CAPAC

Jornada Tecnológica de la Construcción

Construcción de Muros Pantalla

Bauer Fundaciones Panama, S.A.

Baltazar Ochoa / Hans Schwarzweller

Panamá, 17 de mayo de 2012

BAUER

Begeistert für Fortschritt

passion for progress

Bau | **Maschinen** | **Resources**

BAUER Group

The three segments

Construction

- Target ~ 40 % of total Group revenues
- Global provider for specialist foundation engineering and services in the field of infrastructure and engineering works
- Focus on complex, international projects

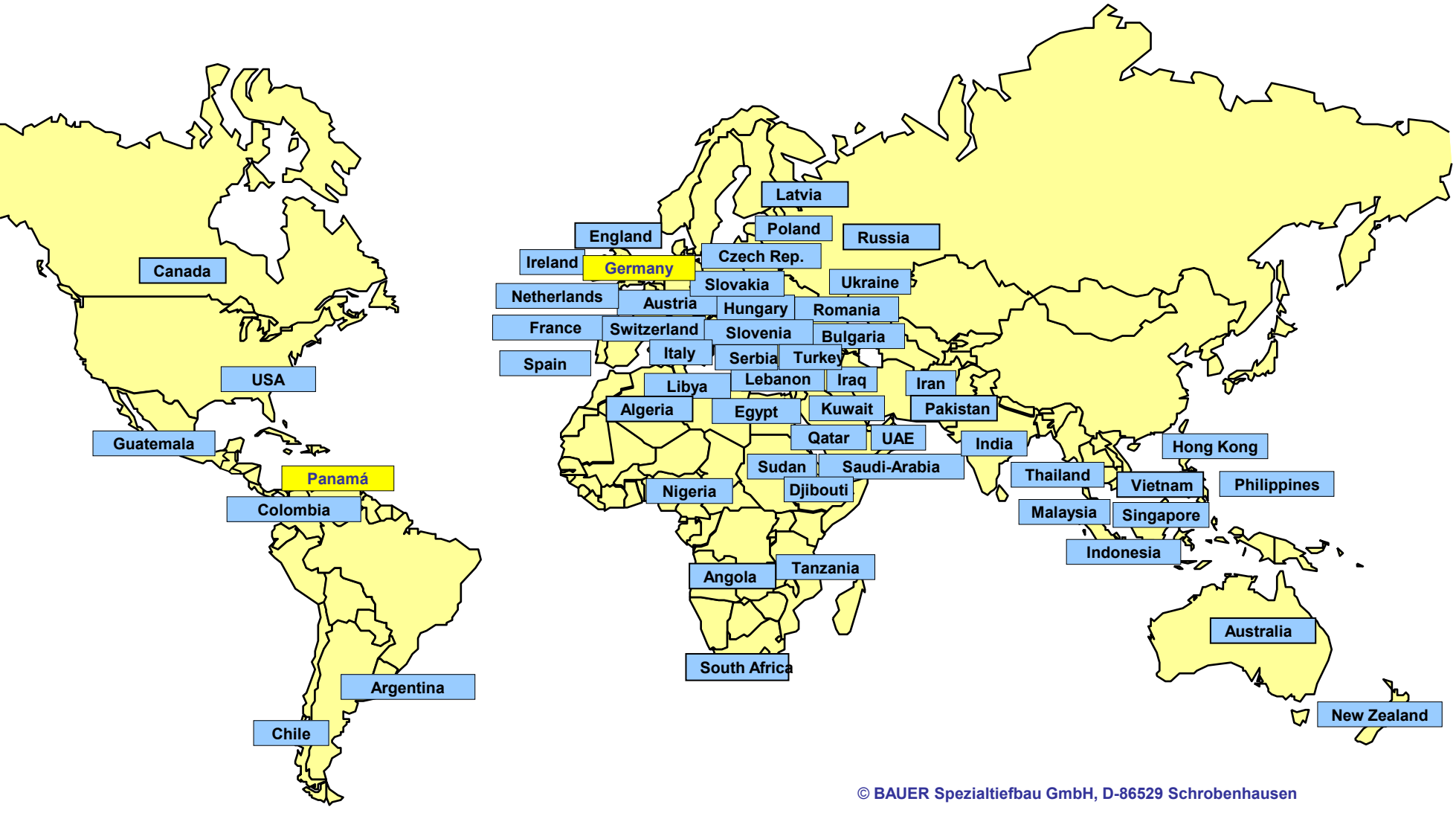
Resources

- Target ~ 20 % of total Group revenues
- Activities in the field of environmental services, mining, geothermal energy, well drilling and well engineering materials

Equipment

- Target ~ 40 % of total Group revenues
- Market leader in specialist foundation equipment
- New products for mining, deep drilling and offshore drilling
- 85 % of revenues from sales abroad
- Multi-branding strategy

SUBSIDIARIAS



BAUER FUNDACIONES PANAMA, S.A.

MURO PANTALLA

¿Qué es?

- Es un muro de concreto reforzado
- Construido en un zanja profunda sin apuntalamiento de las paredes gracias al uso de lodo de perforación.

Objetivos principales:

- Apoyo a cimentaciones
- Contención de cortes verticales en excavaciones

METODOS

Cuchara Bivalba

Hidrofresa

METODOS

Cuchara Bivalba:

Cable

Limitada por el peso de la cuchara

Grúa con winches caida libre

Penetración eficiente en suelo con uso de picas

Uso eficiente hasta 40m, se puede usar hasta 100 m

Hidráulica

Gran fuerza de cierre debido al uso del sistema hidráulico

Grúa con mangueras hidráulicas

Penetración eficiente en suelo duro con uso de picas

Uso eficiente hasta 40m, se puede usar hasta 80 m

METODOS

Hidrofresa

Picas SB
hasta 50 MPa

6-7 m3/hr

Picas cónica RSM
hasta 100 MPa

2.5 m3/hr

Rodillos (roller bits) HRC
> 100 MPa

< 1 m3/hr

Profundidades hasta 200 m y más

PROCEDIMIENTO CONSTRUCTIVO

Componentes:

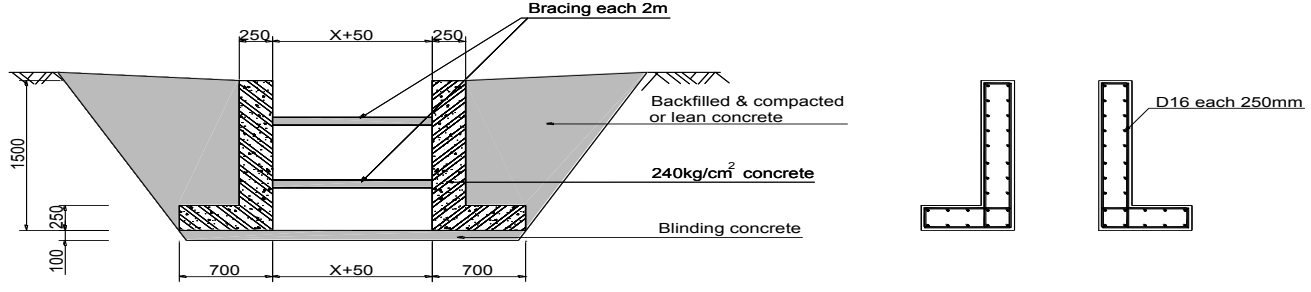
Muro Guía

Asegurar el alineamiento correcto del muro

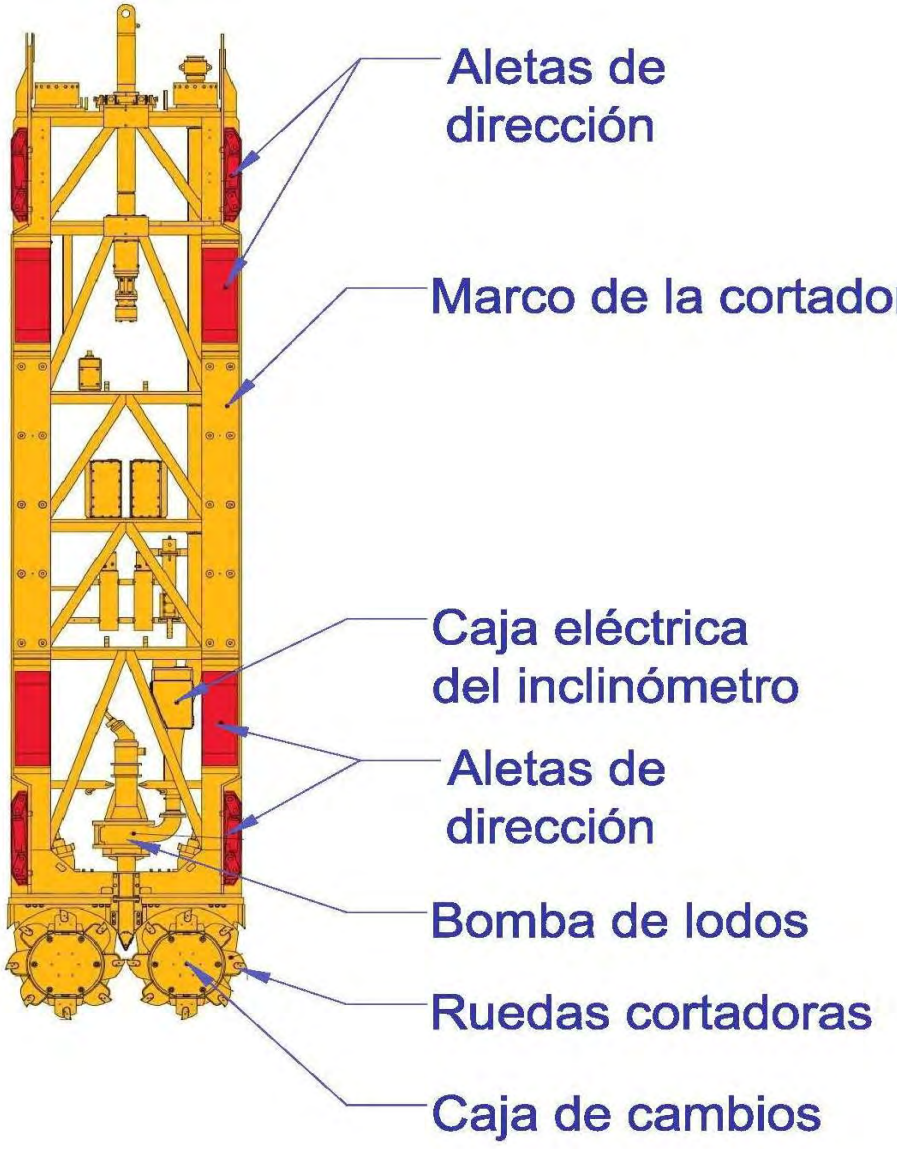
Protección contra inestabilidad de la superficie debido a la fluctuación del lodo de perforación

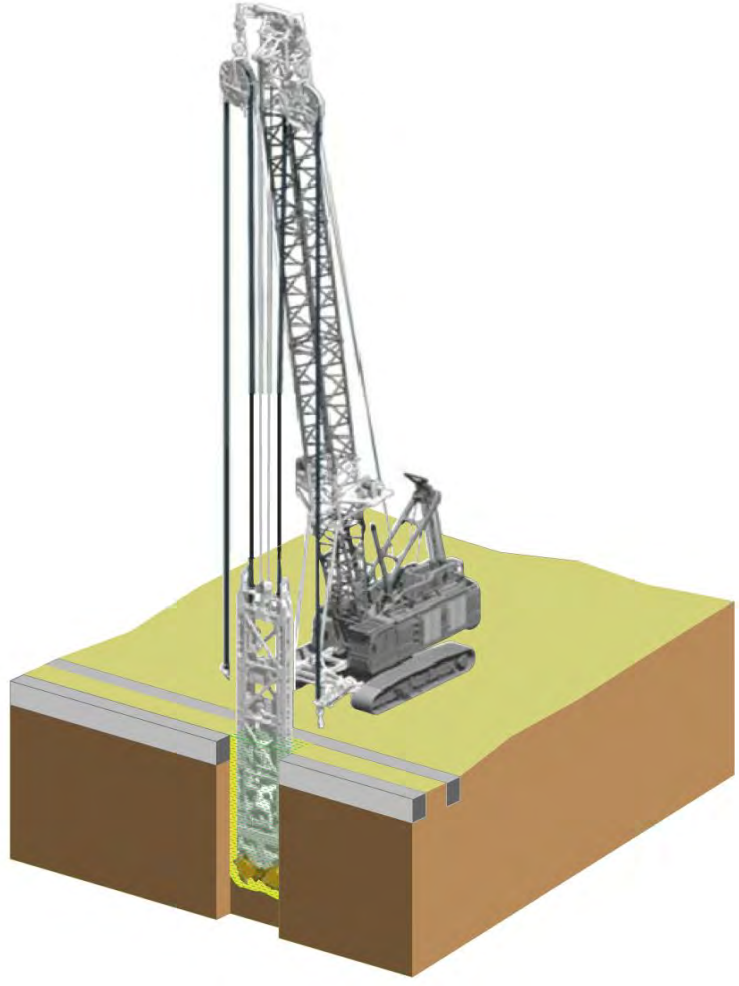
Soporte para la parte superior de la trinchera (influencia del peso de la maquinaria)

Apoyo para



PROCEDIMIENTO CONSTRUCTIVO

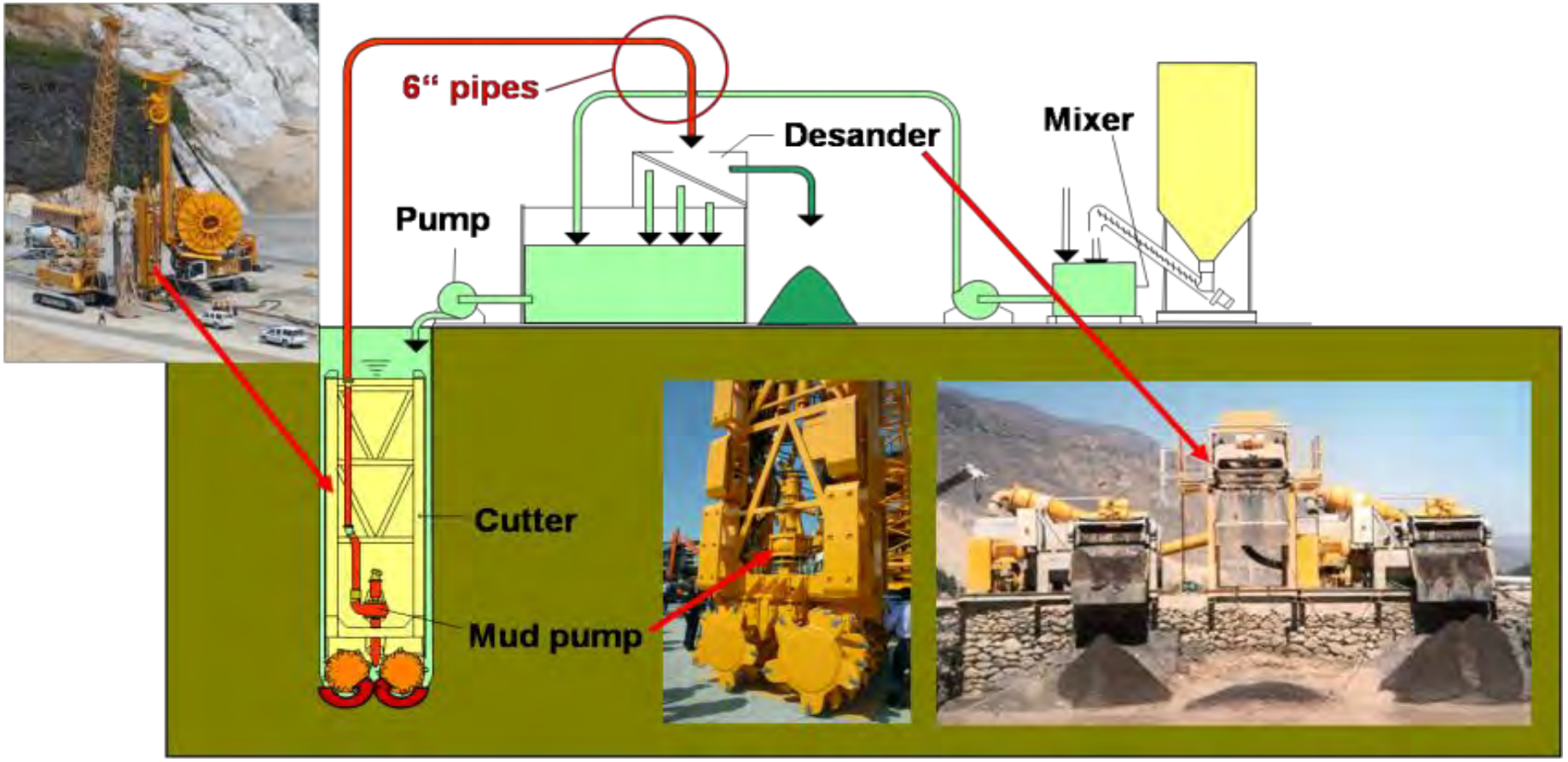




PROCEDIMIENTO CONSTRUCTIVO

PROCEDIMIENTO CONSTRUCTIVO

Instalación de Equipos

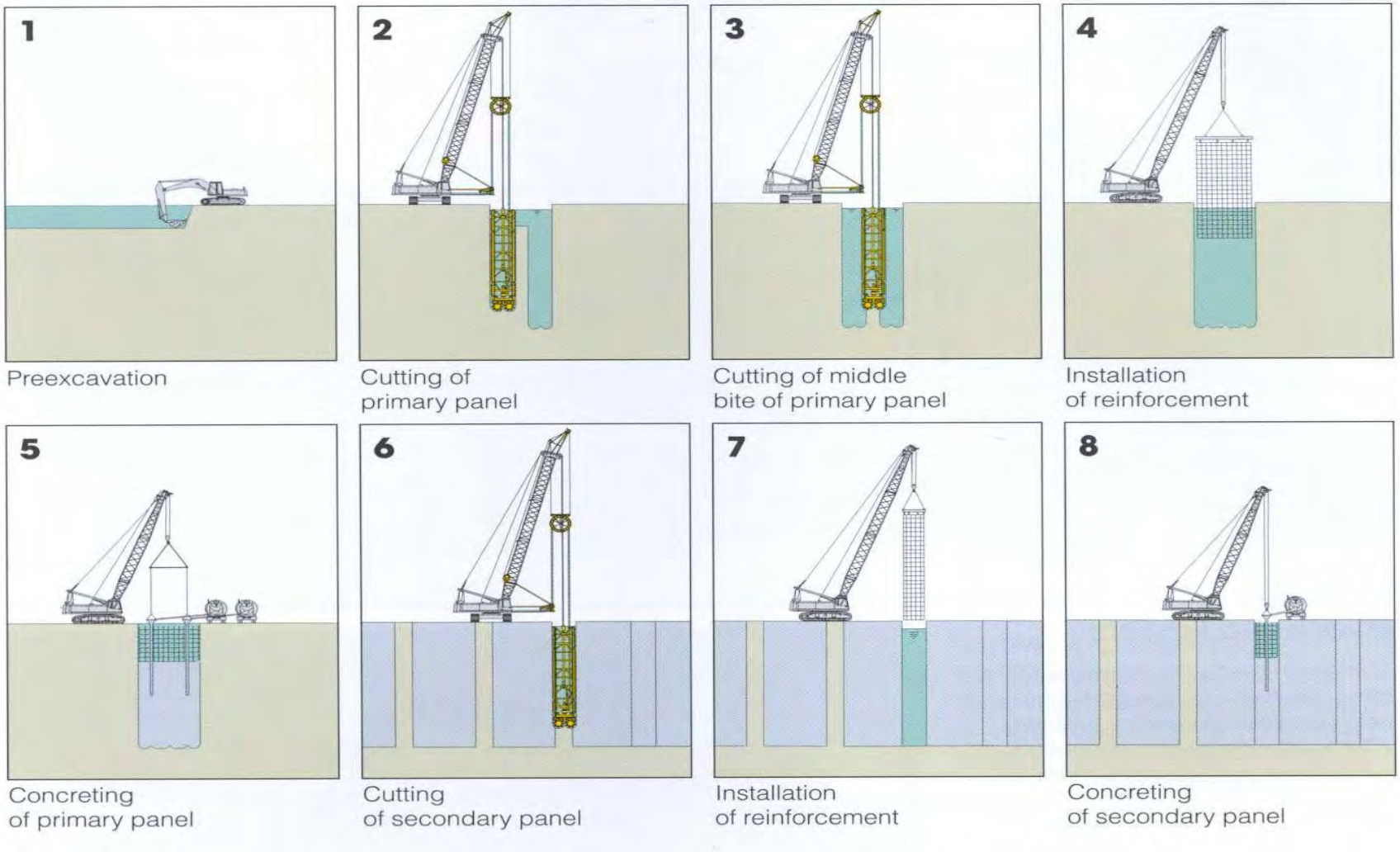


PROCEDIMIENTO CONSTRUCTIVO

Instalación de Equipos

PROCEDIMIENTO CONSTRUCTIVO

Working sequence in the cutting technique



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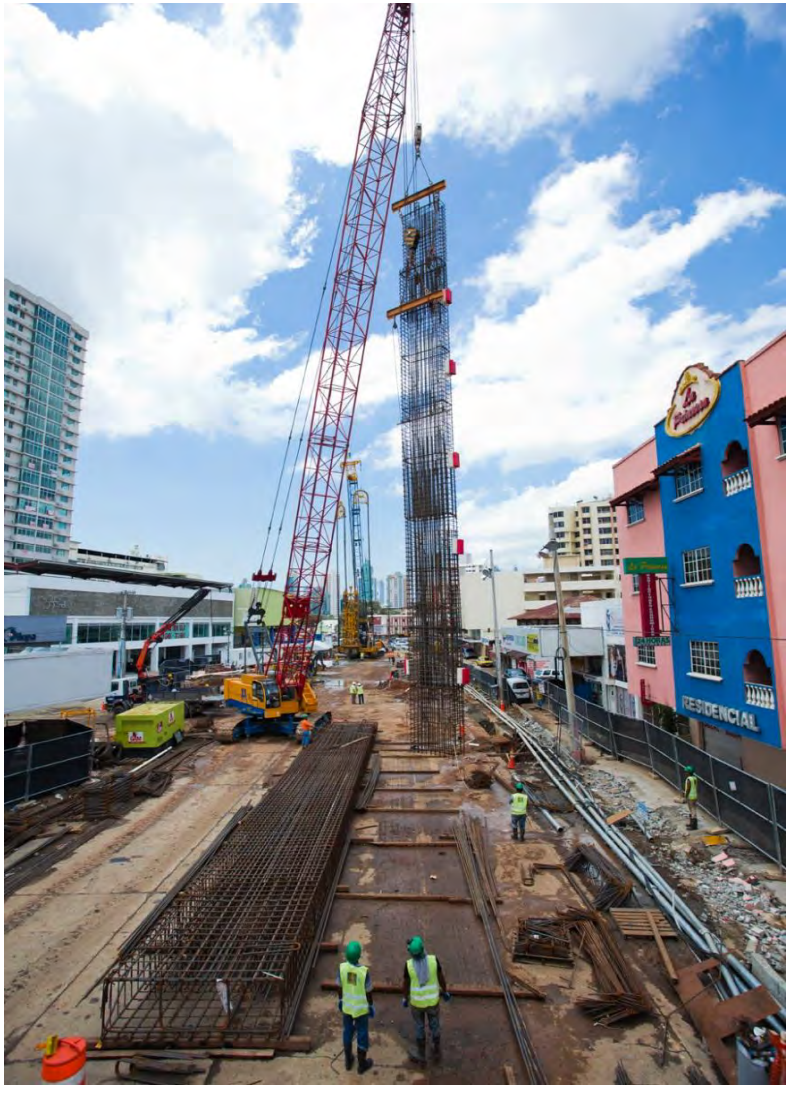

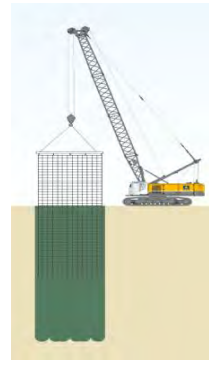

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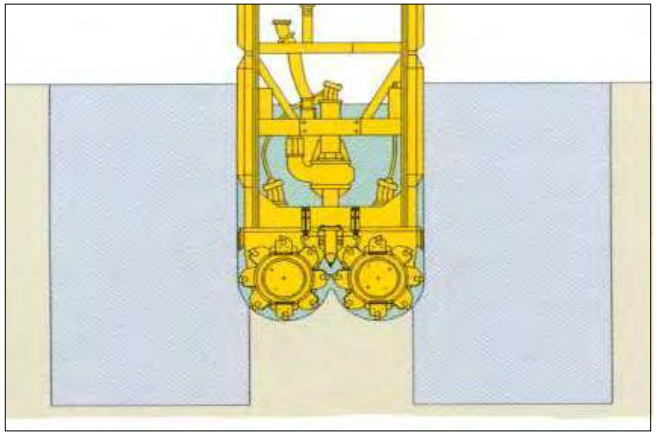
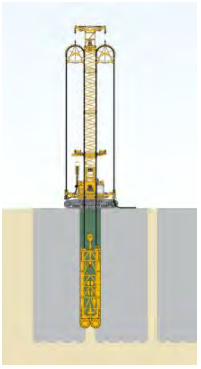
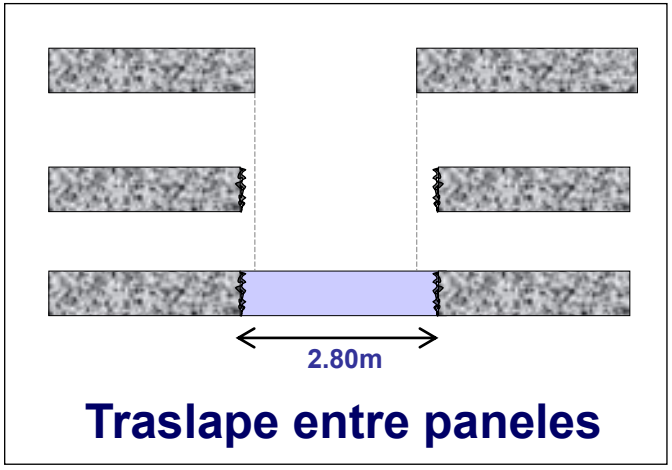






ASEGURAMIENTO CALIDAD

Concreto:

Asentamiento (slum) : app.7 - 8“

Fraguado (tiempo de transporte)

Velocidad de vaciado

Resistencia a la compresión

ASEGURAMIENTO CALIDAD

Acero:

Comprobación de dimensiones

Comprobación visual de traslapes

Rigidizadores

Separadores

ASEGURAMIENTO CALIDAD

Bentonita:

Viscosidad (Embudo de Marsh)

Densidad (Balanza)

Filtración (Filtro Prensa)

Contenido de Arena

Resistencia a cortante

PH

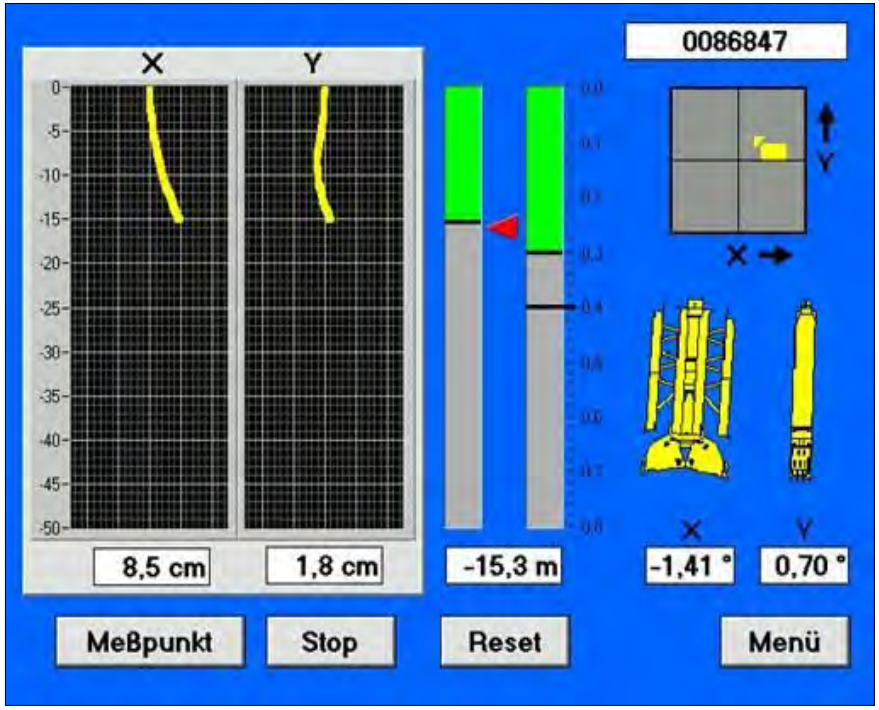
Temperatura

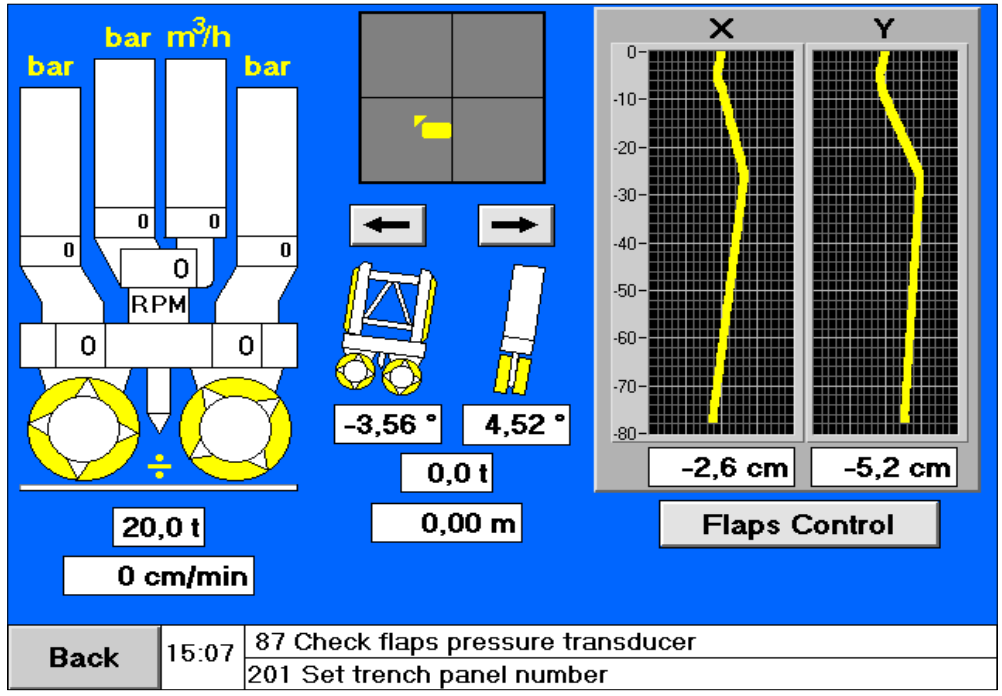
ASEGURAMIENTO CALIDAD

Verticalidad:

ASEGURAMIENTO CALIDAD

Verticalidad:





PROYECTOS

PROYECTOS

PROYECTOS

Concrete Cut-off Walls for Dams

Principles and Applications

Special Foundation Services For Dams Worldwide

1984


Brombach Main Dam, Germany


Rothsee Dam, Germany


New Waddell Dam, USA


Shwaib Dam, United Arab Emirates

1990


Kingsley Dam, USA


Shiokawa Dam, Japan


Wister Dam, USA

1994


Pleiwaichs Hydroelectric Weir Structure, Germany


Laakirchen, Austria


Meeke Cabin Dam, USA


Power Station Dam, Szechuan


Eastside Reservoir, USA


Al Hatta Dam, United Arab Emirates


Ahrental, Austria


Puclaro Dam, Chile

2000


Hodges Village Dam, USA


Diavik, Canada


Dhauliganga Dam, India


Borcka & Muratli Dams, Turkey


Naga Hamadi, Egypt

2004


Kebir Dam, Tunesia

2011


Peribonka Dam, Canada


Merowe Dam, Sudan


Wadi Dayqah Dam, Oman

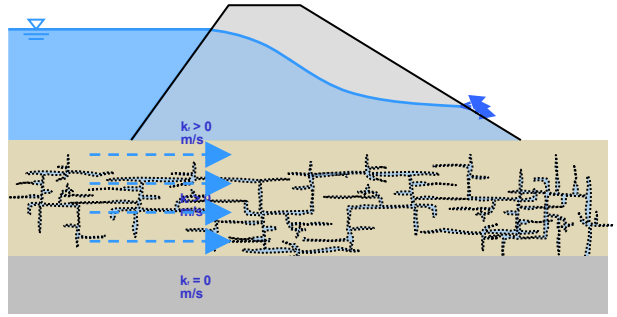

Hinze Dam, Australia

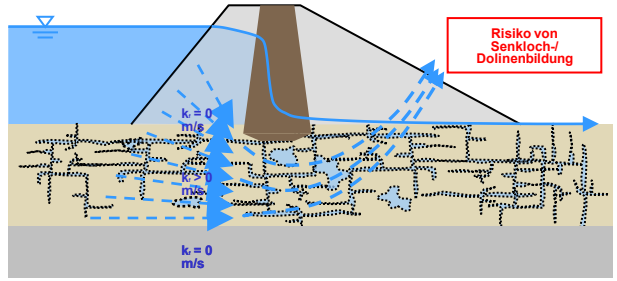

Herbert Hoover Dike, USA

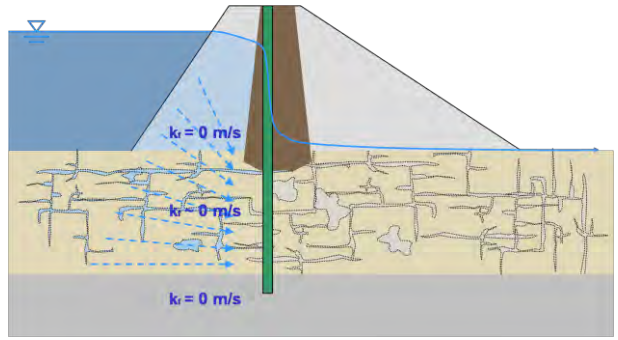
Special Foundation Services For Dams Worldwide – Executed projects

Customers‘ Requirement (Dam Operator)

Dam foundation without admissible leakage water







Customers‘ Requirement

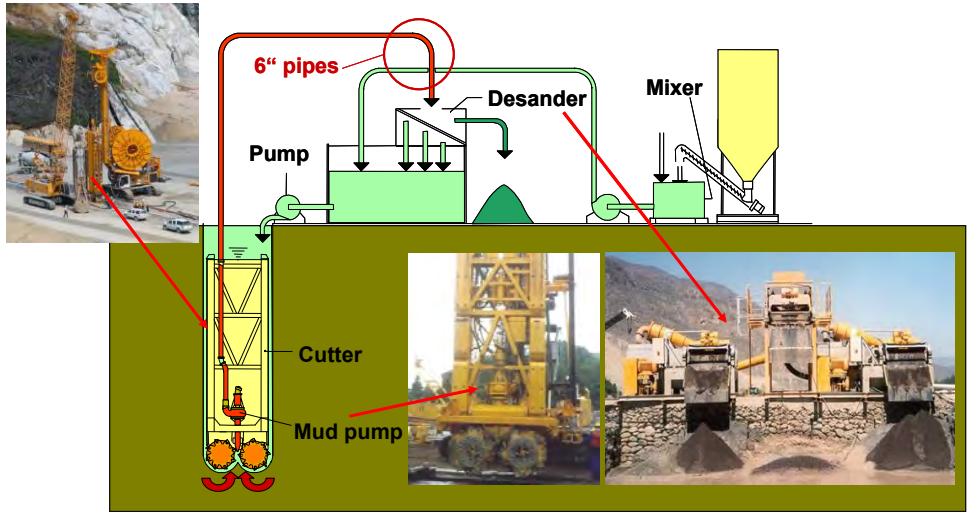
Dam foundation without admissible leakage water

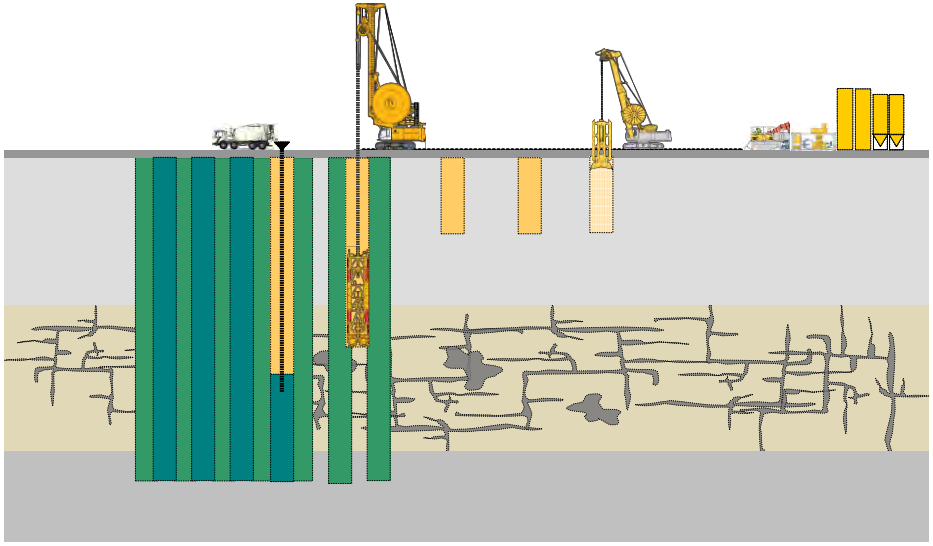
Two-phase Concrete Cut-off wall
The Main Equipment – Trench Cutter + Grab

Australia, Queensland – Hinze Dam Upgrade

Two-phase Cut-off wall

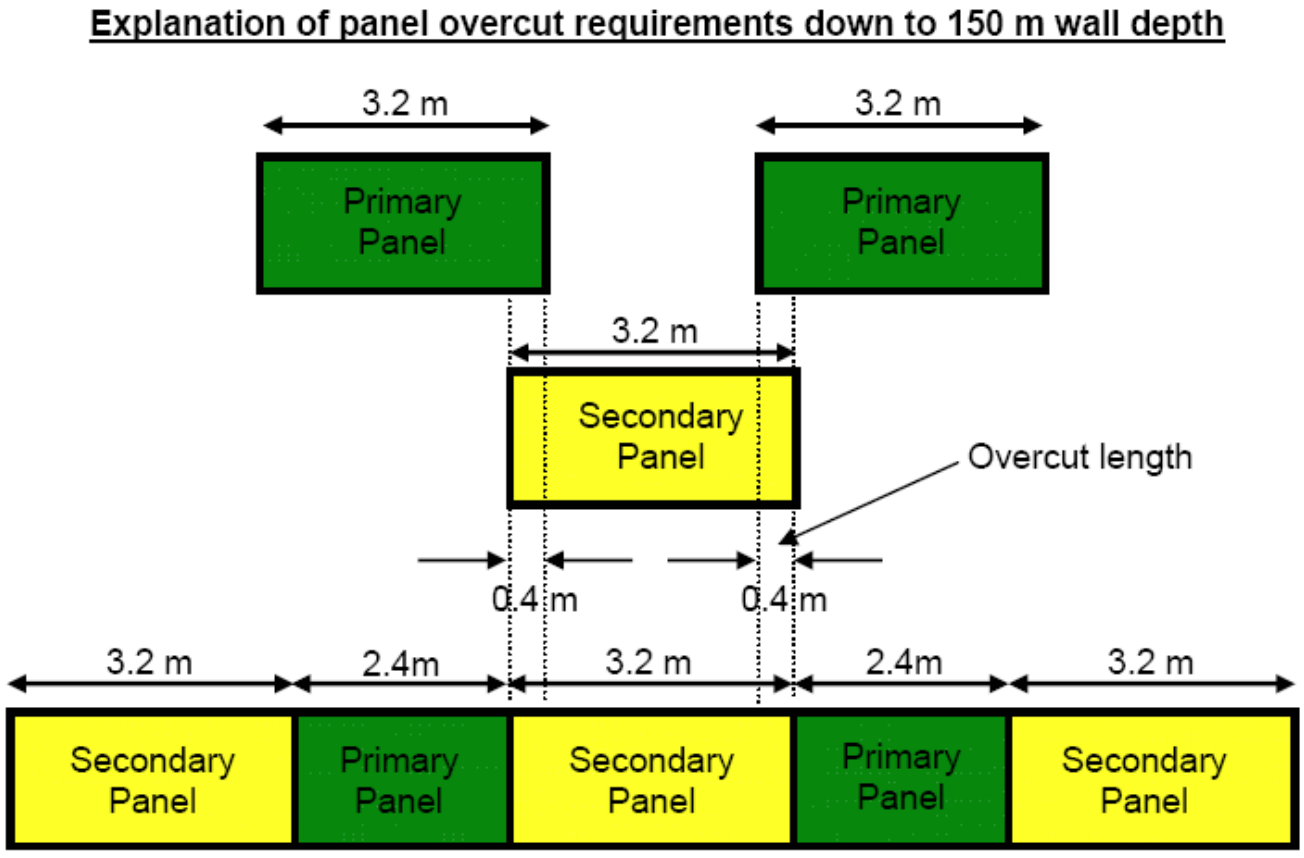
The Principle





Two-phase Cut-off wall

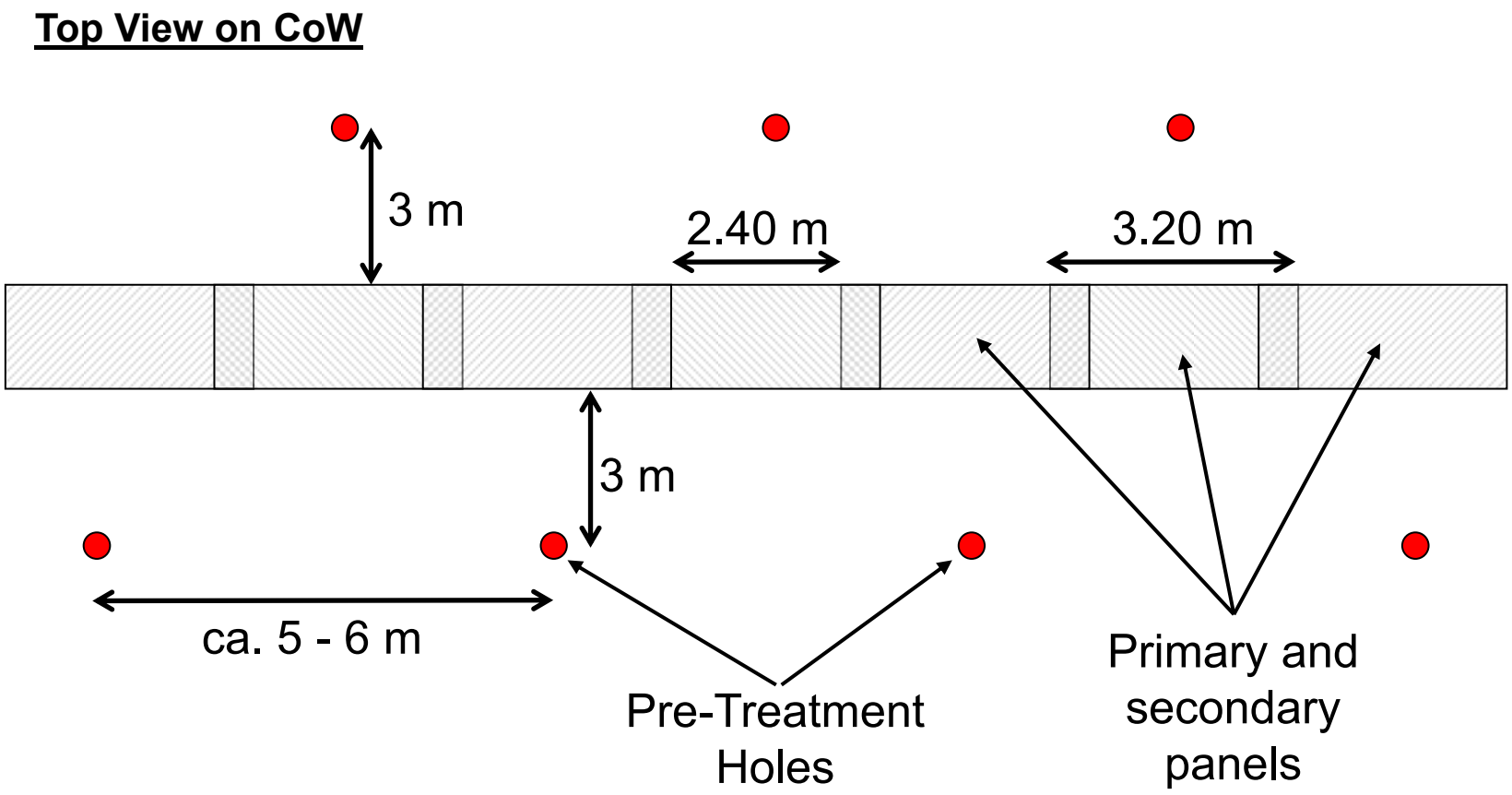
The Principle



Primary and Secondary Panel Layout

Two-phase Cut-off wall

Pre-treatment of the Rock formation next to the COW-line



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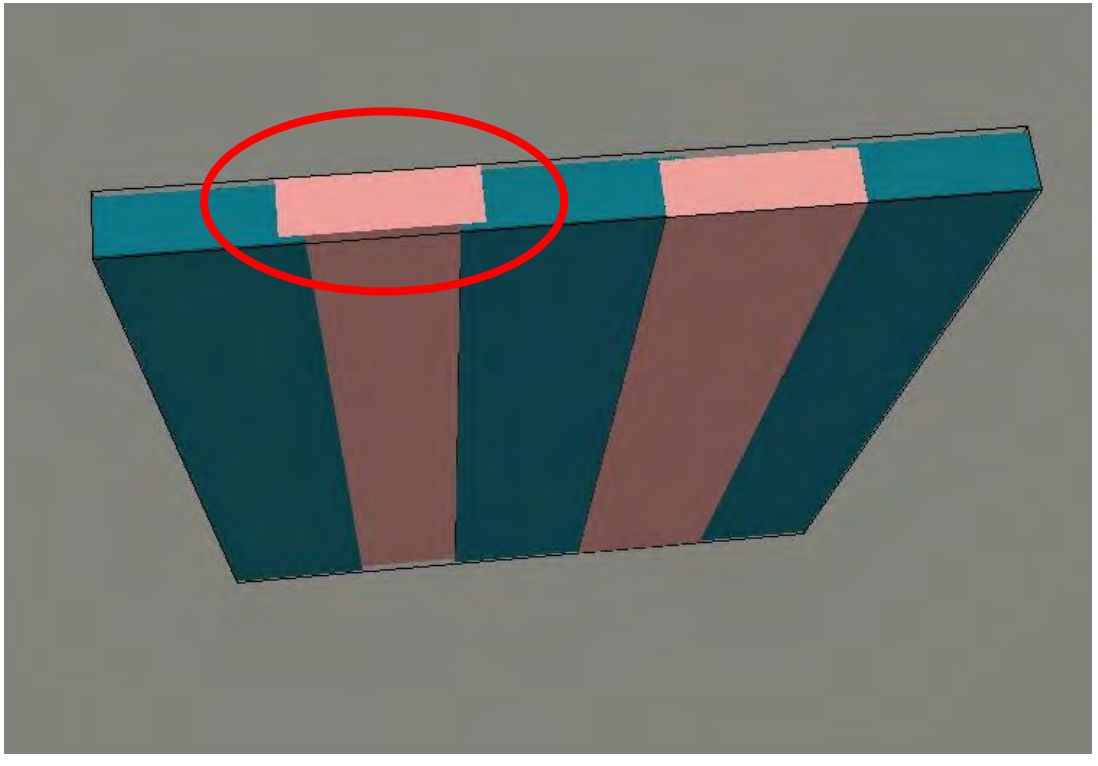
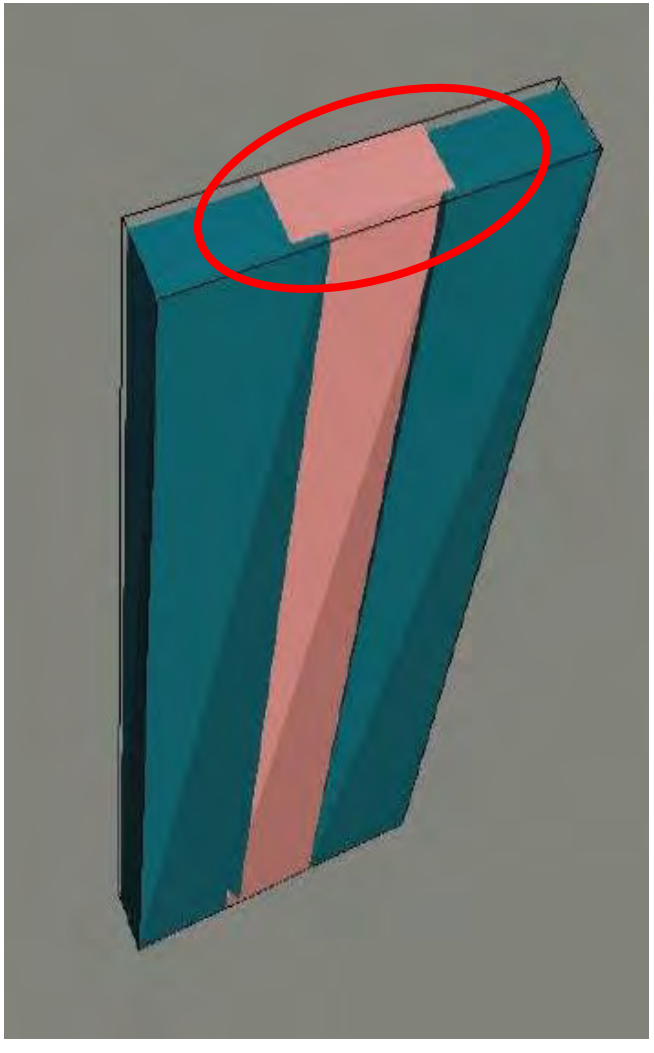
Two-phase Cut-off wall

Quality Assurance and Verification of the works

Cut-off Wall - A well defined barrier element





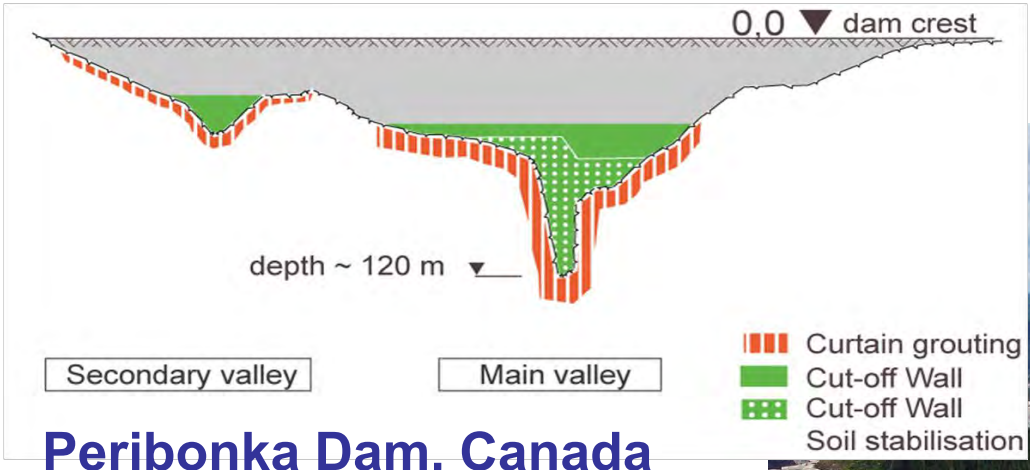
Pictures turned upside down for better visibility

Two-phase Cut-off wall

The Plastic concrete / The joints between the panels

Concrete dyed for better visibility

Plastic Concrete Diaphragm Walls for different Stages – Dam-construction Embankment Dam



Peribonka Dam, Canada

Cut-off Walls constructed with Trench Cutters

Project Examples - Peribonka HE Development, Canada 2006

Project Data:

Client:	Hydro Quebec
Purpose:	385 MW Hydroelectric Power Plant 2,2 TWh annually

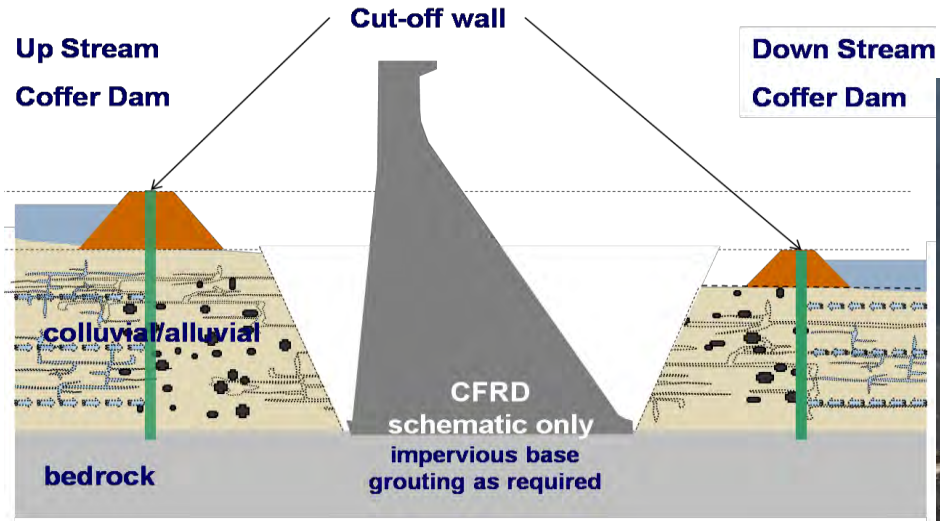
BAUER's Scope of Works Cut-off wall:

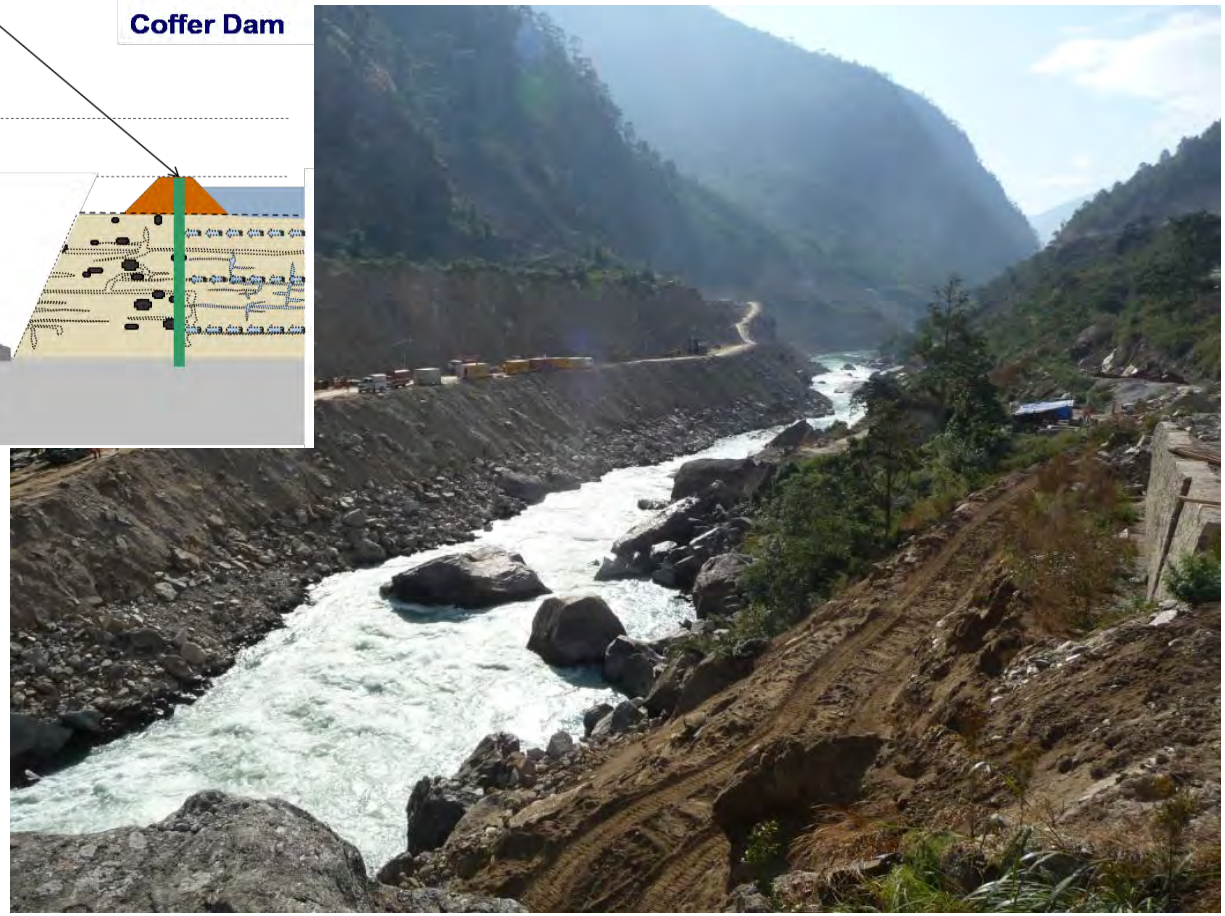
Drilling & Grouting:	Drilling	~ 13.000 lin m
	Injection	~ 5.500 to cement

Construction of 3 Cut-off / Diaphragm Walls:

Max depth:	116 m
Wall surface:	25.000m²
Thickness:	1200 and 1500 mm
Soil:	Sand, Cobbles and Boulders, rock socket in Granite >200MPa
Techniques:	Cutter with round shank chisels and roller bits, plus Hydraulic Diaphragm Wall Grab and Chisel

Plastic Concrete Diaphragm Walls for different Stages – Dam-Construction – Concrete Dam





Punatsangchhu-1 Dam, Bhutan

Cut-off Walls with Trench Cutters

Project in execution – Punatsangchhu-1 HEPP, Bhutan 2012

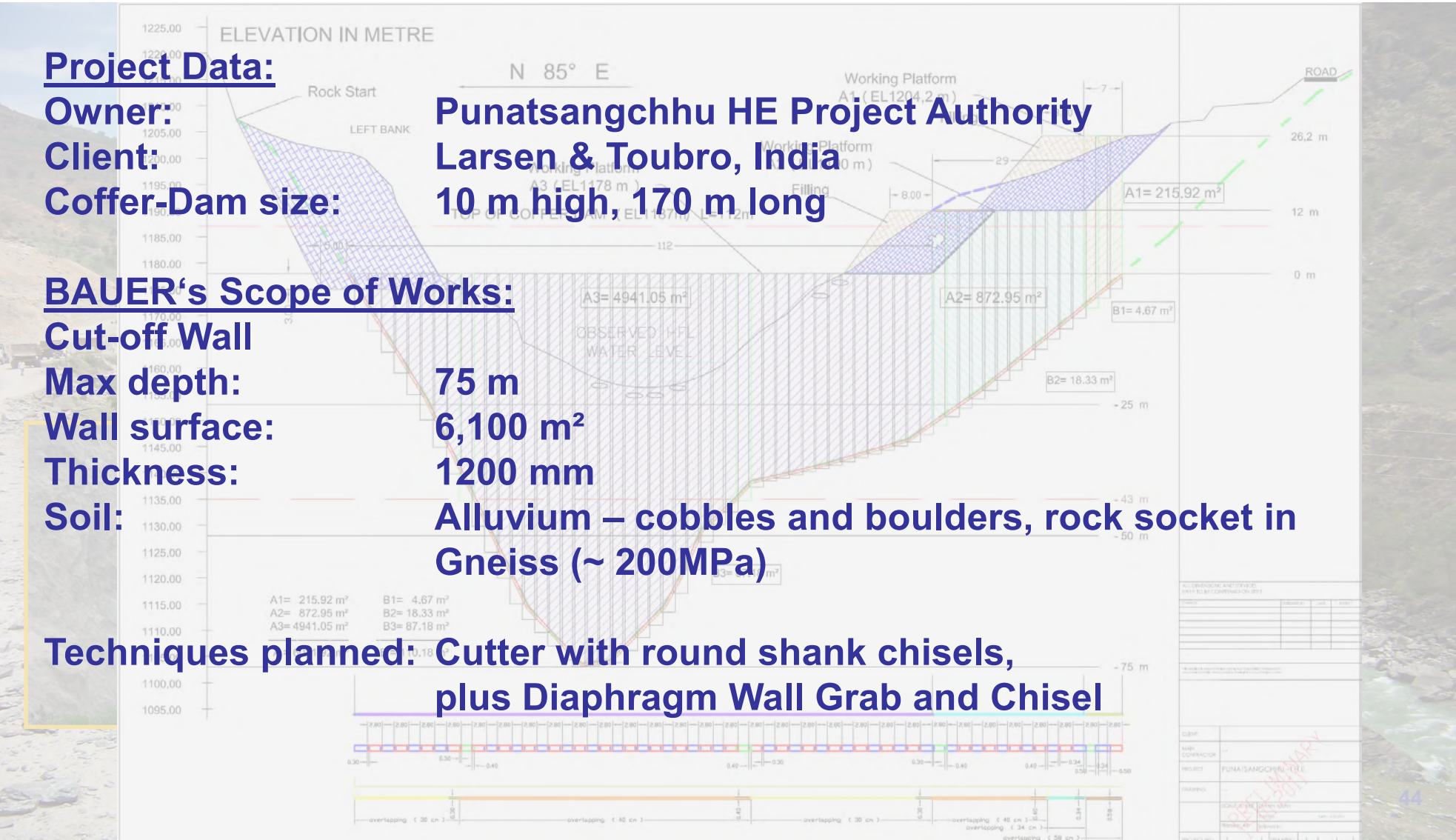
Project Data:

Owner:	Punatsangchhu HE Project Authority
Client:	Larsen & Toubro, India
Coffer-Dam size:	10 m high, 170 m long

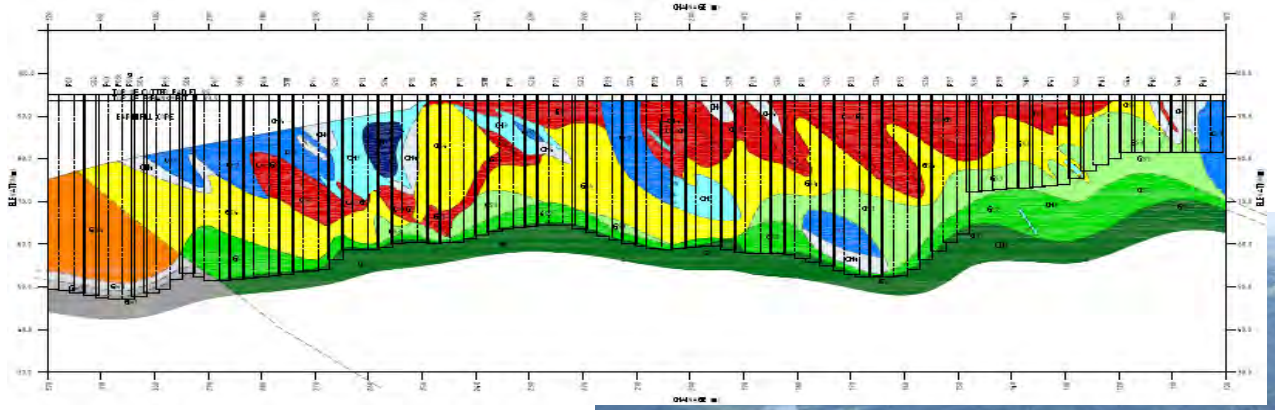
BAUER's Scope of Works:

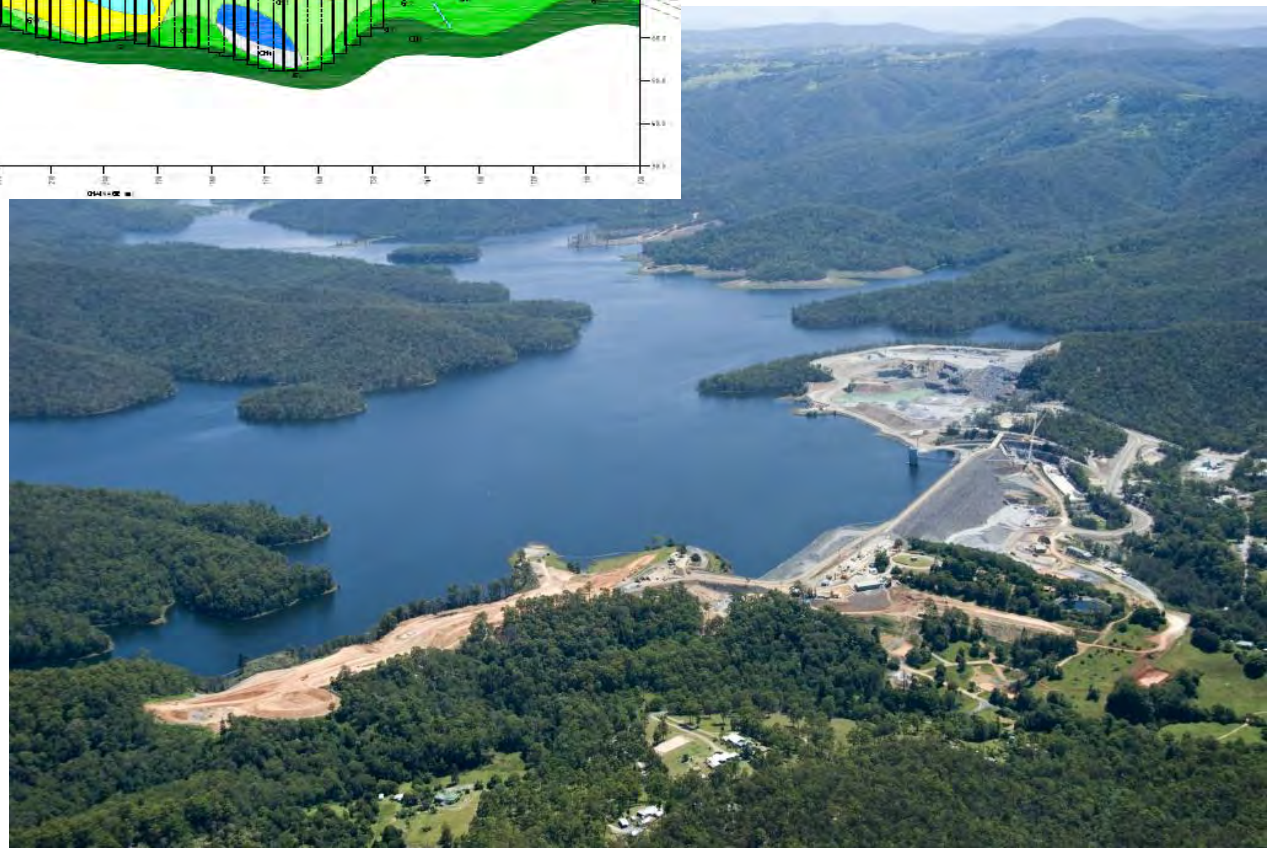
Cut-off Wall

Max depth:	75 m
Wall surface:	6,100 m²
Thickness:	1200 mm
Soil:	Alluvium – cobbles and boulders, rock socket in Gneiss (~ 200MPa)
Techniques planned:	Cutter with round shank chisels, plus Diaphragm Wall Grab and Chisel



Plastic Concrete Diaphragm Walls for different Stages – Upgrading of an Existing Dam





Hinze Dam, Australia

Cut-off Walls constructed with Trench Cutters

Project Examples - Hinze Dam Upgrade Stage 3 , Australia 2009

Project Data:

Owner:	Gold Coast City Council
Client:	Hinze Dam Alliance
Scope:	Upgrade from level 93,5 m to 108 m

BAUER's Scope of Works:

Cut-Off wall

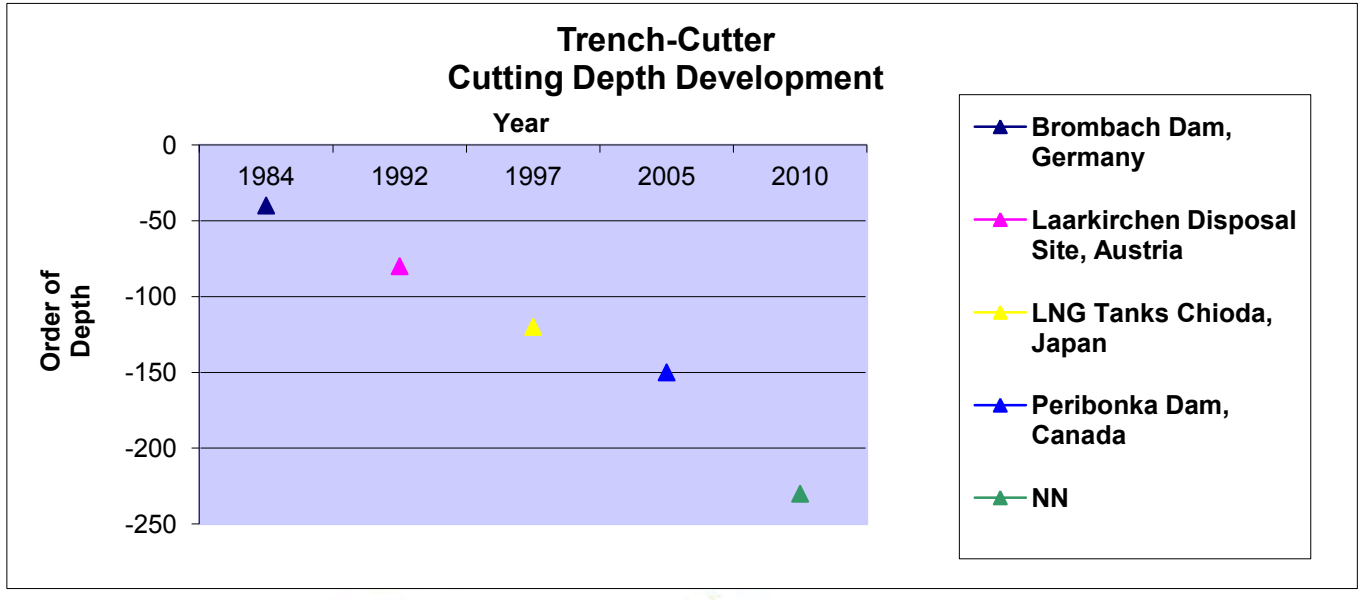
max depth:	55m
Wall surface:	8.300m²
Thickness:	830 mm
Soil:	Greywacke and Greenstone (Basalt) in different grades of weathering, Chert rock (~180 MPa)
Techniques:	Cutter with round shank bits

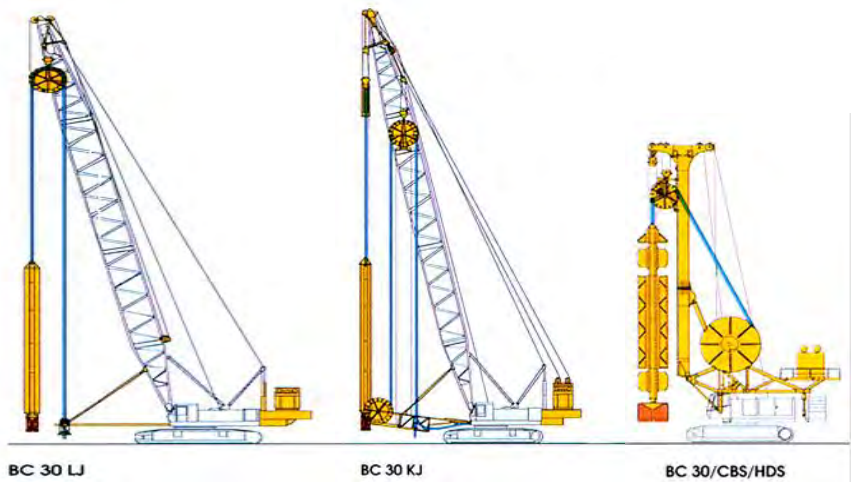
The Main Rig: the BAUER Trench Cutter

Depth: Cutting for 150 m wall depth and deeper…

The BAUER Trench Cutter

Cutter development as precondition for deeper Cut-off walls





The BAUER Trench Cutter

Geology: ... cutting through bolders and solid rock

Cutting in solid rock was developed in 1996 by BAUER using Roller bit-cutter wheels.

The successful cutting through granite and gneiss boulders was a step that followed at the beginning of 2001.

Cutter wheels sets for different geology

Mixed-in-Place by Cutter Soil Mixing (CSM)

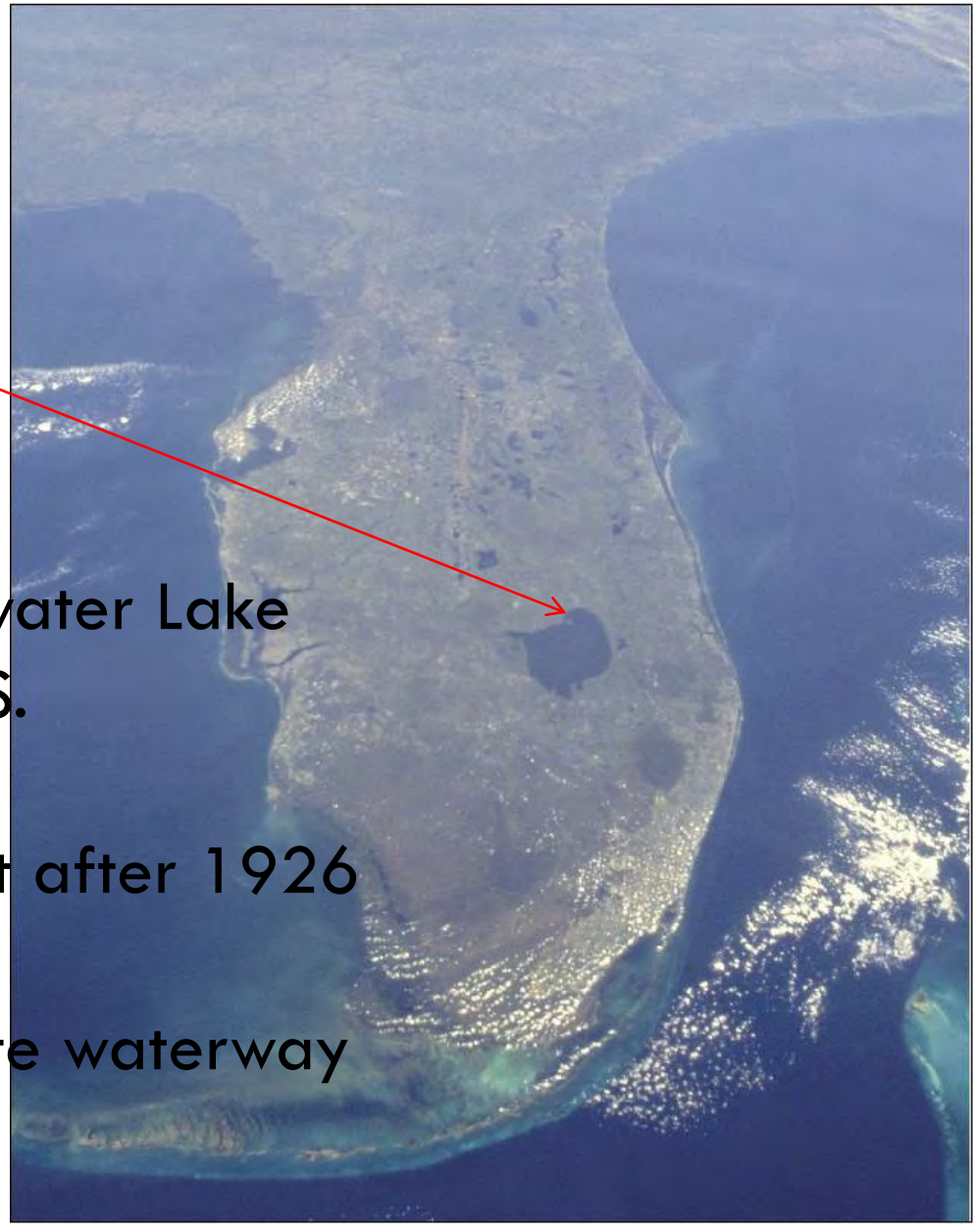
Principles and Applications

Seepage Cut-off Wall By CSM=Cutter-Soil-Mixing Lake Okeechobee, Florida Herbert Hoover Dike

BAUER FOUNDATION

FLORIDA

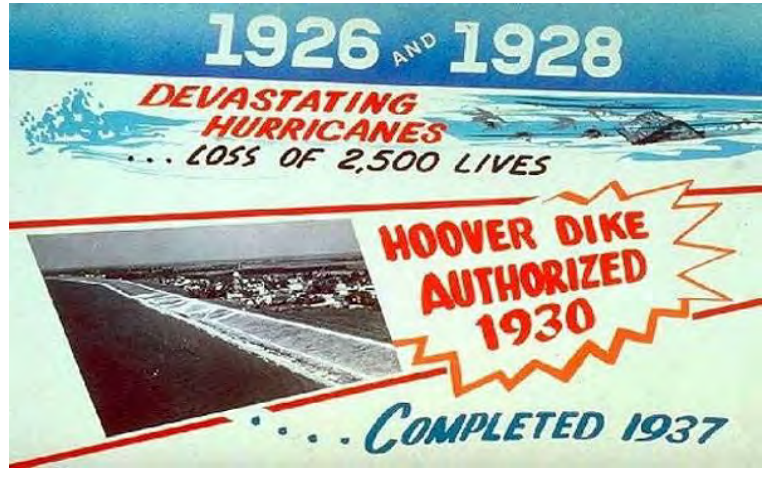
Lake Okeechobee



- 3rd Largest Freshwater Lake w/in continental U.S.
- Depth ~12 feet
- 140-mile dike built after 1926 & 1928 Hurricanes
- 155 mile cross-state waterway

HHD HISTORY

- In the 1930s, a larger system of levees was built around the lake. The U. S. Army Corps of Engineers constructed levees between 1932 and 1938. A major hurricane in 1947 prompted the need for additional flood and storm damage reduction work. The new dike system was completed in the late 1960's and named the Herbert Hoover Dike. [1]



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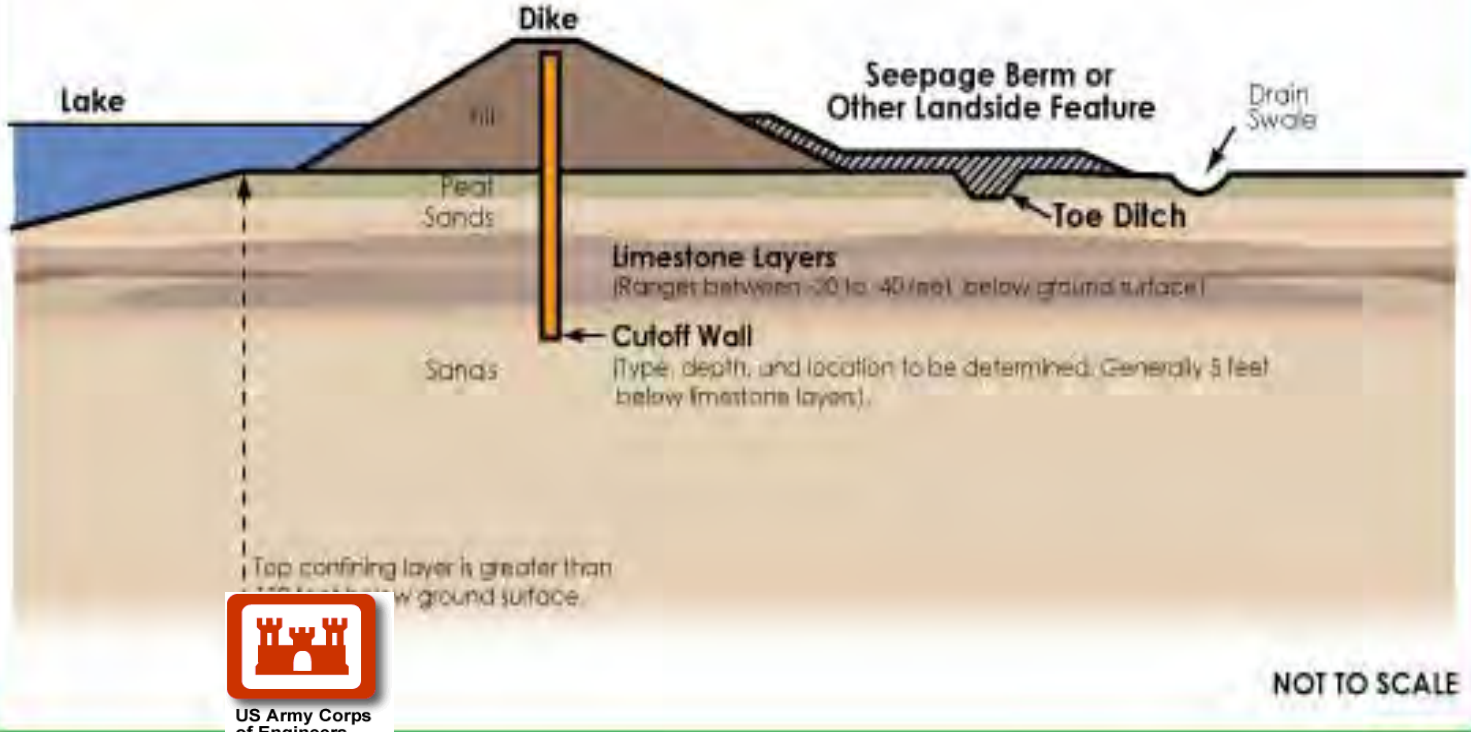
FOUNDATION

Herber Hoover Dike Rehabilitation Project

US Army Corps
of Engineers

BAUER
FOUNDATION

HERBERT HOOVER DIKE
Concept Design



US Army Corps
of Engineers

BAUER
FOUNDATION

Project Objectives

USACE

•Protect lives and property

•Stabilize and secure the aging dike

BAUER Foundation Corp. (BFC)

•Perform safely

•Work efficiently

GEOSYNTEC

•Provide Geotechnical Engineering and Permitting assistance

• Development and Implement QC Management System

•Capture large amounts of QA/QC data for logical presentation

•Integrate QA/QC function with our GIS capabilities

Project Approach, Scope of Services

Work Plan Development

- Contractor Quality Control Plan
- Accident Prevention Plan
- Environmental Protection Plan
- Stormwater Protection Plan

Permitting: (State and Local Agencies)

- FDEP – General Air Permit (bag house silo)
- FDEP – NOI and NPDES Permits
- SFWMD – Consumptive Water Use (lake &well)

CQC Management

GIS Data Management “Wall Tracker”

BAUER FOUNDATION

US Army Corps of Engineers

FLORIDA

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

walltracker

PERFORMANCE CRITERIA

- Continuous CB Wall
- Panel Width < 34 in (25 in)
- Average CSM Panel Length 58 ft

- UC Strength 100 – 500 psi
- K = 1x 10^{-6} cm/sec or less

Herbert Hoover Dike Reach 1 Task Order #6
Work Platform

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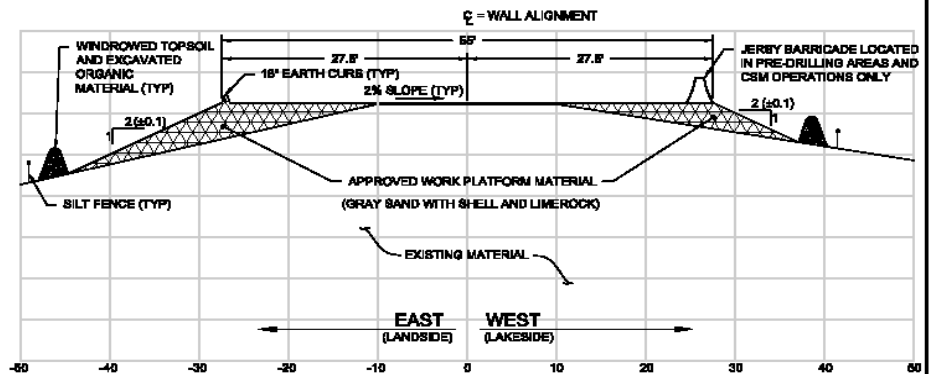
Herbert Hoover Dike Reach 1 Task Order #6 Work Platform

NOTES:

1. The work platform shall be constructed according to the accompanying typical section shown on this sheet.
2. General fill material used to construct the temporary work platform shall be free of debris, foreign objects, large rocks or rock fragments greater than 4-inches in diameter, organics, and other deleterious materials. General fill material shall classify as GW, SP, SP-SM, or SM according to the Unified Soil Classification System (per ASTM D 2487). Soils having other classifications are acceptable as general fill, if approved by the RFC Site Engineer and the Geosyntec Design Engineer.
3. The work platform subcontractor (subcontractor) shall furnish compaction equipment to achieve the required minimum soil dry density within the range of acceptable moisture content. All general fill material to be compacted shall be at a moisture content that will readily facilitate effective compaction. The subcontractor shall furnish water truck(s), or other equipment designed to apply water uniformly and in controlled quantities to remove surface voids for required in-place moisture adjustment, to prevent drying of soil surfaces, and for dust control as needed. The subcontractor shall furnish equipment such as excavators, compactors, loaders, dozers, earth hauling equipment and all other equipment, as required for the temporary work platform construction.
4. Erosion and sediment controls shall be installed along all work areas prior to commencing surface preparation and general fill placement as indicated on this drawing. Erosion and sediment controls shall be maintained in good condition and routinely inspected by the Contractors CQC personnel.
5. General fill material from off-site borrow source(s) used to construct the temporary work platform shall meet the requirements of Section 31 05 00, Part 2, (2.1). The materials shall be placed on surfaces that are free of debris, vegetation, or other deleterious material. The surface on which fill is to be placed shall be plowed, stepped, benched or otherwise scarified before fill placement is started. The general fill shall be placed in loose lifts no greater than 12 inches in thickness. In areas where compaction is to be performed using hand operated equipment or equipment weighing less than that specified below, the general fill shall be placed in loose lifts with no greater than 6 inches in thickness. The CQC personnel may perform soil conformance testing on the general fill as needed to ensure materials and workmanship are compliant with the requirements described below.
6. Prior to placing a successive lift of material over a previously compacted lift, the previous lift shall be thoroughly scarified by disking, raking, tracking or other suitable means. The preceding lift shall be moisture conditioned to readily facilitate effective compaction, if not within the suitable moisture range, and trafficking of scarified surfaces shall be minimized prior to successive lift placement. Temporary general fill stockpiles shall be constructed to drain and surrounding areas shall be adequately protected using erosion and sediment controls.
7. Compaction of each lift of general fill shall be accomplished using a self-propelled smooth drum vibratory compactor with minimum static weight of 14,800 lbs. Each lift shall be graded and level prior to compaction. Each lift shall be rolled with a minimum of 10 passes or until a deflection (rutting) of less than 2 inches is observed in relation to adjacent pass. A pass is defined as one complete travel path both forward and backwards over the same area no greater than the width of the compactor drum. Each pass shall be overlapped a minimum of 6 inches. Soils shall not exhibit pumping or elevation ruts more than 2 inches in depth. General fill in such areas shall be removed and replaced to the width and depth of the affected location or allowed to dessicate and undergo additional compaction until the desired conditions are achieved. Minor rutting, defined as less than 2 inches in depth, shall be regraded or covered with general fill to match finish grade.
8. General fill placement should not be conducted during periods of heavy prolonged precipitation. In areas of the work platform where water accumulates during general fill placement the subcontractor shall implement measures to remove the water such that the subgrade and general fill lift surfaces are free of standing water. Downtrend areas shall be maintained until overlying construction is complete. Dust shall be controlled by the application of water to the general fill surfaces.
9. No crest degradation is anticipated during construction of the temporary work platform.
10. Dike restoration shall be performed in accordance with Section 31 00 00, Part 3, (3.8 and 3.7).
11. The earthwork associated with the temporary work platform construction and dike restoration shall be monitored by the CQC Manager and/or a Geosyntec representative. The CQC Manager and/or a Geosyntec representative will notify the Project Manager of any portion of the earthwork that does not meet the requirements described below, delineate the extent of the nonconforming area and document the corrective actions taken to subsequently achieve compliance. The Temporary Work Platform Subcontractor shall correct all deficiencies and nonconformance's identified by the CQC and/or Geosyntec personnel.



TYPICAL TEMPORARY WORK PLATFORM SECTION

SCALE: N.T.S.

CONSTRUCTION DRAWING

Geosyntec consultants

BAUER FOUNDATION CORP.

TEMPORARY WORK PLATFORM SECTION

HERBERT HOOVER DIKE REHABILITATION PROJECT
REACH 1, SEEPAGE CUT OFF WALL TASK ORDER E (REACH 1B)

HERBERT HOOVER DIKE

Herbert Hoover Dike Reach 1 Task Order #6
Soil Preparation – Pre-Drilling

Herbert Hoover Dike Reach 1 Task Order #6
CSM Cutoff Wall

CSM Process

Wall Characteristics

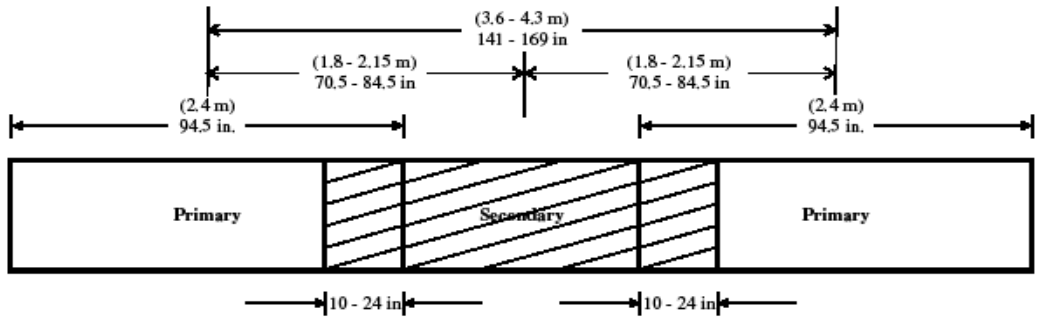
- Highly Impermeable
  - 10^{-6} to 10^{-9} cm/sec
- Strength Range
  - 100 – 500 psi
- Avg. Strength
  - 300 – 350 psi

Intersecting Panels – Water Tight

Monolithic – No Cold Joints

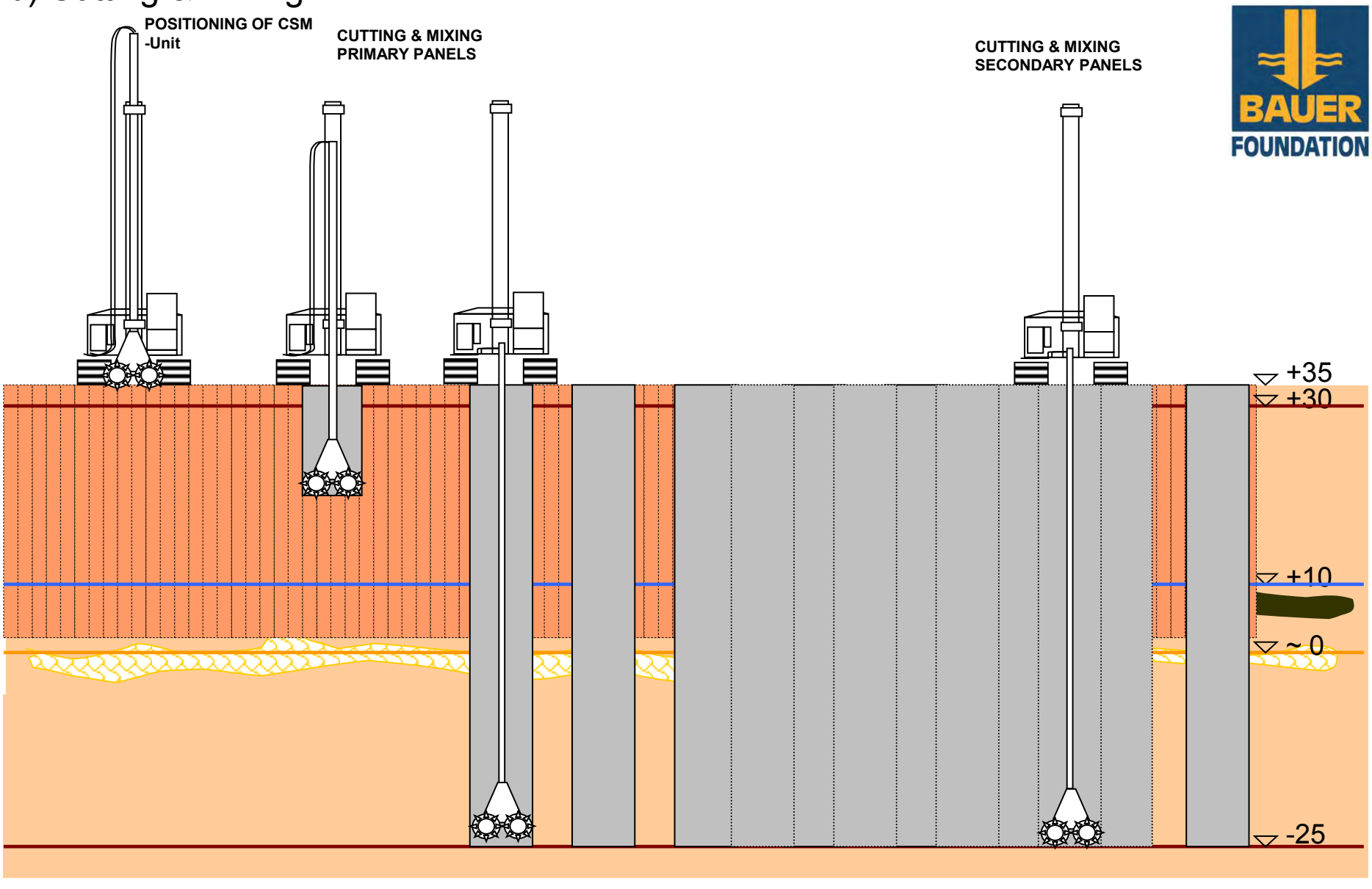
Herbert Hoover Dike Reach 1 Task Order #6
CSM Cutoff Wall

Figure 6
Panel Layout Plan



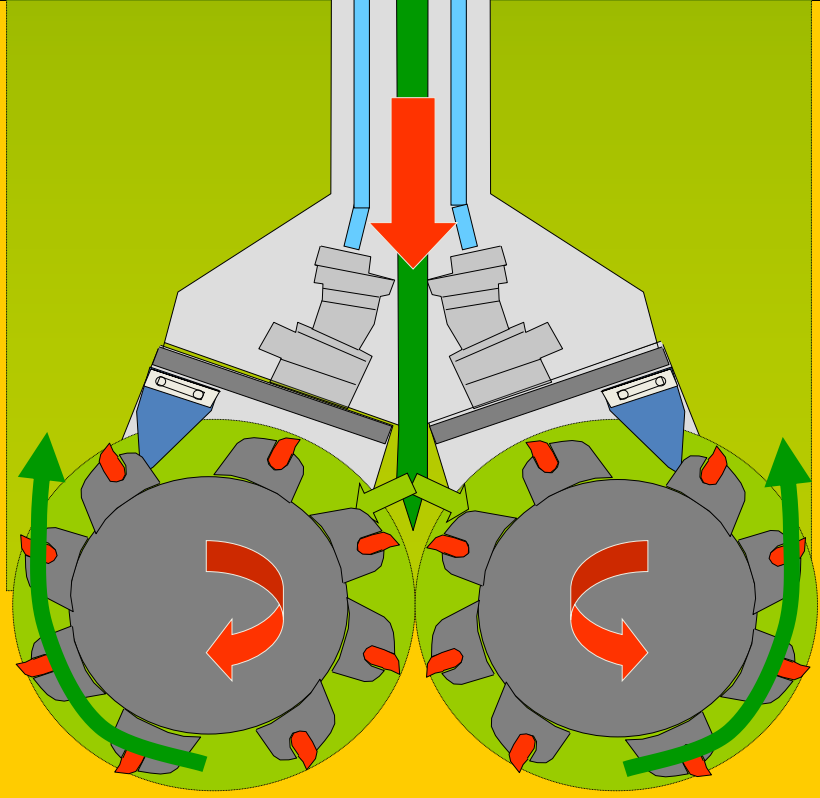
Note: Not to scale.

2.b) Cutting & Mixing



CSM
Work sequence

Loosening and
mixing while cutting

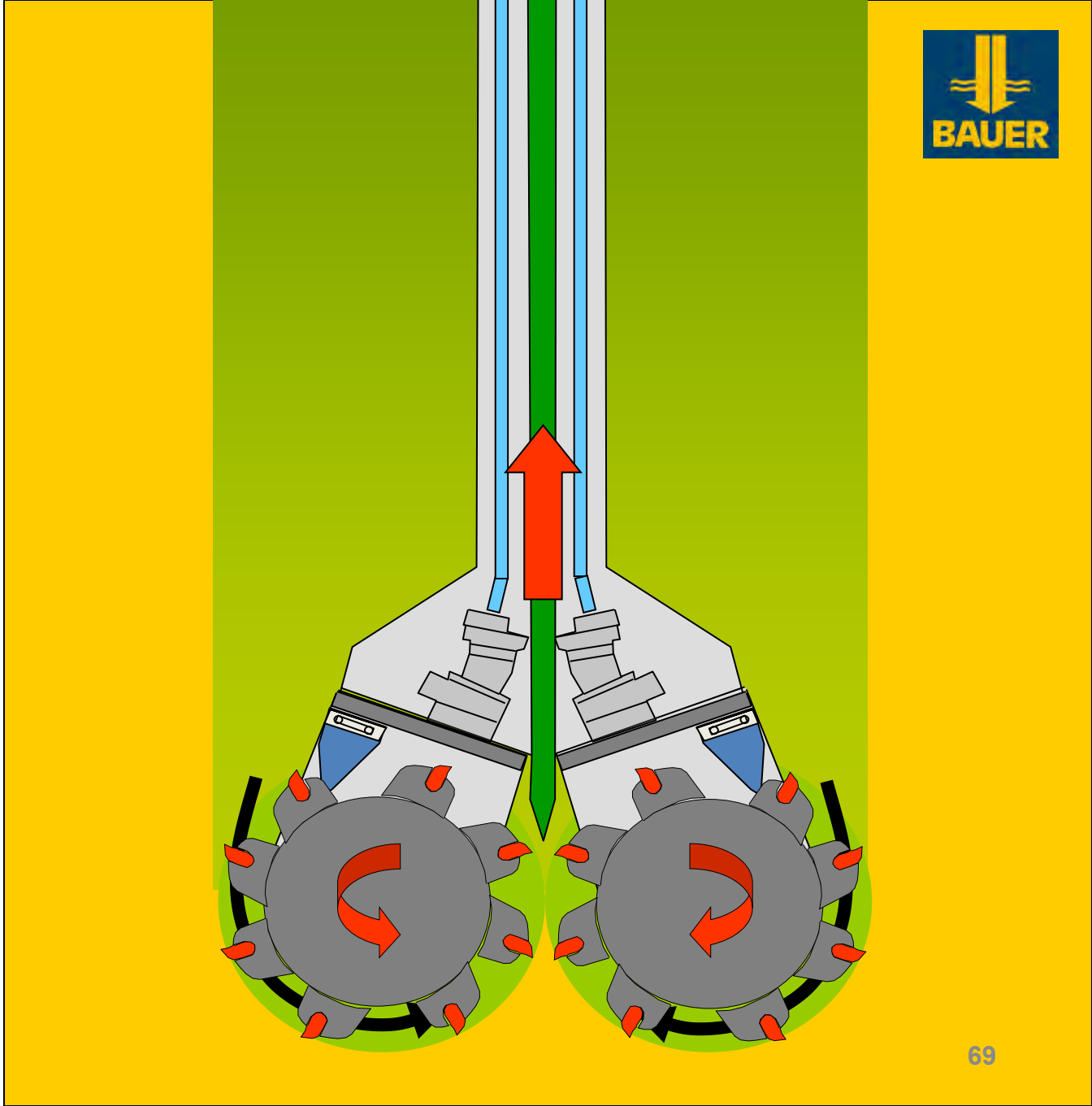


CSM
Work sequence

Loosening and mixing while descending

backflow of excess material

mixing and homogenizing during extraction



CSM
Work sequence

Loosening and mixing

Cutter Soil Mixer (CSM)


JAN 23 2009

CSM Quality Control Systems

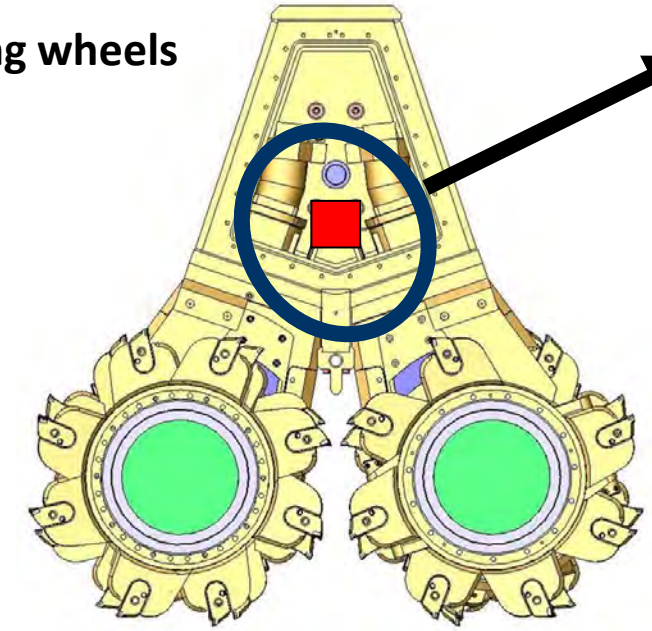
Smart Soil Mixing System

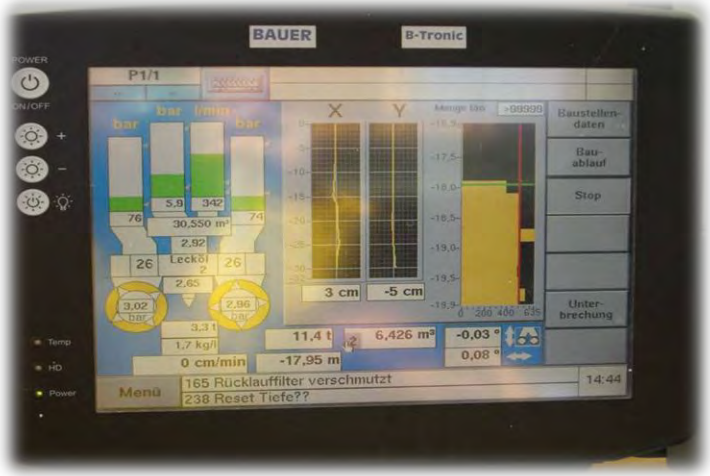
BAUER FOUNDATION

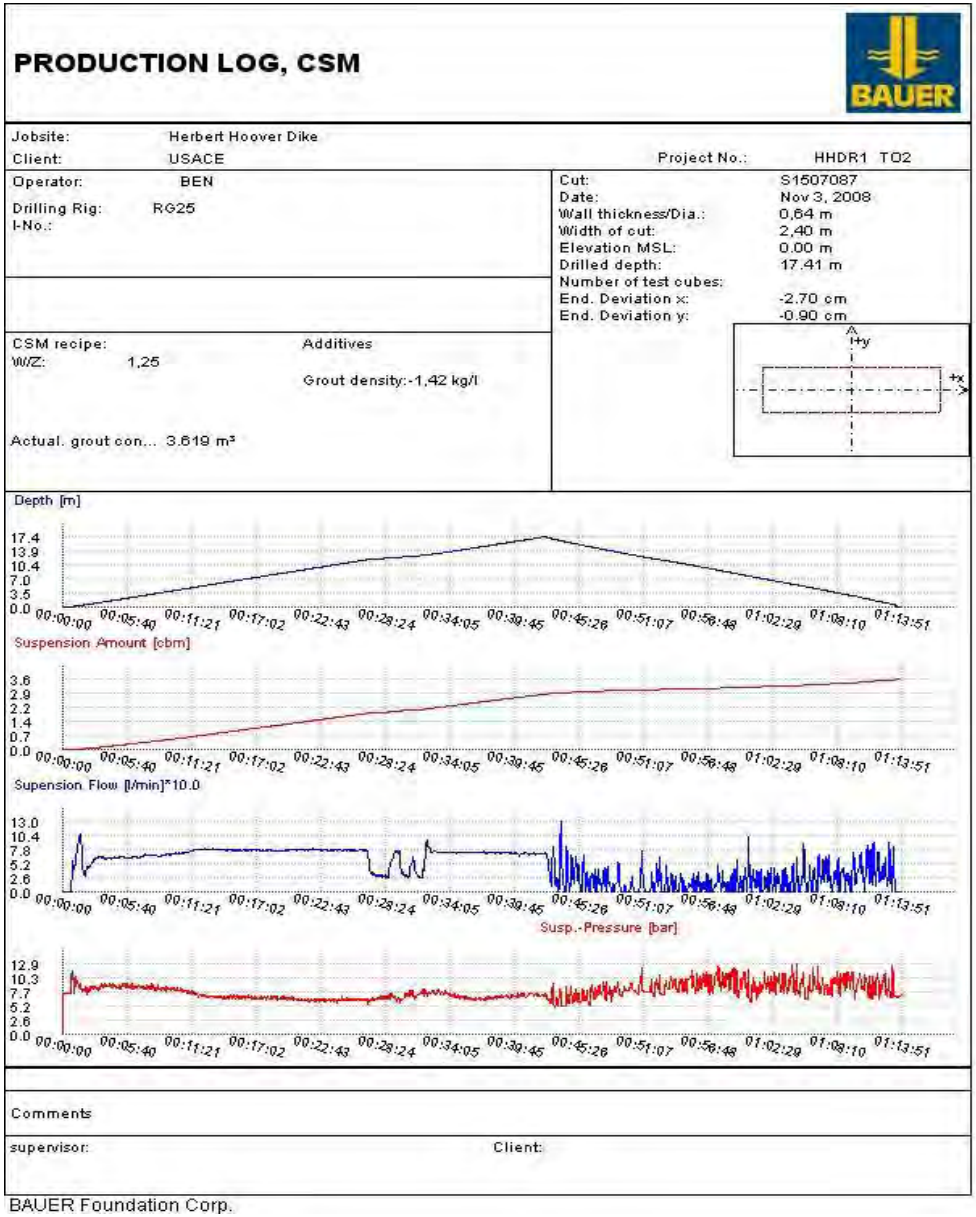
Fully instrumented to convey real time information

Instruments to control:

- **Verticality on “X” and “Y” axes**
- **Torque on cutting wheels**
- **Wheel speeds**
- **Direction**
- **Flow rates**
- **Slurry injection**







PRODUCTION LOG, CSM

BAUER

Jobsite: Herbert Hoover Dike
Client: USACE
Project No.: HHDR1 TO2

Operator: BEN
Drilling Rig: RG25
I-No.:

Cut: S1507087
Date: Nov 3, 2008
Wall thickness/Dia.: 0,64 m
Width of cut: 2,40 m
Elevation MSL: 0.00 m
Drilled depth: 17.41 m
Number of test cubes:
End. Deviation x: -2.70 cm
End. Deviation y: -0.90 cm

CSM recipe:
W/Z: 1,25
Additives
Grout density:-1,42 kg/l

Actual. grout con... 3.619 m³

Depth [m]
17.4 13.9 10.4 7.0 3.5 0.0
00:00:00 00:05:40 00:11:21 00:17:02 00:22:43 00:28:24 00:34:05 00:39:45 00:45:26 00:51:07 00:56:48 01:02:29 01:08:10 01:13:51

Suspension Amount [cbm]
3.6 2.9 2.2 1.4 0.7 0.0

Supension Flow [l/min]*10.0
13.0 10.4 7.8 5.2 2.6 0.0

Susp.-Pressure [bar]
12.9 10.3 7.7 5.2 2.6 0.0

Comments

supervisor: Client:

BAUER Foundation Corp.

BAUER FOUNDATION

- Production Log
- Depth
- Time
- Flow
- Pressure

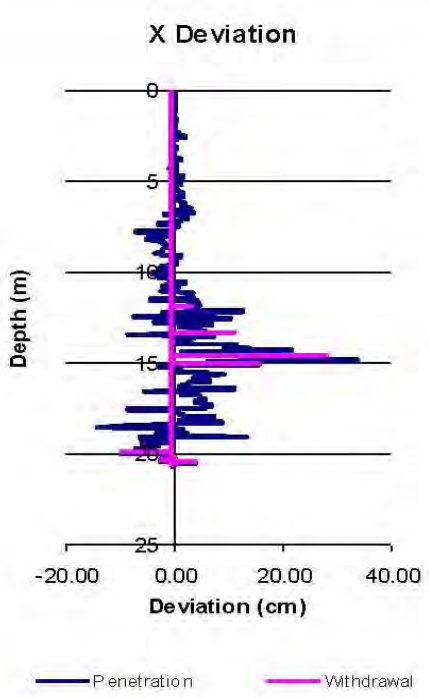
Panel Quality Control Report: Panel S 1610139

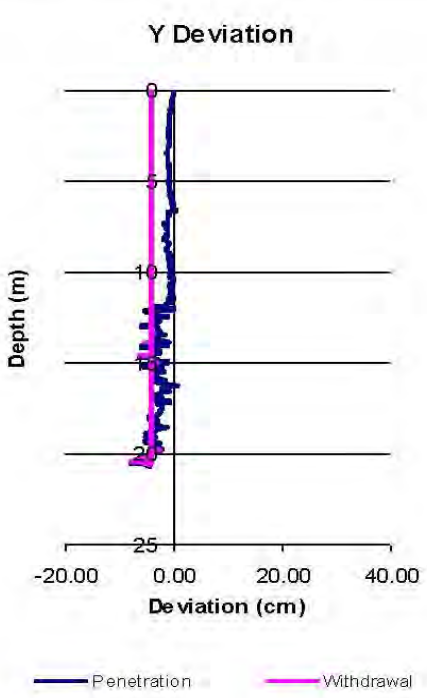
Panel Completed on May 6, 2010 at 1:27 PM (Day Shift) | **Slurry Mix Design ID** TO5.300.2 | **Monday/Post-Holiday Panel** ☐

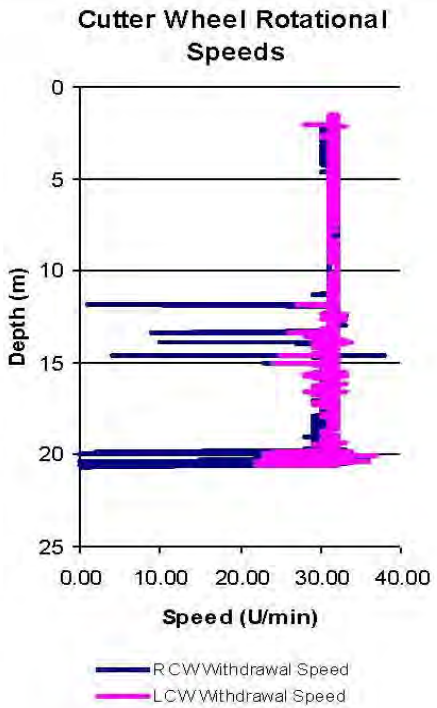
Total Slurry Volume (m3)	6.26	Slurry Volume in Peat Zone (m3)	2.03	Total CSM Operation Time (h:m:s)	1:21:03
Total Slurry Volume - Penetration (m3)	3.83	Slurry Volume in Peat Zone - Penetration (m3)	1.19	CSM Operation Time - Penetration (m:s)	41:54
Total Slurry Volume - Withdrawal (m3)	2.43	Slurry Volume in Peat Zone - Withdrawal (m3)	0.84	CSM Operation Time - Withdrawal (m:s)	39:09
Panel Top Elevation (ft msl)	35.00	Depth to Top of Peat Zone (ft)	20.00	Maximum Y Deviation (cm)	7.8
Panel Bottom Elevation (ft msl)	-32.91	Depth to Bottom of Peat Zone (ft)	40.00	Maximum Y Deviation Criterion (10 cm) Exceeded	☐
Panel Bottom Depth (ft)	67.91				

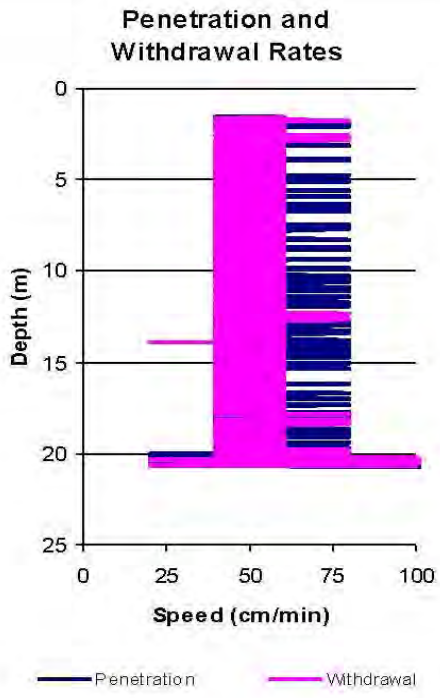
Total Slurry Volume Criterion (<4.72 m3) Exceeded	☐
Penetration Slurry Volume Criterion (<2.48 m3) Exceeded	☐
Withdrawal Slurry Volume Criterion (<2.23 m3) Exceeded	☐
Peat Zone Total Slurry Volume (<1.56 m3) Exceeded	☐
Peat Zone Withdrawal Slurry Volume (<0.83 m3) Exceeded	☐

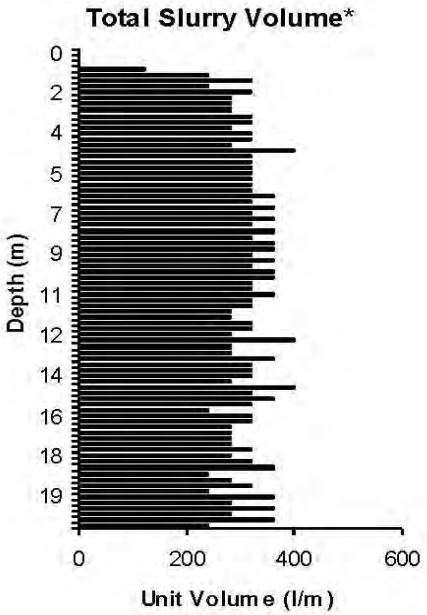
PANEL APPROVED

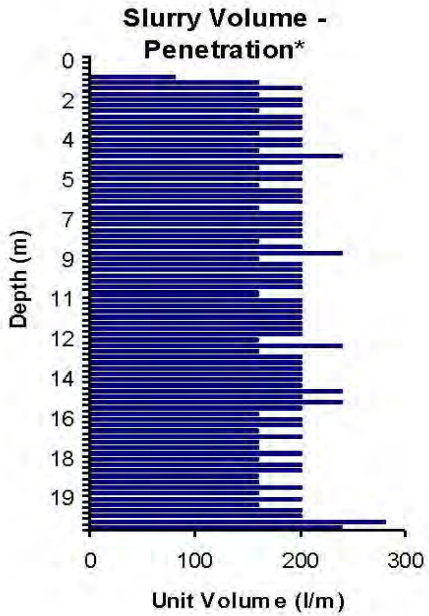


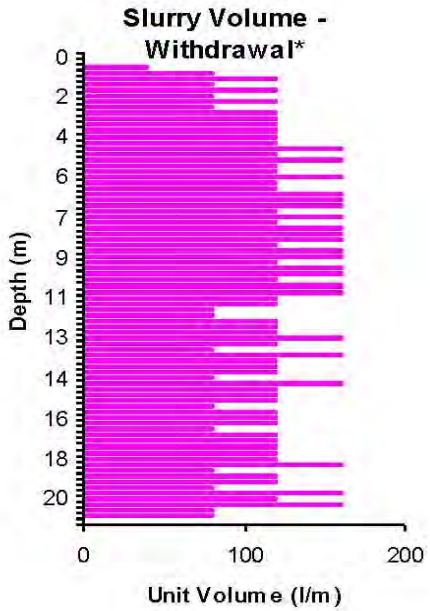


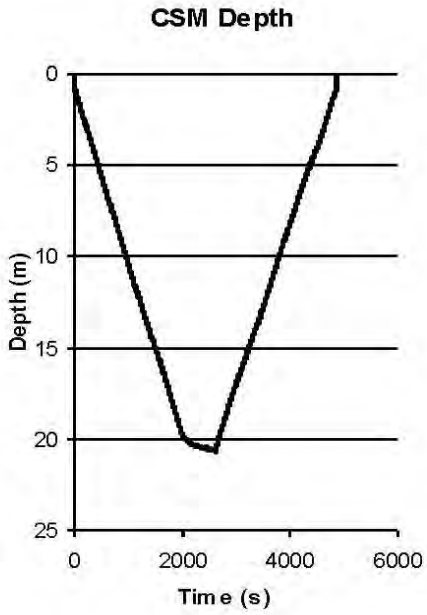












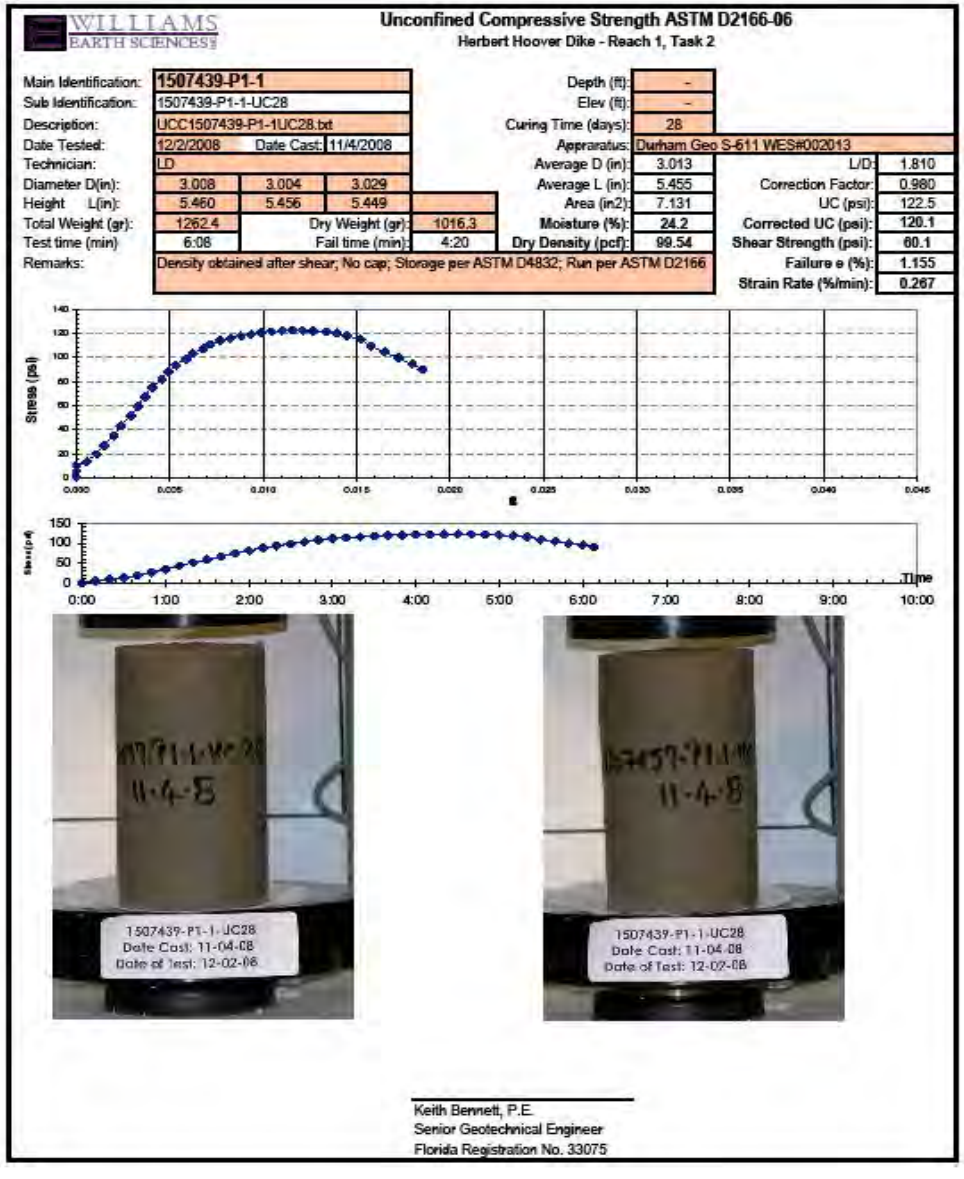
* Slurry volumes are grouped in 0.25 meter increments

Depths of Exceeded Criteria

Depth (m)	Y Deviation (10 cm)**	Left Cutter Wheel Speed (15 rpm)	Right Cutter Wheel Speed (15 rpm)
11.88			1.0
13.33			9.0
13.88			10.0
14.59			4.0
19.82			2.0
19.88			10.0
19.91			0.0
20.36			0.0
20.57			0.0
20.65			0.0

** Y Deviation data are presented as absolute values

Herbert Hoover Dike Reach 1 Task Order #6
Quality Control - Verification Drilling



WILLIAMS EARTH SCIENCES

Unconfined Compressive Strength ASTM D2166-06

Herbert Hoover Dike - Reach 1, Task 2

Main Identification:	1507439-P1-1			Depth (ft):	-		
Sub Identification:	1507439-P1-1-UC28			Elev (ft):	-		
Description:	UCC1507439-P1-1UC28.txt			Curing Time (days):	28		
Date Tested:	12/2/2008	Date Cast:	11/4/2008	Appraratus:	Durham Geo S-611 WES#002013		
Technician:	LD			Average D (in):	3.013	L/D:	1.810
Diameter D(in):	3.008	3.004	3.029	Average L (in):	5.455	Correction Factor:	0.980
Height L(in):	5.460	5.456	5.449	Area (in2):	7.131	UC (psi):	122.5
Total Weight (gr):	1262.4	Dry Weight (gr):	1016.3	Moisture (%):	24.2	Corrected UC (psi):	120.1
Test time (min)	6:08	Fail time (min):	4:20	Dry Density (pcf):	99.54	Shear Strength (psi):	60.1
Remarks:	Density obtained after shear; No cap; Storage per ASTM D4832; Run per ASTM D2166					Failure e (%):	1.155
						Strain Rate (%/min):	0.267

Keith Bennett, P.E.
Senior Geotechnical Engineer
Florida Registration No. 33075

BAUER FOUNDATION

- Unconfined Compressive Strength
- ASTM D2166

Boring Designation 1504506

WILLIAMS EARTH SCIENCES

VERIFICATION BORING LOG

DIVISION	INSTALLATION	SHEET 1 OF 3 SHEETS
Jacksonville		

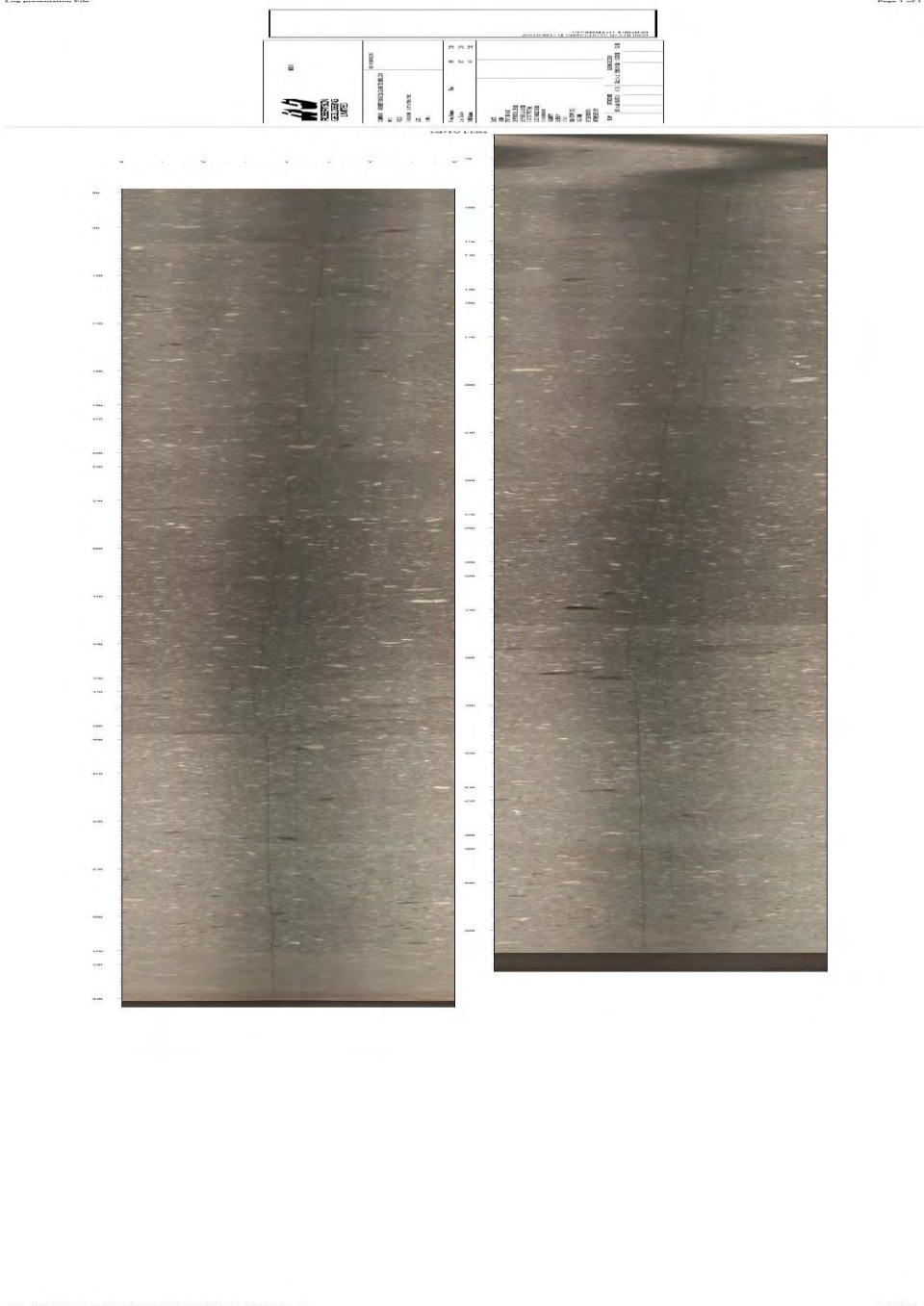
PROJECT	Herbert Hoover Dike Demonstration section 1504+50.6
BORING DESIGNATION	1504506
LOCATION COORDINATES	X= -1.9 Y= -0.3
DRILLING AGENCY	Williams Earth Sciences
CONTRACTOR FILE NO.	
DEPTH OF BORING (ft)	55
NAME OF DRILLER	Jim Spoon
SIZE & TYPE OF BIT	Diamond Stepbit Bottom Dish
TYPE OF DRILL RIG	CME 850
TOTAL NUMBER CORE BOXES	5
ELEVATION GROUND WATER	14.33 (assumed based on reported lake level)
DATE BORING	START 11/18/08 COMPLETED 11/18/08
ELEVATION TOP OF BORING	35.14
MAX SAMPLE LENGTH (in)	60
CORE SAMPLE DIAMETER (in)	3.3
BOREHOLE LOGGER:	Gabrielle Enos

ELEV.	DEPTH	MATERIAL DESCRIPTIONS & NOTES	BOX #	GEAR	PRESS. (psi)	RPM	TIME (min:sec)	REC (%)	RQD (%)	Qu (psi)	PICTURE
35.1	0	No samples collected in upper 5 feet. Top of wall begins at 5 ft bls									
30.1	5	Dark greenish-grey cementious soil with shell inusions	1	2nd	200	60	0:2	100	95		
				2nd	200	60	4:30				
				2nd	200	60	4:42				
				2nd	200	60	4:34				
				2nd	200	60	4:58				
25.1	10	Dark greenish-grey cementious soil with shell inusions hard drilling at 3 feet into run	1	2nd	200	60	8:24	100	100		
				2nd	200	60	9:24				
				2nd	200	60	13:19				
				2nd	200	60	5:17				
				2nd	200	60	6:15				
20.1	15	Dark greenish-grey cementious soil with shell inusions UCC Sample at 17-18 ft bls	2	2nd	200	60	3:54	100	100	767.1 844.6	
				2nd	200	60	4:22				
				2nd	200	60	4:01				
				2nd	200	60	4:33				
15.1	20			2nd	200	60	5:04				

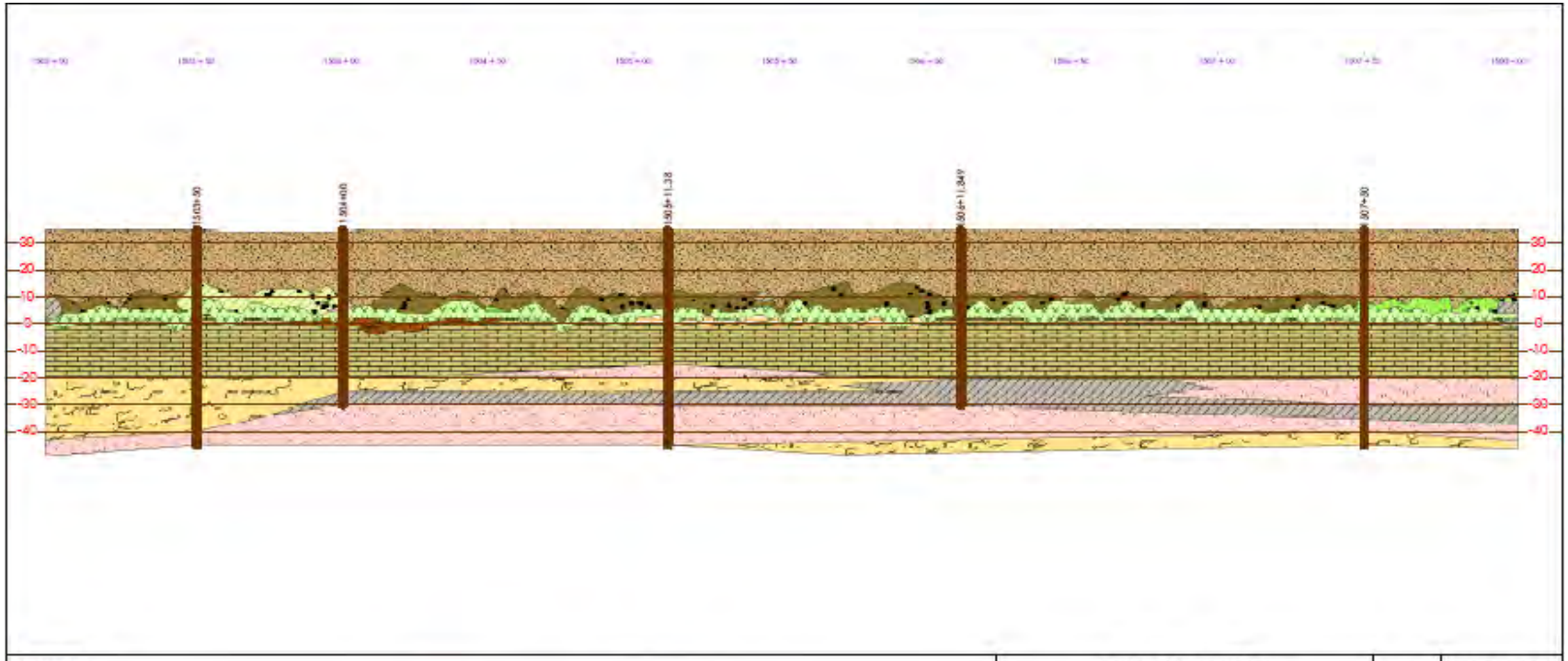
BAUER FOUNDATION

- Verification Coring & Photo Log

Core sample of demonstration wall



- Downhole Video Log
- 360 degree view



LEGEND

Station Number

Elevation (feet NAVD88)

Rotosonic Boring
(not to scale horizontally)

Lithology

- Sand (Fill Material)
- Sandy Clay
- Sand with Limestone
- Interbedded Silt, Silty Sand and Clay
- Silt and Silty Sand
- Sand
- Clay
- Peat
- Shell Hash with Sand
- Interbedded Limestone and Silty Sand
- Limestone

40 20 0 40 Feet

no vertical exaggeration 1:400

NAVD88 - North American Vertical Datum of 1988

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

Herbert Hoover Dike
Rehabilitation Reach 1
Seepage Cutoff Wall, Task Order No. 2
Martin and Palm Beach Counties, Florida
Contract No. W912E9-07-D-0011

Profiles - Demonstration Section
Station 1503+00 to 1508+00
Existing Lithology

Rev. 0:	25 FEB 2009
Rev. 1:	05 MAR 2009
Drawn By: J.R.	Drawing No. AB-01
Ckd By: D.S.	Sheet 1 of 4

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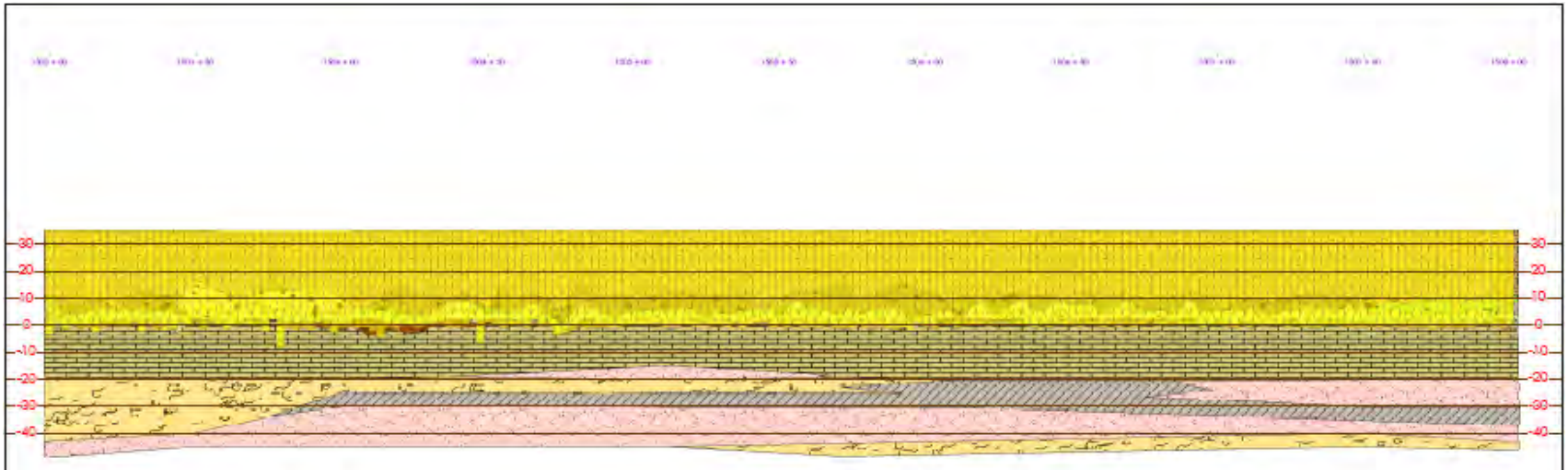
13020 Byrd Legg Drive, Odessa, FL 33556
727.536.4748



LEGEND

- Station Number
- Elevation (feet NAVD88)
- Predrill Extent

Lithology

- Sand (Fill Material)
- Sandy Clay
- Sand with Limestone
- Interbedded Silt, Silty Sand and Clay
- Silt and Silty Sand
- Sand
- Clay
- Peat
- Shell Hash with Sand
- Interbedded Limestone and Silty Sand
- Limestone

NAVD88 - North American Vertical Datum of 1988

40 20 0 40 Feet

no vertical exaggeration 1:400

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

Herbert Hoover Dike
Rehabilitation Reach 1
Seepage Cutoff Wall, Task Order No. 2
Martin and Palm Beach Counties, Florida
Contract No. W912E9-07-D-0011

Profiles - Demonstration Section
Station 1503+00 to 1508+00
Predrill Extents

Rev. 0:	25 FEB 2009
Rev. 1:	05 MAR 2009
Drawn By: J.R.	Drawing No. AB-02
Ckd By: D.S.	Sheet 2 of 4

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727.536.4748

Thank You