CERTIFICATION

Certified Engineers Statement : This herby certifies that the TITAN Three Lite has been designed in accordinance with the requirements and guidlines and promulgated by the Occupational Safety and Health Administration (OSHA) [Construction Standard for Excavations [29 CFR Part 1926.650 - .652] Subpart P].

TRENCH SHIELD #11

-Michael J. Vanetta, P.E.
Ohio Registration # E-46015 (Vanetta Engineering)

Manufacturer's Statement : Kundel Industries Inc. hereby certifies all materials and processes involved in every stage of production of each and every TITAN Three Lite Trench Box strictly and stringently follow every material, production, and design specification put forth by Vanetta Engineering (Michael Vanetta, P.E.) to ensure that each TITAN Three Lite Trench Box is in full accordinance with the requirements and guidelines promulgated by the Occupational Safety and Health Administration.

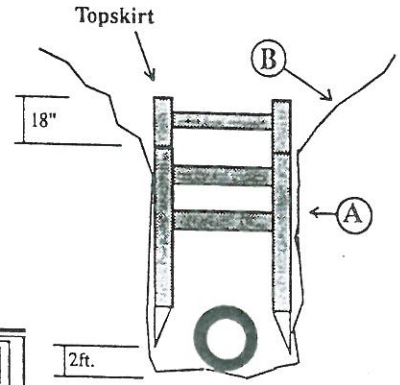
-Robert Kundel, Pres. KUNDEL Ind., Inc.

SERIAL NO. : 1605

BOX DIMENSIONS : 6' X 14'

TITAN 3 LITE
Manufacturer's Recommendations for Use

1. The trench box must fit snugly into the trench. Example "A".
2. Protection must be provided against any spoil falling into the trench box, Example "B".
3. O.S.H.A. Regulations are to be observed at all times.
4. All other applicable regulations are to be observed. (city,state,etc...)
5. Designed working load may not be exceeded.
6. Observe Tabulated Data soil description and slope figures for determinations of adjusted depth.
7. A damaged box or components may not be used.
8. The trench boxes may only be used by a competent person as outlined in O.S.H.A.'s Trench Safety Rules. (Ex. The Final Rule)
9. To determine the side wall pressure, use the soil type chart and pressure/depth graph.*
10. Repairs are to be made only by a KUNDEL Ind. representative.
11. All components must be completely and properly assembled.
12. Please note that all tables and notes are for illustrative puposes only. The tables are based upon static load conditions and assumed soil pressures. Safe depths can vary from design assumptions. Please refer to all manufacturer's usage instructions, consult a qualified engineer, or contact KUNDEL Ind. technical support line.
13. It is the contractor's responsibility to maintain the working area within the Trench System free of water for hydrostatic and sub soil conditions.
14. KUNDEL Trench products are designed and built to function as soil support systems and to protect workers.



Example type "B" Soil

Box Dimensions	6'X14'
Serial Number	1605
Lbs. per sq.ft.	600
w/ 7 pipe sys.	N/A
w/ clear to rear	N/A
"A" Soil	30
w/ 7 pipe sys.	N/A
w/ clear to rear	N/A
"B" Soil	18
w/ 7 pipe sys.	N/A
w/ clear to rear	N/A
"C" Soil	10
w/ 7 pipe sys.	N/A
w/ clear to rear	N/A
Muck	7
w/ 7 pipe sys.	N/A
w/ clear to rear	N/A

SOIL DESCRIPTIONS

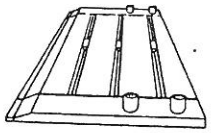
Type A SOIL means:
Cohesive soils with an unconfirmed compressive strength of 1.5 ton per sq. ft.(tsf) (144kPa) or greater. Examples of cohesive soils are: clay,silty clay, sandy clay, clay loam and, in some cases, silty clay loam, sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is type A if:
(i) The soil is fissured; or
(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or
(iii) The soil has been previously disturbed; or
(iv) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or
(v) The material is subject to other factors that would require it to be classified as a less stable material.
TYPE B means:
(i) Cohesive soil with an unconfirmed compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa) ; or
(ii) Granular cohesionless solid including: angular gravel (similar to crushed rock), silt, silt loam and sandy loam and, in some cases,silty clay loam and sandy clay loam.
(iii) Previously disturbed soils except those which would otherwise be classified as Type "C" Soil.
(iv) Soil that meets unconfirmed compressive strength or cementation requirements for Type "A", but is fissured or subject to vibration; or
(v) Dry rock that is not stable; or
(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4h kPa), but only if the material would otherwise be classified as Type "B".
TYPE C means:
(i) Cohesive soil with an unconfirmed compressive strength of 0.5 tsf (48 kPa) or less; or
(ii) Granular soils including gravel, sand, and loamy sand; or
(iii) Submerged soil or soil that water is freely seeping; or
(iv) Submerged rock that is not stable; or
(v) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.
MUCK: The "MUCK" soil designation found on the chart on other KUNDEL literature is intended to describe those special soil situations where the pressure is higher than the standardized "C" designation. It is not an exact or official soil designation with exact or specific parameters! It is present only because there are situations where the pressure is higher than "C", and to provide a guide line for using KUNDEL Trench Products in those special situations.

Kundel Industries *Basic* Trench Usage Instructions

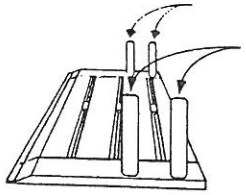
The following illustrations are only guidelines, that is, intended to provide an outline for the use of Kundel trench products. They will not necessarily be applicable to all situations, and the illustrations themselves may not exactly reflect the dimensions or all aspects (options, design differences, etc.) of your particular system.

Assembly...

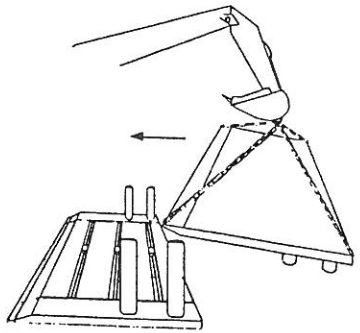
Step 1. Lay single side panel on ground with collar sockets (cuffs) facing up.



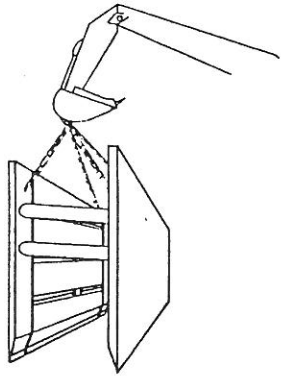
Step 2. Place spreaders/struts into the appropriate collars and secure with the appropriate pins, etc.



Step 3. Lower and position second sidewall over the first and secure appropriately.



Step 4. Stand trench box into the upright position and prepare for installation.



TITAN THREE LITE

ADJUSTED SLOPE DATA

Formula: Adj. Slope Depth+Spoil Height*+Straight Wall Height = **Total Allowable Depth**

* The N. B. S. recommends that a **2' surcharge** be added to your depth computations (to account for added weight and pressure) when **any amount** of spoil is present. When no spoil is present, no surcharge should be added.

Formula: (sh) × f = **Adjusted Slope Depth** (height reduction for depth rating)

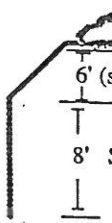
Where sh = slope height

f = height reduction factor for depth rating based on slope

O. S. H. A. Allowable Slopes with Corresponding Reduction Factors

O. S. H. A. Allowable Slopes			Factor (f)
A Soil	3/4 : 1	53°	.63
B Soil	1 : 1	45°	.50
C Soil	1 1/2 : 1	34°	.25

Examples



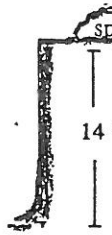
spoil = 2' surcharge = 2 Feet

6' (sh) 1 : 1 Slope 6 x .50 = Adjusted Slope Depth 3 Feet

8' Straight Wall = + 8 Feet

13 Feet

Total Adjusted Depth



spoil = 2' surcharge = 2 Feet

14 ' Straight Wall = + 14 Feet

16 Feet

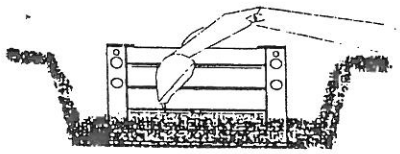
Total Adjusted Depth

*Note: Both slope examples use situations where *spoil is present*. However, as stated above, if *no spoil is present* in your situation, do not add 2' surcharge.

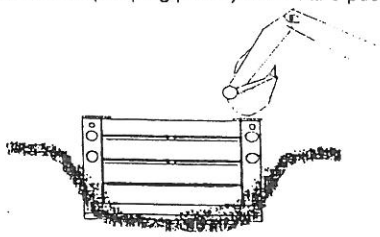
Kundel Industries *Basic* Trench Usage Instructions

Basic usage of a trench box in *un*stable soils...

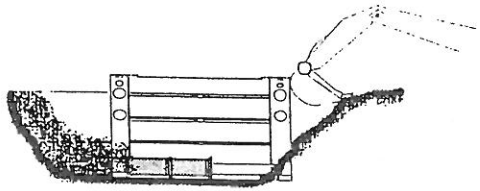
↱ **Step 1.** Excavate until soil begins to crumble beyond your desired trench width. Then place shield on line of excavation. (cut-away side view)



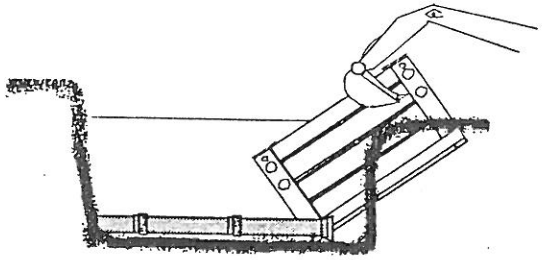
↱ **Step 2.** Press down on corners (tamping plates) of box and push down to grade.



↱ **Step 3.** Pull box forward (*towards the right in illustration*) and up on the appropriate angle.



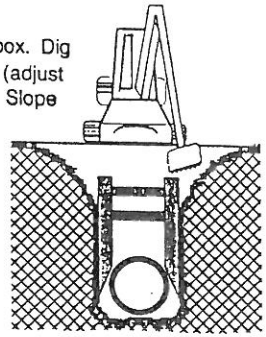
↱ **Step 4.** Excavate soil within the trench box and repeat the process.



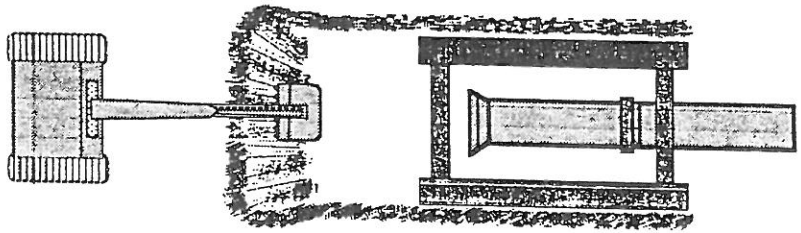
Kundel Industries *Basic* Trench Usage Instructions

Basic usage of a trench box in stable soils...

↱ **Step 1.** Excavate to grade just slightly wider than the trench box. Dig walls vertically to a minimum of 18" below the top of the shield (adjust accordingly for use with top skirt or other special equipment). Slope soil above shield according to O.S.H.A. regulations for the soil you're working in. Install shield into trench. Again, *always* adjust your procedures to the particular trench system that you're working with and the particular soil situations you encounter to conform to O.S.H.A.'s safety regulations. Also, **we always** recommend consulting with a qualified engineer and/or contacting Kundel Industries' Tech Support for help.



↱ **Step 2.** Excavate area in front of the trench shield. The illustration below shows a top view, and the "front" would be on the left.



↱ **Step 3.** Pull shield forward by front top spreader pipe or with the appropriate lugs or eyes. The spreader(s) should not be used to drag the box forward when the soil pressure is severe enough to cause the spreader to deflect or otherwise damage its integrity. *(where appropriate, also see "Leap Frogging" elsewhere in the literature)*