

Sewer Cleaning 102 Training Curriculum

MASTER COURSE SYLLABUS
MALVIN "RUSTY" NEZAT II



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Goals

Our training is designed to assist the participants in understanding the basics of sewer cleaning requirements. There are four (4) main goals we would like to highlight:

- **Health and Safety Awareness** – Safety awareness is paramount to helping to ensure there is no injury (or in some cases, death) caused by the tools and machinery required in daily sewer cleaning operations.
- **Increased Production** – By increasing the daily production rate, we reduce the cost of performing the service. If jobs can be done correctly by an in-house sewer group, then there is often no need to outsource.
- **Reduction of Equipment Downtime** – The standard machinery items used in sewer operations are expensive pieces of equipment. When there is no training on the proper usage and maintenance of the machines, errors in operation can add up to costly repairs and increased periods of downtime.
- **Make Your Job Easier** – Providing the participants with proper training helps to ensure that they feel confident and comfortable with every aspect of their job.

Prerequisite Statement

Students who enter this program of study should have:

- A general understanding of collection system maintenance, including basic functions of applicable equipment, tools, and procedures.
- A minimal amount of field experience related to collection system maintenance.

Training Formats

This training course is provided to students in three (3) different delivery formats: in-person classroom, live webinar (Zoom Software) and online self-paced learning management system (LMS). This allows the student to choose the learning environment that best suits their learning method and time limits.

This curriculum will give course information on all three (3) delivery formats. Each course grants a certificate of completion.

Sample Course Agenda (Classroom / Webinar)

Name of Program: Sewer Cleaning Training 102

Date and Time of Program: T.B.D.

Location of Program: T.B.D.

Materials:

- Optional Training Manual (*Upon Request of Client*)
- Physical Quizzes, Virtual Quizzes

List of Class Modules and Approximate Durations:

1. Course Introduction (1/2 hour)
 - a. Background of Sewer Maintenance and Systems
 - b. Production and Cost Issues
2. Pneumatic Plugs (1 Hour)
3. Sewer Hose (1 Hour)
4. Nozzles (1 and 1/2 hour)
 - a. Introduction to Nozzles
 - b. High Pressure Water Systems
5. Nozzle Capacity Cleaning (1/2 hour)
6. Dynamic Filling (1/2 hour)
7. Blockage Removal: Roots and Blockages (1 hour)
8. Vacuum Systems (1 hour)

**Please note: each module will consist of instruction, review, and testing.*

Sample Schedule:

8:00 am	–	Course Introduction
8:30 am	–	Pneumatic Plugs
9:30 am	–	Break
9:45 am	–	Sewer Hose
10:45 am	–	Break
11:00 am	–	Nozzles
12:30 pm	–	Lunch
1:30 pm	–	Nozzle Capacity Cleaning
2:00 pm	–	Break
2:15 pm	–	Dynamic Filling
2:45 pm	–	Roots and Blockages
3:45 pm	–	Break
4:00 pm	–	Vacuum System
5:00 pm	–	Class Dismissed

Sewer Cleaning Training 102 Instructional Plans - Classroom

Classroom Course Overview

Overview

- This program of study will review basic wastewater collection system maintenance, i.e. sewer cleaning. Students will explore various tools, techniques, and safety issues related to sewer cleaning. At the end of the program, students will be able to recognize the importance of proper use of equipment, techniques, and safety procedures. Students will explore and recognize best practices of wastewater collections system maintenance.
- This program will require six (6) hours of class time along with one (1) hour of discussion and examination, and one (1) hour lunch break.
- This program will take place in a classroom setting for the entire time.
- This training program involves direct instruction, media-rich content, and interactive, activity-based discussions.

Accompanying training manuals are available upon request for an additional cost to end user but are not provided automatically.

- Testing for comprehension occurs for each of the content modules with physical paper testing to be collected at the end of the course.
- Attendance will be taken on a physical sign in sheet and saved for up to five (5) years.

Learning Objectives

At the end of this training program, students will know and be able to:

- Recognize the history and current standard of wastewater collections system maintenance.
- Develop the skills related to proper sewer cleaning methods.
- Comprehend the importance of following all safety procedures and regulatory requirements.
- Identify the procedures involved with preparing the equipment for proper wastewater collections system maintenance.
- Become familiar with selection and use of the proper tools and methods to remove blockages and clean sewer lines.

Sewer Cleaning Training 102 Instructional Plans - Webinar

Webinar Course Overview

Overview

- This program of study will introduce basic wastewater collections system maintenance. Students will explore various tools, techniques, and safety issues related to cleaning. At the end of the program students will be able to recognize the importance of proper use of equipment, techniques, and safety procedures. Students will explore and recognize best practices of wastewater collections system maintenance.
- This program will require six (6) hours of interactive virtual teaching, one (1) hour of discussion and examination and one (1) hour for lunch break.
- This program will take place in a webinar setting (Zoom Software) for the entire time.
- This training program involves direct instruction, media-rich content, and interactive, activity-based discussions.

Accompanying training manuals are available upon request for an additional cost to end user but are not provided automatically.

- Testing for comprehension occurs for each of the content modules with Zoom Polling at the end, before moving forward in the course. Polls are then downloaded into Excel and retained digitally for up to five (5) years.
- Attendance will be taken via Zoom Attendee Reporting showing login time, if the student leaves, log out and total minutes in the virtual classroom. This report will be retained digitally for up to five (5) years.

Learning Objectives

At the end of this training program, students will know and be able to:

- Recognize the history and current situation of wastewater collections system maintenance.
- Develop the skills related to proper sewer cleaning methods.
- Comprehend the importance of following all safety procedures and regulatory requirements.
- Identify the procedures involved with preparing the equipment for proper wastewater collections system maintenance.
- Become familiar with selection and use of the proper tools and methods to remove blockages and clean sewer lines.

Webinar Requirements

General Information:

- The training will be live with an instructor via Zoom software. Participants do not have to download the Zoom application to join but it is suggested.
- Participants must have sound available on individual terminal / speakers, video capabilities, and microphone for participation in exercises.
- Participants will receive automated emails with reminders to ensure awareness prior to class date.
- If completing in a group setting, please be sure that the camera can capture all participants in the room to receive credit.
- In addition to the instructor, there will also be a separate moderator to assist with roll call, questions via chat, technical difficulties, and monitoring attendees for participation.
- PDF of training manual to be provided five (5) days in advance to students. It is suggested that these are printed so students may make notes as the instructor reviews the materials.

Accompanying training manuals are available upon request for an additional cost to end user but are not provided automatically.

Identity Verification:

- Pre-registration will take place requiring the client to provide a list of participants, email addresses, State WW License Number (if CEU's are requested) and any additional information to ensure proper documentation / certification is met.
- Attendees must have valid city employment or state ID available to display during roll call. Please show this to the moderator and cover your personal information other than name.

Monitoring Comprehension and Participation:

- After roll call the moderator will review the "housekeeping" items including muting the microphone while instructor is speaking, required polls/quiz for each module and ensuring that the attendee is always in view of camera. If you must step away, please inform the moderator via chat to ensure credit is received.
- At the end of each module attendees will need to complete a poll quiz consisting of three (3) to five (5) questions. Upon completion the instructor

will share the results, review the correct answers, and open the floor to all participants to discuss the material as needed.

- Reports related to Zoom Polling and Zoom Attendee Reporting are retained for up to five (5) years and can be provided to the client for documented training records or state certification boards upon request.
- Instructor and Subject Matter Expert: Malvin "Rusty" A. Nezat II can be reached via email at Rusty@Nezat.com or phone @ 281-788-5221 and will provide a response within two (2) business days to any questions.

Sewer Cleaning Training 102 Instructional Plans – Online Learning

Online Learning (LMS) Course Overview

Overview

- This program of study will introduce basic wastewater collections system maintenance. Students will explore various tools, techniques, and safety issues related to sewer cleaning. At the end of the program students will be able to recognize the importance of proper use of equipment, techniques, and safety procedures. Students will explore and recognize best practices of wastewater collections system maintenance.
- This program will require six (6) hours of interactive video training separated into 15-minute sections. This allows the student to break between modules and learn at their own pace.
- This program will take place in an online learning management system (LMS) for the entire time.
- This training program involves video based content and interactive quizzes/exercises.

Accompanying training manuals are available upon request for an additional cost to end user but are not provided automatically.

- Testing for comprehension occurs for each of the 15-minute content modules with a required passing rate of 70% before moving forward in the course. Quiz data is retained digitally within the LMS for up to five (5) years.
- "Attendance" reporting is also available within the LMS to determine the start and end time of each module. This data will be retained digitally within the LMS for up to five (5) years.

Learning Objectives

At the end of this training program, students will know and be able to:

- Recognize the history and current situation of wastewater collections system maintenance.
- Develop the skills related to the methods of proper wastewater collections system maintenance.
- Comprehend the importance of following all safety procedures and regulatory requirements.
- Identify the procedures involved with preparing the equipment for proper wastewater collections system maintenance.
- Become familiar with selection and use of the proper tools and methods to remove blockages and clean pipe.

Online Learning Requirements

General Information:

- To complete this online training, you will require either Internet Explorer or Google Chrome (Internet Browser) to access the website and basic sound either via speakers or headphones. No software or applications are required to be downloaded.
- Upon completion the individual student will receive an email including login instructions, username and password and technical support available via email at rachael@nezat.com.
- The course is presented in a "locked" format that does not allow the user to fast-forward through any video or quiz materials unless it has already been completed previously with a passed quiz result.
- If the student misses a question, the portion of the video with the correct answer will play automatically ensuring the student understands the accurate response.

Identity Verification:

- Pre-registration will take place requiring client to provide a list of participants including: First Name, Last Name, License/Operator Number (if requesting CEUs) and valid company email address.

Monitoring Comprehension and Participation:

- There are a total of eight (8) modules (Introduction + seven (7) Core Topics) required to be completed. Each module is broken into 15-minute parts creating a total of fifteen videos for the student to view.
- At the end of each video, the student is required to complete a comprehension quiz. The student will receive three (3) attempts to pass requiring score of 70% or greater to "unlock" the next video.
- Once all modules are completed there is a final exam compiled with questions from the material presented in the entire course. Students will receive three (3) attempts to pass with a score of 70% or greater to receive their certificate of completion.
- Instructor and Subject Matter Expert: Malvin "Rusty" A. Nezat II can be reached via email at Rusty@Nezat.com or phone @ 281-788-5221 and will provide a response within two (2) business days to any questions.
- Feedback regarding the course material is requested after the successful completion of the final exam. This is not mandatory however it is available if the participant desires to communicate positive or negative comments.

Sewer Cleaning Training 102

Course Module Outline

Module 1: Course Introduction - History of Sewer Maintenance and Systems

Learning Objectives:

- a. Students will become educated on the history and background of wastewater collections systems.
- b. Students will be exposed to the operationalization of wastewater collection for business purposes.
- c. Students will review the holistic field of wastewater collection.

Materials:

- Training manual (*Upon Request*)

Lesson:

1. Introduction:

- a. Welcome students to the Sewer Cleaning 102 Training Program
 - i. The instructor will explain the purpose of the course.
 - ii. The instructor will explain the agenda of the course.

(Applicable only to classroom and webinar delivery formats.)

2. Content Presentation:

- a. The instructor will introduce himself, complete a short icebreaker with students for engagement and then provide a breakdown for the disclaimer advising students to only proceed with safety and operations as outlined within their own organization.
- b. Video Presentation: Course Introduction
 - i. Disclaimer.
 - ii. History of Sewer Cleaning.
 - iii. Credentials of Instruction including speaking engagements, organizations, presentations, published works and patents.
 - iv. Goals of training program.
 - v. How information was obtained for the creation of modules.
 - vi. Outline of course training modules with graphics.
 - vii. Discuss privatization and cost.
 - viii. Discuss national average cleaning times.

3. Application of New Knowledge:

- a. The instructor will ask if there are any questions from students.

(Applicable only to classroom and webinar delivery formats.)

4. Check for Understanding:

- a. Not applicable.

Module 2: Pneumatic Plugs

Learning Objectives:

- a. Students will develop an appreciation of the use and maintenance of pneumatic plugs.
- b. Students will be exposed to the dangers involved with the use of pneumatic plugs.
- c. Students will review the use and storage of pneumatic plugs.

Materials:

- Training manual (*Upon Request*)
- Teacher-provided quiz (Classroom paper, Zoom Poll or LMS Quiz)

Lesson:

1. Introduction:

- a. Instructor will ask students to identify if they possess any current knowledge about plugs and how any plugs at their own facilities are stored.

(Applicable only to classroom and webinar delivery formats.)

2. Content Presentation:

- a. Video Presentation: Plugging Part 1 and Part 2
 - i. Introduction to main manufacturers of plugs.
 - ii. Discussion of pneumatic plugs with graphics including what is a plug, which pressures to never exceed, and ratings of plugs.
 - iii. Clip of exploding plug.
 - iv. Published articles relating to death by plug.
 - v. Manufacturer video of contained explosion of a plug.
 - vi. Explanation of force and head pressure.
 - vii. Setting of plugs and determining proper plug size for use.
 - viii. Discuss working around and removing plugs.
 - ix. Proper storage of plugs.

3. Application of New Knowledge:

- a. The instructor will review content presented in preparation for the quiz by asking the type of questions that will be presented on the quiz. This will give the students more confidence going into the first quiz.

(Applicable only to classroom and webinar delivery formats.)

4. Check for Understanding:

- a. Students will take Quiz One: Plugs
- b. Instructor will review quiz with class to address any missed questions and ensure full participation and understanding.

Module 3: Sewer Hose

Learning Objectives:

- a. Students will learn the importance of the color-coding system for high-pressure sewer hose used in the industry.
- b. Students will be taught how to properly splice a hose and protect it.
- c. Students will be instructed in proper use and storage of high-pressure sewer hose.

Materials:

- Training manual (*Upon Request*)
- Teacher-provided quiz (Classroom paper, Zoom Poll or LMS Quiz)

Lesson:

1. Introduction:

- a. Before presentation, check for understanding of basic background knowledge of hoses.

(Applicable only to classroom and webinar delivery formats.)

2. Content Presentation:

- a. Video Presentation: Sewer Hose Part 1 and Part 2
 - i. Review hose types and manufacturers.
 - ii. Identify hose components and how they are manufactured.
 - iii. Show hose mending issues with video footage.
 - iv. Explain inner hose manufacturer color-code guidelines.
 - v. Discuss outer hose color-code guidelines and manufactures.
 - vi. Explain level winding of the hose onto the reel and proper equipment.
 - vii. Discuss hose safety and signs of hose damage.
 - viii. Review how to identify new hose defects.
 - ix. Explain how to identify improper splicing and fittings.
 - x. Discuss injuries that could occur from high-pressure fluid and faulty hose.
 - xi. Discuss hose protection importance and different protection options.
 - xii. List the complete process steps for mending and splicing including proper tools.
 - xiii. Discuss hose replacement.
 - xiv. Explain the importance of proper training in splicing.
 - xv. Recap the importance of hose manufacturers and fittings.

3. Application of New Knowledge:

- a. Open class discussion. Encourage students to provide examples of what they have seen or done that was correct or incorrect in their own experiences, based on this training.

(Applicable only to classroom and webinar delivery formats.)

4. Check for Understanding:

- a. Students will take Quiz Two: Sewer Hose (Classroom paper, Zoom Poll or LMS Quiz)
- b. Instructor will review quiz with class to address any missed questions and ensure full participation and understanding.

Module 4: Nozzles

Learning Objectives:

- a. Students will be taught proper operation and maintenance of the components of a high-pressure water system.
- b. Students will acquire troubleshooting skills related to low-pressure issues of a high-pressure water system and be taught characteristics of a high-pressure nozzle.
- c. Students will be equipped to make better choices as to which nozzle to use in various applications and/or situations.

Materials:

- Training manual (*Upon Request*)
- Teacher-provided quiz (Classroom paper, Zoom Poll or LMS Quiz)

Lesson:

1. **Introduction:**

- a. Instructor will present article and story regarding death of sewer worker.

2. **Content Presentation:**

- a. Video Presentation: Nozzles Parts 1 - 5
 - i. Discuss what is a nozzle.
 - ii. Discuss water source - pumps with moving parts of each.
 - iii. Discuss how nozzles clean pipes.
 - iv. Understanding pressure and velocity relationship with graphics.
 - v. Discuss orifices and cleaning orifices.
 - vi. Compare inlet opening vs combined outlet opening nozzles.
 - vii. Examine pressure vs velocity.
 - viii. Discuss the angle of jets and common nozzles.
 - ix. Review footage of working nozzles in dirty pipe.
 - x. Relate the action of high-velocity water.
 - xi. Discuss choosing the right nozzle and extension for the job.
 - xii. Explain the importance of nozzle extensions.
 - xiii. Explain which type of nozzle should be used for which type of job.
 - xiv. Graphics of a mistake made in the field with a nozzle.

3. **Application of New Knowledge:**

- a. Open class discussion. Encourage students to provide examples of what they have seen or done that was correct or incorrect in their own experiences, based on this training.
- b. Have students identify which type of nozzle would be correctly suited for the field work they encounter on a day-to-day basis.

(Applicable only to classroom and webinar delivery formats.)

4. Check for Understanding:

- a. Students will take Quiz Three: Nozzles (Classroom paper, Zoom Poll or LMS Quiz)
- b. Instructor will review quiz with class to address any missed questions and ensure full participation and understanding.

Module 5: Nozzle Capacity Cleaning

Learning Objectives:

- a. Students will learn the correct step cleaning process including correct nozzle selection and length of step for cleaning.
- b. Students will gain knowledge that can lead to increases in daily production rates.
- c. Students will understand the potential increase in the quality of their pipe cleaning abilities.

Materials:

- Training manual (*Upon Request*)
- Teacher-provided quiz (Classroom paper, Zoom Poll or LMS Quiz)

Lesson:

1. **Introduction:**

- a. Instructor will assess prior knowledge interactively by using examples within the class to see how students determine:
 - i. Correct nozzle size based on diameter of pipe.
 - ii. Step length for nozzle and pipe combination.
(*Applicable only to classroom and webinar delivery formats.*)

2. **Content Presentation**

- a. Video Presentation: Capacity Cleaning Part 1
 - i. What is the capacity cleaning process?
 - ii. Discuss the finned fantail nozzle with graphics and video.
 - iii. Discuss step cleaning calculations with charts and graphics.
 - iv. Explain reverse step cleaning.
 - v. Demonstrate how step cleaning is productive.
 - vi. Explain the different dynamics of large diameter pipe cleaning.
 - vii. Identify the best utilization of screw jacks.

3. **Application of New Knowledge:**

- a. Ask students to provide examples of what they have seen, that was done correctly and what was incorrect based on this training.
- b. Instructor will review content to be assessed on the quiz.
(*Applicable only to classroom and webinar delivery formats.*)

4. **Check for Understanding:**

- a. Students will take Quiz Four: Capacity Cleaning (Classroom paper, Zoom Poll or LMS Quiz)
- b. Instructor will review quiz with class to address any missed questions and ensure full participation and understanding.

Module 6: Dynamic Filling

Learning Objectives:

- a. Students will understand the process and equipment requirements associated with utilizing the dynamic filling process in the field.
- b. The trainee will understand how their sewer cleaning production and quality of sewer cleaning can be increased by using the dynamic filling process.
- c. The trainee will understand the safety precautions that must be taken when utilizing the dynamic filling process in the field.

Materials:

- Training manual (*Upon Request*)
- Teacher-provided quiz (Classroom paper, Zoom Poll or LMS Quiz)

Lesson:

1. Introduction:

- a. The instructor will discuss basic time management strategies and time related challenges that occur in the field to set up the students for this module.

(Applicable only to classroom and webinar delivery formats.)

2. Content Presentation

- a. Video Presentation: Dynamic Filling Part 1
 - i. Discuss how much time is spent cleaning dirty lines a day.
 - ii. Discuss various ways to increase cleaning time.
 - iii. Realize unit cleaning time per tank of water.
 - iv. Explain how to increase cleaning time by using dynamic filling.
 - v. Explain the dynamic filling process and its benefits.
 - vi. Identify recommended equipment.
 - vii. Explain the results of using the dynamic filling process.

3. Application of New Knowledge:

- a. Instructor will review content to be assessed on the quiz.

(Applicable only to classroom and webinar delivery formats.)

4. Check for Understanding:

- a. Students will take Quiz Five: Dynamic Filling (Classroom paper, Zoom Poll or LMS Quiz)
- b. Instructor will review quiz with class to address any missed questions and ensure full participation and understanding.

Module 7: Blockage Removal Roots and Grease

Learning Objectives:

- a. Students will learn about the formation of and prevention of blockages.
- b. Students will acquire techniques that will allow for quicker and safer blockage removal.
- c. Students will gain an understanding of tools designed for root and grease removal.

Materials:

- Training manual (*Upon Request*)
- Teacher-provided quiz (Classroom paper, Zoom Poll or LMS Quiz)

Lesson:

1. Introduction:

- a. The instructor will check for previous understanding by asking students to list the types of blockages that they find most difficult to clear.
(*Applicable only to classroom and webinar delivery formats.*)

2. Content Presentation

- a. Video Presentation: Blockage Removal Part 1 and 2
 - i. Discuss where grease comes from and why it is a problem.
 - ii. Review how several types of consumer products can cause sewer blockages.
 - iii. Explain how root intrusion occurs.
 - iv. Review information on roots and methods of eliminating roots.
 - v. Provide examples and video of what roots look like inside pipe.
 - vi. Explain pressure behind the blockage.
 - vii. Detail the proper process of how to relieve a blockage.
 - viii. Review equipment options including nozzles and root cutters.
 - ix. Discuss how to utilize dynamic filling for clearing blockages.

3. Application of New Knowledge:

- a. Open class discussion. Encourage students to provide examples of what they have seen or done that was correct or incorrect in their own experiences, based on this training.
- b. Have students identify which type of nozzle would be correctly suited for the field work they encounter on a day-to-day basis.
(*Applicable only to classroom and webinar delivery formats.*)

4. **Check for Understanding:**

- a. Students will take Quiz Six: Blockage Removal (Classroom paper, Zoom Poll or LMS Quiz)
- b. Instructor will review quiz with class to address any missed questions and ensure full participation and understanding.

Module 8: Vacuum

Learning Objectives:

- a. Students will learn the theories of vacuum, lift and air movement.
- b. Students will be taught the various configurations of a vacuum system (PD and/or Fan Combination Unit) in sewer cleaning equipment.
- c. Students will learn about fluidizing and the process of liquefaction of a solid.

Materials:

- Training manual (*Upon Request*)
- Teacher-provided quiz (Classroom paper, Zoom Poll or LMS Quiz)

Lesson:

1. Introduction:

- a. The instructor will ask students the type of combination unit they primarily utilize on a day-to-day basis and discuss the difference between PD and Fan machines.

(Applicable only to classroom and webinar delivery formats.)

2. Content Presentation

- a. Video Presentation: Vacuum Part 1
 - i. Discuss what air is.
 - ii. Discuss the weight of air with demonstration video.
 - iii. Explain vacuum with graphics.
 - iv. Explain how to create a vacuum.
 - v. Identify the components and operations of a compressor Fan.
 - vi. Identify the components and operations of a PD Blower.
 - vii. Explain the fluidizing process.
 - viii. Discuss utilizing vacuum in storm sewer.

3. Application of New Knowledge:

- a. Open class discussion. Encourage students to provide examples of positive and negative experiences with vacuums in the field.

(Applicable only to classroom and webinar delivery formats.)

4. Check for Understanding:

- a. Students will take Quiz Seven: Vacuum (Classroom paper, Zoom Poll or LMS Quiz)
- b. Instructor will review quiz with class to address any missed questions and ensure full participation and understanding.