reverse the high pressure line in and out of the pipe. The frame is constructed with two sets of wheels that can be adjusted to help control the forward and reverse speed.

Only one of the wheel assemblies is in use during normal operations. The technician simply uses the lever to lift the top wheel of either assembly to render it inactive.



Feed mechanism

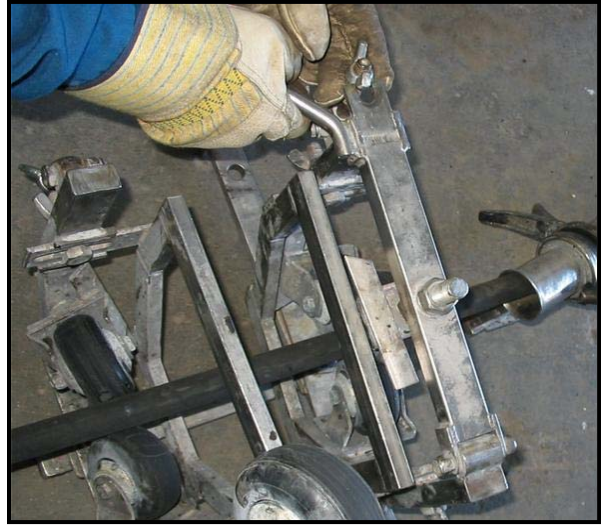
The Feeder Mechanism is a fully adjustable assembly with regards to its wheels, their height as well as their angle can be manipulated to be as efficient as possible. Most Feeder Mechanisms have plates attached to the wheel frames to ensure the proper angle is achieved during setup. If the wheel frame does not have this plate, talk with your supervisor to set correct angle. The Height of your wheels is fully dependent on what size hose is selected to complete your task. To adjust height we simply loosen off the “Jam Nut” component and set appropriate height. Be sure to make the wheel assemblies tight to the hose to allow the Feeder Mechanism to do what it’s designed for.

In order to install the high pressure hose, the technician will raise the top wheel on both assemblies and inserts the hose. Once the hose is inserted, the technician will secure the feeder by latching the top wheel into position.

Never manipulate or touch the feeder assembly while the hose is rotating



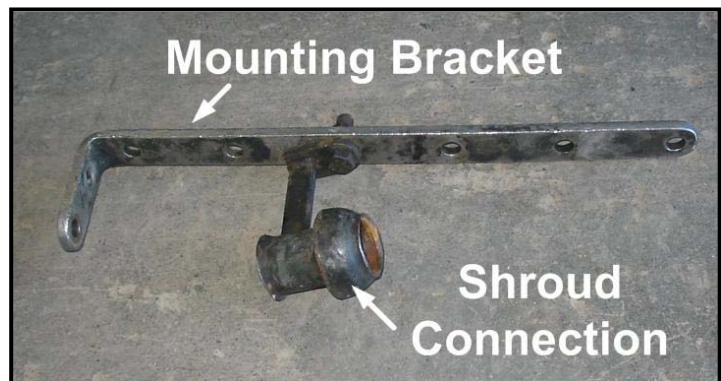
Technician Installing Hose into Feeder



Technician Securing Feeder Assembly

Mounting Bracket and Shroud

The mounting bracket is used to secure the shroud and adds an extra measure of safety. There are several styles of mounting brackets to choose from and the technician will select the one that is most appropriate for the operation.



Example of a Mounting Bracket

In many cases the bracket is mounted to the pipe entry point. The technician simply bolts the bracket to the flange face.



Bracket Mounted to Flange at Pipe Entry Point



Shroud

A steel shroud is attached to the mounting bracket and feeder mechanism. The shroud allows the high pressure hose to safely advance into the line, while at the same time providing a rigid fixed distance between the pipe entry point and feeder mechanism.

The high pressure hose is passed through the feeder mechanism, shroud and mounting bracket. The shroud can then be fastened to the bracket and feeder mechanism.



Shroud, Mounting bracket and high pressure hose assembled

Air Hose

An air hose connection is required to drive the roto fan pneumatic motor. The air is usually supplied by the plant. A whip check is required for this connection. Please ensure we use safety pins at all air hose connections

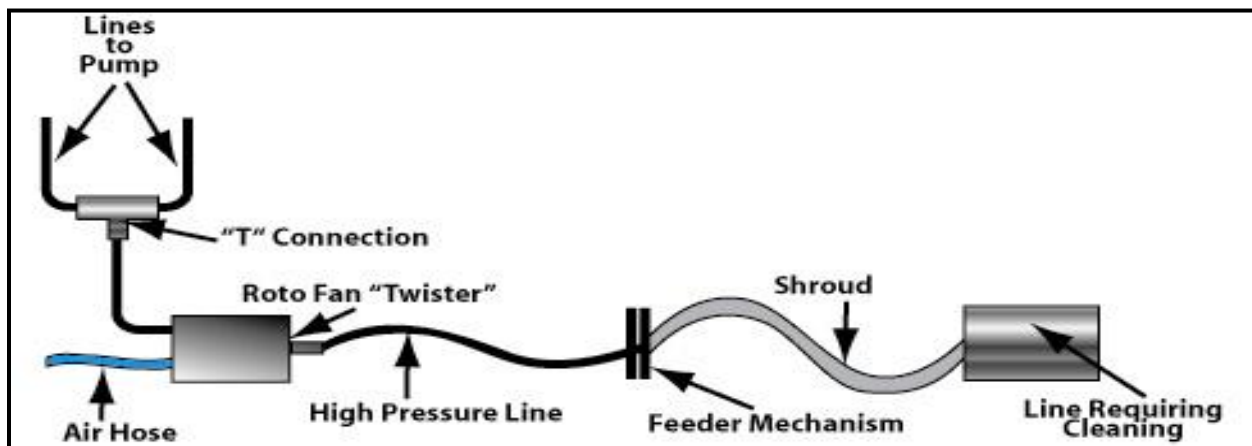


Technician Attaching Air Hose

General Roto Fan Process Summary

Once the size of the pipe or line has been determined and the type of debris that requires removal, the roto fan technicians will select the appropriate hose and nozzle. In many cases, the client can provide a schematic for the line to be cleaned. The schematic will indicate the pipe length and the number elbows in the line.

Roto Fan technicians work in crews of three; pump operator, roto fan operator and laborer. The technician(s) must ensure there is sufficient room to operate and must flag and tag area before beginning operations. The technicians will then assemble the equipment and prepare the line for cleaning.



When cleaning has begun, the roto fan will begin to slowly move forward as the high pressure line advances into the pipe. Therefore, the roto fan technicians must also ensure there is enough clearance for the roto fan to operate. For example, if a 30 foot high pressure hose is used, the roto fan will be pulled 30 feet toward the pipe opening as the tip advances down the pipe.

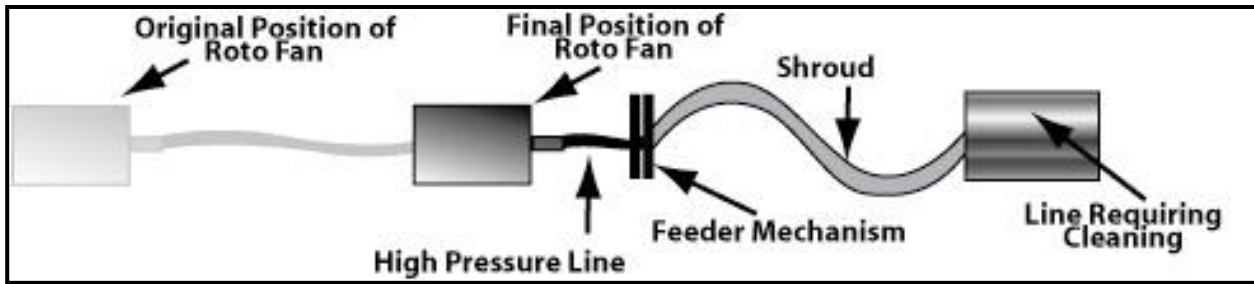


Illustration of Roto Fan advancing towards pipe opening during operation

The movement of the Twister has to be taken into account when setting up. Consider:

- Space to move
- Length of feed hose between pump and twister
- Area for exclusion zone
- Placement of feeder mechanism so its accessible and secured when possible
- Length of air hose between source for pressurized air and Twister
- Clockwise rotation of hose looking towards pipe entry. (The hose will always move to the right hand side)

Once the roto fan has advanced to the point where it is contacting the feeder mechanism, the technician must stop the operation so that the roto fan can be disconnected from the high pressure line and new line can be added.

The roto fan will be pulled back to its original starting position by a technician and another high pressure line will be coupled with the existing line. This procedure may be required several times during a cleaning job, particularly when the pipe exceeds the length of the high pressure line. In order to properly perform this procedure, the Technicians must flag and tag an unobstructed area that is large enough to allow the roto fan twister to freely move (usually 20 feet greater than the length of the high pressure hose in use).



Technician Reversing Roto Fan Twister

During the cleaning process, normal operation will require several movements advancing and retracting to ensure the section of pipe our cleaning nozzle sits in is clean. This is dependent on the blockage percentage on the line to be cleaned, this can be a very long process and if you feel uncertain at any time about the duration of your task ask a Foreman or Supervisor. During our Advancing motions our forward Feeder wheels should be engaged, when we reach the return point you are to stop rotation, engage the retracting Feeder wheels (this should stop rotation as the directional wheels will be



opposed, followed by opening forward set. Retracting can be particularly challenging if many elbows or bends in the pipe occur.

Once the cleaning is complete, the client may have the line inspected with a camera to ensure the line is free from debris.

Only properly instructed and trained personnel should be allowed to operate or maintain the high pressure jetting equipment including accessories. Before use, the equipment has to be checked for tightness and proper operation. All connections should be checked for tightness before engaging any source of energy (air or water). Any leaking connections must be repaired but only when the pump has been stopped and the pressure discharged from the line. Under no circumstances should connections of components leading high pressure water be tightened while under pressure. Do not over-tighten connections. Only proper tools should be used so that parts are not damaged. Use suitable spanners and not pipe wrenches. When operating jetting equipment, care should be taken to stand in a safe position. The whole working area should be flagged off in a clearly visible manner by appropriate barriers and signs. A minimum distance of at least 10 meters should be marked off and unauthorized personnel should be outside while unit is pressurized.

Procedural Guidelines

Procedural Guideline: Set up Rotofan

Step	Description	Notes
1.	Don required PPE.	✓
2.	Complete daily pre-job checklist.	✓
3.	Complete field level hazard assessment (FLHA) in the work environment.	✓ Review FLHA with crew performing the scope. ✓ Review of JHA with crew performing the scope ✓ Complete a Pre job start up meeting to ensure all parties involved understand the specific details of the scope (ie. Max cleaning pressure, roles and responsibilities)
4.	Position Feeder in vicinity of pipe entry	✓
5.	Adjust feeder wheels. Use one set of three wheels to feed into, one set of wheels to feed hose out of pipe.	✓ The feed adjustment plates help to set all wheels to the same angle.
6.	Clamp Smash Plate to pipe entry	
7.	Connect Safety Protection Hose to Feeder and Safety Protection Hose Connector	



8.	Attach rope from smash plate to feeder to prevent pulling on flex tube.	
9.	Open dump valve or Put shut off valve on Twister in closed position.	✓ In closed position lever of valve is perpendicular to hose length axis
10.	Connect hoses between twister and pump.	✓ Make sure that the total hose length will accommodate the travel of the twister while cleaning. ✓ Secure hose connections with Whip-Checks!
11.	Check O-ring on hose fitting, check threads of hose coupling, clean sealing surface on coupling and hose fitting.	✓ Turn nuts not couplings when connecting coupling to hose to not hurt O-ring!
12.	Connect high pressure water hoses to Twister.	✓ Secure feed hose with Whip-Check.
13.	Lead run hose through Hose Catcher.	
14.	Use only ONE hose between Twister and Feeder.	✓ DO NOT expose hose to hose couplings between Twister and Feeder or outside the Safety protection hose
15.	Connect air hose to twister.	✓ Secure air hose connections with Whip-Checks and safety pins
16.	Check water catcher of air dryer.	✓ Drain if necessary
17.	Check/add lubricant in air lubricator.	✓ Fill lubricant to max. mark (best: air tool oil)
18.	Connect cleaning nozzle to run hose	✓
19.	Feed high pressure water hose through Feeder, Safety Protection Hose and Smash Plate into pipe	✓
20.	Clamp run hose in Feeder.	✓
20.	Secure area around pipe entry and pipe outlet(s) – use barricade tape	✓

Procedural Guideline: Cleaning with Rotofan

Step	Description	Notes
1.	Don required PPE.	✓
2.	Complete daily pre-job checklist.	✓
3.	Complete field level hazard assessment (FLHA) in the work environment.	✓ Review FLHA with crew performing the scope. ✓ Review of JHA with crew performing the scope ✓ Complete a Pre job start up meeting to ensure all parties involved understand the specific details of the scope (ie. Max cleaning pressure, roles and responsibilities)



4.	Verify proper hose connections (whip checks/safety pins in place)	✓
5.	Verify cleaning nozzle is inside of pipe	✓
6.	Open pressurized air supply	✓ Always walk entire air line to confirm connection before starting
7.	Open air control valve at Twister to turn air motor, adjust lubricant flow to xx oil drops per minute on air lubrication unit. Close air control valve, air motor stops	
8.	Evacuate area around pipe entry/outlet(s) and secondary exclusion zone.	
9.	Open shut-off valve on Twister. (Dump system)	✓
10.	Adjust water pressure on water pump	✓
11.	Open air control valve and adjust rotational speed with lever and hand wheel on gear box while adjusting water pressure	✓

Safety Considerations

Minimizing Hazards During Operation

Failure to read and observe all safety considerations statements could result in severe injury or death to personnel and damage to property.

- Operate a machine that is not completely or fully assembled could result in injury or property damage. Do not operate this machine until it is completely assembled. Inspect hoses, fittings for leaks or fatigue before each use.
- Water under high pressure can cause severe injury.
- Smash Plate Anti-withdrawal device/back out prevention device must be used at all times. If the smash cannot be used than a Critical High Pressure Water Blasting Authorization Form must be completed and authorized to use the steel flex guide hose 'L' bracket
- Injury to the operator or bystanders could occur if the machine is operated without safe guards in place on the unit. When operating the machine, all safety devices must be in place including whip checks
- Stinger 1.5 times the diameter of the pipe must be used. If a stinger of adequate size cannot be used, a deflector plate may be used as long as it prevents the tool from exiting the pipe.
- Minimum crew of 3 must be in place to operate a rotofan; (1) pump operator (2) roto fan operator and (3) Spotter and/or helper.



- Machines have moving parts that can cause injury. Keep hands, feet and loose clothing away from the unit. Maintain a safe working distance. There is no scenario where manipulating the rotating hose manually is acceptable during the work.
- Red tape exclusion zone must be set up around the Rotofan work area to keep others in the area away from the equipment.
- Secondary exclusion zone needs to be established inside the general exclusion zone specifically around the rotation hose component. No person (including CEDA workers) are to enter the secondary exclusion zone when hose is rotating.
- All precautions need to be taken to eliminate the opportunity for worker to accidentally come in contact with rotating equipment.
- Always wear correct PPE when operating the unit.
- Shut the machine OFF and confirm zero energy before servicing or completing maintenance. Failure to do so could result in injury.
- All hoses used for high pressure must be certified for the intended pressure, tested annually and inspected each time prior to use to ensure no damage and free/clear of obstruction. Any other components being used need to be properly rated and compatible for the cleaning pressure
- Work areas must be properly flagged off with tagging to prevent others from entering the work space
- Hose sections must not be added when the nozzle tip is in a vertical section of pipe. Any loss of water pressure while the nozzle is in a vertical section creates a significant risk of the nozzle reversing direction in the pipe and travelling back towards the operators when system cleaning pressure is returned
- Always keep strain on the waist belt attached to your Roto Fan going in or out, but remember to let the feed mechanism do the work. Trying to pull the hose out faster than the feed mechanism is set can result in debris blockages within the pipe and can cause unnecessary strain on your muscles and back causing injury. There are situations where extra effort is required from our team, there are times when we may get more debris than anticipated. When this is the case, we may have to use extra team members to retract our cleaning hose. If you are unsure or uncomfortable in a situation like this talk to your supervisor
- Avoid using reverse gear, always have hose rotating clockwise. A counterclockwise rotation of the hose can result in the hose section disconnecting under pressure. If counterclockwise rotation is required, then completion of the Critical High Pressure Water Blasting Authorization Form is required prior to executing this operation
- Always clear air hoses of debris and obstructions. Never check an air hose that's under pressure by looking in the end
- Always keep pressure on when cleaning vertical sections of line
- Always keep pressure on the cart while going forward or backward to avoid kinks.
- Making adjustments to the Feeder without stopping rotation will place the operator dangerously close to the rotating hose, creating a significant risk of serious injury. Rotation of the hose MUST be stopped and air supply valve closed prior to any adjustments being made on the Feeder



- When reversing the hose out of the pipe, ensure Labourer pulling the cart is allowing the feed mechanism to do most of the work.
- Trying to pull the hose out faster than the feed mechanism is set, can result in debris blockages within the pipe and has resulted in back injuries to employees.
- Avoid using reverse gear, always have hose rotating clockwise. The tip could thread off.

Maintenance

Preventative Maintenance Program

As with any equipment used regularly, all roto fan components of the must receive the appropriate preventative maintenance in order to properly operate.

It is important to identify the following components and perform the required maintenance for routine operation.

Field Level Maintenance

Part/Device	Required Maintenance	Frequency
Pumps	Preventative Maintenance	Every 250 hours
Nozzles	Replace	As required
High Pressure Swivel	Replace	As required
Valve seats	Clean	As required
Hose Feeder Wheels	Adjust	As required
PTO	Adjust tension	As required
Roto Fan	Glycol through lines	Cold Weather Shut-Down
Swivel	Replace when fine water stream sprays	As required
Clutch	Replace O-Ring and back up ring if leaking	As required
Air Motor	Replace wear parts when motor does not supply sufficient power	As required
Air Dryer	Replace Air Filter element	As required
Air Motor – Gear box coupling	Replace bushing when it wears out	As required



Troubleshooting

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION(S)
Roto Fan not rotating	Restricted/frozen filter	Replace filter
	No Air / Low Air	Check air hoses, compressor and fitting for leaks or blockages
	No water pressure / Clutch not engaging	Check water flow/pressure
	Worn clutch	Repair/replace clutch
	Worn air motor	Repair/replace air motor
	Air motor to gear box coupling failure	Repair/replace coupling
	Gear box failure	Replace gear box
Hose not feeding	Feeder not engaged	Engage feeder
	Improper Wheel height on feeder	Adjust wheel height
	Improper wheel angle on feeder	Adjust wheel angle
	Wheels on feeder worn/no tread	Replace feeder wheels
Hose feeding too quickly		Set gearbox to slowest setting
High Pressure Line not advancing	Blockage in Pipe	Increase air to motor
Loss of Cleaning Pressure	Cartridge in bypass leaking	Replace Cartridge
Leaking Swivel	Worn Seal	Replace seal



Multiple Choice Questions (Technical Quiz)

Complete the following test, and have it graded by your assessor. If any questions are answered incorrectly, your assessor will explain what the correct answer is, and why it is correct. Once you understand the correct answer, both the assessor and students initials are required to indicate that mentoring or coaching has taken place.

Question	Assessor's Initials	Student's Initials
1. The roto fan is capable of cleaning pipe up to 120 inches in diameter. a. True b. False		
2. The roto fan system can clean pipe as long as: a. 500 meters b. 1000 feet c. 50 meters d. All of the above		
3. The roto fan can be rotated in both a clockwise and counter clockwise direction without any concerns. a. True b. False		
4. Only a specially designed hose shall be used on the roto fan. a. True b. False		
5. Roto fan hoses are available in which size? a. 1/4" b. 1/2" c. 3/8' d. All of the above		
6. Loss of pressure when cleaning a vertical section of pipe can cause the Roto fan nozzle to reverse direction? a. True b. False		
7. Before making adjustments to the feeder an operator must? a. Stop the rotations of the hose b. Close air supply valve c. Both A and B d. None of the above		
8. All personnel must stay clear of the rotating hose while in operation? a. True b. False		
9. When is a critical High Pressure Water Blasting Authorization Form required? a. If an Anti-Withdrawal Cannot be used b. If a Clockwise rotation is required c. If a Counter clockwise rotation is required d. Both A and C		
10. If a Hose or Nozzle becomes stuck, the operator should? a. Depressurize the system b. Stop the rotation and shut down the pump(s) c. Contact the Supervisor/Leader d. All of the above		
11. When cleaning large amounts of debris or if there is a long distance to the drain point, back flushing will be required more often? a. True b. False		
12. A high pressure roto-fan hose requires an O-ring in its coupler on both ends of itself? a. True b. False		



13. The Swivel component of the roto-fan has a packing element that needs to be replaced when? a. A slight water drip b. A fine mist/spray c. No water leaks d. Never, it does not have packing		
14. Only CEDA Personnel are allowed inside the secondary exclusion zone around the rotation hose when in operation. a. True b. False		
15. A pre-use inspection must be completed on the rotofan a. Start of each shift b. Each Day c. Each Week d. Each Month		



Practical Assessment – Rotofan Operations

This form is to be filled out by the assessor as they observe the student successfully demonstrate these items in order to be deemed competent.

Assessment Check List

#	Identify the following...	Trainee Initials	Assessor Initials
Roto Fan High Pressure Tool			
1	Pump		
2	Water Inlet Hose		
3	“T” Coupler		
4	Roto Fan		
	Swivel		
	Hose Catcher		
	Dump/Ball Valve		
	Moisture Trap/ Oiler Assembly		
5	Pressure Hose		
6	Nozzles		
	Cleaning		
	Pulling		
7	Feed Mechanism		
8	Mounting Bracket/Anti Withdrawal Device		
9	Shroud		
10	Air Hose		



Assessment Sign Off

All boxes must be completed before signing an employee competent.

- ☐ Expectation Letter Signed
- ☐ Minimum 100 hours of on the job training completed
- ☐ On the Job Practical Assessment Completed by an approved Assessor
- ☐ Has reviewed and understands the operator manuals for the TLX
- ☐ Reviewed and understands Procedures and Safety Documentation
- ☐ Technical review and Knowledge Exam complete
- ☐ Training documentation sent to CEDA Training Department

Assessor

I, _____ have taken the below named employee through this Assessment, and he/she has successfully demonstrated competence in the areas identified.

Signature Date

Student

I, _____ have completed this competency, including the on-job demonstration, practical assessment and multiple-choice questions. I understand the information presented and agree to follow all of the rules and procedures set out by CEDA.

Signature Date



Revision Log

Revision Date	Section Affected	Changes Made
October 21, 2021	All	Updated Template, multiple changes throughout.



Training Change Request Form

Date: _____

Location: _____

Name: _____

Contact information: _____

Email/Phone number

Description

Please use the back of this sheet to make additional comments.

Section Name: _____

Page Number: _____

Description of Problem/ Suggested Resolution:

