

EXCAVATION AND TRENCHING PROCEDURE

1.0 Purpose

The purpose of this procedure is to protect employees against cave-ins and other unexpected hazards associated with excavation and/or trenching operations.

2.0 Scope

This procedure applies to all International Paper, Franklin Mill employees, including Sheet Converting and Fiber Recycling Plant, as well as any contractors performing work at the site who make an open excavation in the earth's surface including trenches.

3.0 Responsibilities

3.1 International Paper employees and contractors are responsible for following all requirements outlined in this procedure and any related procedures.

3.2 All employees are responsible for ensuring strict enforcement of all requirements within this procedure and are to frequently audit the worksite for compliance.

3.3 The Competent Person is responsible for ensuring that the excavation/trench and related operations present no foreseen hazards and meet all requirements of this procedure as well as all applicable regulations. The Competent Person also has the authority to promptly eliminate any or all foreseen hazards.

4.0 Definitions

4.1 **Accepted engineering practices** - Those requirements which are compatible with standards of practice required by a registered professional engineer.

4.2 **Aluminum hydraulic shoring** - A pre engineered shoring system comprised of aluminum hydraulic cylinders (cross braces) used in conjunction with vertical rails (uprights) or horizontal rails (walers). Such systems are designed specifically to support the sidewalls of an excavation and prevent cave-ins.

4.3 **Bell bottom pier hole** - A type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a belled shape.

4.4 **Benching (benching system)** - A method of protecting employees from cave ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near vertical surfaces between levels.

4.5 **Cave in** - The undesired separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

4.6 **Competent Person** - One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary or present a hazard to employees, and who has authorization to take prompt corrective measures to eliminate them.

4.7 **Cross braces** - The horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or wales.

4.8 **Excavation** - Any man made cut, cavity, trench, or depression in an earth surface, formed by earth removal, regardless of size or depth.

4.9 **Faces or sides** - The vertical or inclined earth surfaces formed as a result of excavation work.

4.10 **Failure** - The breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

4.11 **Hazardous atmosphere** - An atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

4.12 **Kickout** - The accidental release or failure of a cross brace.

4.13 **Protective system** - A method of protecting employees from cave ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

4.14 **Ramp** - An inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.

4.15 **Registered Professional Engineer** - A person who is registered as a professional engineer in the state of Virginia. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

4.16 **Sheeting** - A shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

4.17 **Shield (Shield system)** - A structure that is able to withstand the forces imposed on it by a cave in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Shields used in trenches are usually referred to as "trench boxes" or "trench shields".

4.18 **Shoring (Shoring system)** - A structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave ins.

4.19 **Sloping (Sloping system)** - A method of protecting employees from cave ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave ins. The angle of incline required to prevent a cave in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

4.20 **Stable rock** - A natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

4.21 **Structural ramp** - A ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock is not considered structural ramps.

4.22 **Support System** - A structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

4.23 **Tabulated data** - Tables and charts approved by a registered professional engineer and used to design and construct a protective system.

4.24 **Trench (Trench excavation)** - A narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

4.25 **Uprights** - The vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called "sheeting".

4.26 **Wales** - Horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

5.0 References

5.1 OSHA 29 CFR 1926.650-652, Subpart P - Excavations

5.2 Franklin Mill, Confined Space Entry Procedure

5.3 Franklin Mill, Barricade Procedure

6.0 Procedure

6.1 Initial Procedures

6.1.1 The location of all utility installations that may be encountered during an excavation shall be determined prior to commencing work by a competent person. The appropriate area owner, fire mechanics, engineering department, etc., shall be contacted prior to the excavation activity and requested to determine the exact location of all installations such as fire lines, piping, conduit, etc. If the exact location cannot be determined, the excavation may proceed provided that extreme caution is used while opening the excavation.

6.1.2 A daily pre excavation safety briefing shall be conducted by the jobsite supervisor for all people directly involved in the excavation to discuss any and all procedures and potential hazards associated with the excavation work. These meetings shall be documented and forwarded to the Franklin Mill Loss Prevention Department upon completion of the work.

6.2 General Rules

6.2.1 Access/egress-approved stairways, ladders or ramps shall be provided for access/egress in excavations that are 4 feet or more in depth and so located that an employee will not be required to travel laterally more than 25 feet, from any point within the excavation, for a safe means of egress. In extremely large excavations where it is not practical to provide a stairway, ladder, or ramp every 25 feet, they shall be placed in locations of easy access and shall provide a safe means of egress. All stairways and ramps shall be equipped with standard handrails and toeboards where applicable.

6.2.2 Ladders - All ladders shall extend a minimum of three feet above the surface and shall be secured by tying off or by an employee holding the ladder.

6.2.3 Ramps - All structural ramps used for access/egress of employees and/or equipment shall be designed by a qualified person and inspected by the Competent Person prior to use. The structural members of the ramp shall be of uniform thickness and connected to prevent displacement. Also, all ramps shall be free from tripping hazards and the surface treated to prevent slipping.

6.2.4 Stairs, ladders, and ramps shall meet applicable OSHA regulations for design, construction, and installation.

6.3 Hazards from Falling Objects

6.3.1 All surface items located adjacent to the excavation that may readily fall shall be removed to a safe location a minimum of 6 feet from the trench or securely supported as necessary.

6.3.2 At no time shall employees be permitted underneath or adjacent to loads handled by equipment. Operators may remain in the cabs of their vehicles during loading or unloading if the vehicles are equipped to provide adequate overhead protection.

6.3.3 Excavated or other loose materials located on the excavation face or surface shall be removed, secured with retaining devices, or by other acceptable means, to prevent the materials from falling or sliding into the excavation. Surface materials, such as excavated soil, shall be kept at least two feet from each edge of the excavation or adequate retaining devices used.

6.3.4 At no time shall employees be permitted to work on the faces of sloped or benched excavations above other employees.

6.4 Warning Systems

6.4.1 Employees working in mill areas that may contain vehicular traffic shall wear warning vests marked with high visibility material.

6.4.2 All mobile excavation equipment must have electronic audible warning systems, including a functional horn for forward travel and a back up alarm for reverse travel, to alert people of their location. Also, when this equipment is operated adjacent to an excavation, warning systems such as barricades, stop logs, or hand signals must be used.

6.5 Fall Protection

6.5.1 Standard walkways, with guardrails and toeboards, shall be provided and used where employees are required to cross over excavations.

6.5.2 All excavation areas must have the entire perimeter barricaded in accordance with the current International Paper - Franklin Mill Barricade procedure. Excavations that have accumulated water or are in high traffic areas shall be protected by substantial wood or metal barricades in addition to the tape and tags. There shall be no openings left in the barricade in which a person could enter.

6.6 Water Accumulation

6.6.1 Employees shall not work in hazardous excavations in which there is accumulated water or water is accumulating unless there are adequate support systems in place to prevent cave ins and

there is an adequate water removal system in place that can control the amount of accumulating water. The Competent Person must monitor these systems to ensure proper operation.

6.6.2 When excavations change or prevent the natural drainage of surface water, suitable means must be provided to prevent the water from entering the excavation or accumulating adjacent to the excavation.

6.7 Safeguards

6.7.1 When excavations may affect the stability of adjacent structures, support systems (underpinning, bracing, etc.) must be provided to ensure the stability of the structure and protect the employees working in the excavation. The support system shall be designed by a professional engineer.

6.7.2 Excavations below the level of the base or footing of a foundation or retaining wall shall not be permitted unless a support system designed by a registered professional engineer is installed or a registered professional engineer determines that the excavation will not endanger the stability of the structure or expose the employees to hazards.

6.7.3 When approaching the estimated location of underground installations the exact location shall be determined by safe and acceptable means such as removing material with a shovel. Also, all underground installations shall be protected or removed as necessary to safeguard employees.

6.8 Inspections

6.8.1 Inspections of the excavation, all related work areas, and all protective systems and equipment shall be conducted by the Competent Person on a daily basis, prior to the start of work, as needed throughout the shift, and after any hazard increasing occurrence such as a rainstorm.

6.8.2 If the Competent Person finds evidence of hazardous conditions, all employees at risk of injury must be immediately removed from the excavation until all necessary precautions have been taken and the Competent Person inspects the area and authorizes the work to continue.

6.9 Hazardous Atmospheres

6.9.1 Excavations/Trenches four feet or greater in depth, regardless of length or width, are considered confined spaces and therefore all Confined Space Entry Procedures apply. Prior to entry all four pages of the Confined Space permit must be completed.

Any exceptions must be approved by the International Paper - Franklin Mill Loss Prevention Department.

6.10 Protective Systems

6.10.1 Every excavation where a hazard exists, such as the potential for cave ins, or those four feet or greater in depth, must have an adequate protective system to prevent cave ins and protect every employee in the excavation. Protective systems shall be capable of withstanding all loads that could reasonably be expected to be applied or transmitted to the system.

6.11 Soil Classification

6.11.1 The Competent Person must perform one visual and one manual inspection of soil samples from the excavation for a soil classification. The soil must then be classified as Type A, B, C, or stable

rock. A soil classification is not required if all protective systems conform to the requirements of Type C soil. Type C soil shall be assumed as the common types at the Franklin Complex.

6.11.2 Definitions of the soil classifications and approved inspection methods are outlined in 29 CFR 1926.652, Appendix A to Subpart P. All soil and rock deposits shall be classified in accordance with 29 CFR 1926.652, Appendix A to Subpart P Sloping and Benching

6.11.3 Excavations shall be sloped or benched in accordance with the following table:

SOIL TYPE MAXIMUM ALLOWABLE SLOPES (H:V)

Type A 3/4 : 1 (53 Degrees)

Type B 1 : 1 (45 Degrees)

Type C 1.5 : 1 (34 Degrees)

6.11.3.1 The numbers shown in parentheses next to the maximum allowable slopes are angles expressed in degrees from the horizontal.

6.11.3.2 Sloping or benching for excavations greater than 20 feet in depth must be designed by a registered professional engineer.

6.11.3.3 The unsupported vertical sides of all benched excavations shall be a maximum of 3.5 feet high with the overall benching system conforming to the maximum allowable slope for the specific type of soil.

6.11.3.4 When two or more soil types are classified from the same excavation the weakest classification type (more stringent requirements) shall be used for the entire excavation.

6.12 Other Protective Systems

6.12.1 Support, shield, or other protective systems can be designed in accordance with the conditions and requirements of the following appendices to 29 CFR 1926.652:

Appendix A - Classification

Appendix C - Timber Shoring

Appendix D - Aluminum Hydraulic Shoring

6.12.2 Protective systems may be designed by using manufacturer's tabulated data. The systems must be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer without deviation.

6.12.3 Protective systems shall be designed by a registered professional engineer registered in the state of Virginia.

6.12.4 All designs shall be in written form, signed by the registered professional engineer, and a copy of the design maintained at the job site for the duration of the excavation.

6.13 Materials and Equipment

6.13.1 All materials and equipment used for protective systems must be free from damage or defects and maintained in a manner consistent with the manufacturer's recommendations and in a manner that will prevent employee exposure to hazards.

6.13.2 The Competent Person shall evaluate all materials and equipment used for protective systems on a daily basis and have any materials or equipment that are not suitable for continued use immediately removed from service and replaced with suitable materials before continuing work.

6.14 Installation and Removal of Supports

6.14.1 All members of a support system shall be securely fastened together and installed so as not to subject the members to loads exceeding their design or subject employees to hazards.

6.14.2 Removal of supports shall begin, and progress from the bottom of the excavation and all precautions shall be taken to ensure employee safety during the removal of supports. Backfilling of the excavation shall progress with the removal of the support system.

6.15 Shield Systems

6.15.1 Shield systems shall be installed to restrict hazardous movement and shall not be subjected to loads exceeding the design of the system.

6.15.2 Employees shall not be allowed in the shields when they are being installed, removed, or moved, and means shall be provided to protect employees when entering or exiting the shielded areas. Note: Materials shall not be excavated greater than 1.5 feet below the bottom edge of a support or shield system.

6.16 Timber Shoring

6.16.1 All timber shoring systems shall be designed in accordance with the conditions and requirements of 29 CFR 1926.652, Appendix C to Subpart P: Timber Shoring.

6.16.2 The tables provided in 29 CFR 1926.652, Appendix C to Subpart P shall be used to determine the minimum size of cross braces, wales, and uprights with respect to the depth of the trench.

6.17 Aluminum Hydraulic Shoring

6.17.1 All aluminum hydraulic shoring systems shall be designed in accordance with the conditions and requirements of 29 CFR 1926.652 Appendix D to Subpart P Aluminum Hydraulic Shoring.

6.17.2 The tables provided in 29 CFR 1926.652, Appendix D to Subpart P shall be used to determine the specifications for the hydraulic cylinders, wales, and uprights with respect to the depth of the trench.

6.18 Alternatives to Timber or Aluminum Hydraulic Shoring

The following are alternatives to timber or aluminum which may be identified by the competent person or registered professional engineer:

6.18.1 Pneumatic/Hydraulic Shoring

6.18.2 Trench Jacks (screw jacks)

6.18.3 Trench Shields (trench boxes)

7.0 Documentation

The competent person shall be responsible for forwarding all documents pertaining to the excavation work to the Loss Prevention Department upon completion of the work. Such documents may include but are not limited to confined space entry permits, opening dangerous systems permits, safety meeting minutes, and excavation audit reports.