Challenges in Pipeline Construction

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Introduction

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- Working in the pipeline construction since 1984.
- Positioned in work preparation, estimation, planning and cost control, project management
- Director of A. Hak International B.V.
Contents

- The Hak Company
- Pipeline Construction
- Special Crossings methods
- Direct Pipe Technique
History A. Hak

- A. Hak started in 1945 after World War II as a transport company to rebuild Rotterdam in the Netherlands

- In 1974 A. Hak constructed our first 48-inch gas transportation pipeline for Gasunie

- In 1975 A. Hak (International) was involved in the construction of the Kirkuk-Ceyhan crude oil pipeline in Turkey
A.Hak

Multidiscipline contractor
National and international

- Pipe lines (Underground and Aboveground)
- Industrial piping installations
- Industrial services
- Pipe line material protection
- High voltage pylons & cables
- Telecoms
- Mast constructions for lighting, portals for overhead lines for trains & trams, advertising columns
- Equipment manufacturer
- Drilling
Pipeline Construction

The installation of a pipeline can be describe in different stages:

01- Quality, Health, Safety and Environmental “QHSE”
02- Right of Way
03- Receipt, handling and stocking of materials
04- Stringing of pipes
05- Pipe bending
06- Dewatering
07- Trench excavation
08- Line-up and Welding
09- Application of Coating at Field Joints
10- Lowering in of pipeline in trench
11- Trench backfilling and clean up
12- Logistics
13- Challenges
A.Hak International B.V. is an ISO 9001 and OHSAS 18001 certified Company.

In June 2008 following re-certification took place with positive result ISO 9001: 2000, Safety Checklist for Contactors, OHSAS 18001.

The aspects of QHSE are fully integrated in the Total Management System, whereby the organisation and its entire staff strive for a continuous improvement in all the Company’s daily activities.
Pipeline Construction

Right of Way
Pipeline Construction
Receipt, handling and stocking of materials
Pipeline Construction
Stringing of pipes
Pipeline Construction

Stringing of pipes
Pipeline Construction
Pipe bending
Pipeline Construction

Pipe bending on depot
Pipeline Construction

Dewatering

- Vertical drainage
- Deepwell drainage
- Horizontal Drainage
Pipeline Construction
Trench excavation
Pipeline Construction
Line up and Welding
Pipeline Construction

Line up and Welding

welding of the tie-ins
Pipeline Construction
Line up and Welding

welding of the tie-ins
Pipeline Construction

Application of coating at field joints
Pipeline Construction
Lowering in
Pipeline Construction

Back filling and clean up
Pipeline Construction
Logistics
Pipeline Construction

Influences

- Local laws and rules
- Soil conditions
- Weather conditions
- Circumstances
Pipeline Construction

Influences

- Rock
Pipeline Construction

Influences

- Soft grounds
Pipeline Construction

Influences

- Weather conditions and heights
Pipeline Construction

Influences

- Weather conditions and heights
Pipeline Construction

Influences

- Circumstances
Pipeline Construction

Influences

- Circumstances
Special Crossings

- Crossings can be performed by an open cut trench or boring method.
- Depending on the subsoil, the diameter and the length the boring method will be adapted.

- Methods are:
  - 01- Crossings performed by auger boring
  - 02- Closed Front drilling
  - 03- Crossings by directional drilling
  - 04- Crossings by direct pipe
Special Crossings

Auger drilling
Special Crossings
Closed Front Drilling
Special Crossings
Closed Front Drilling
Special Crossings
Horizontal Directional Drilling
Special Crossings

Horizontal Directional Drilling
Direct Pipe Drilling technique
Direct Pipe Drilling technique

- Equipment
- Drilling Process
- Measuring System
- Possibilities
- Advantages
Tunnelling Machine

1. Cutting head – adapted to geology
2. Power pack
3. Steering cylinder of the active steering joint
4. Feed line
5. Slurry line
Cutting head TBM

Rock
Cobbles
Coarse gravel
Medium gravel
Fine gravel
Coarse sand
Medium sand
Fine sand
Sandy, Silty clay
Silt
Clay

Rock
Gravel / Sand
Clay / Silt / Peat
Pipe Thruster
Detail Pipe Thruster
Mix and recycling installation
Bentonite Lubrication System

Direct Pipe® Machine
Measuring System

- **Measuring wheel**
- **Altitude reference device**
- **Water level hose**

**Horizontal orientation:** (+/- centimeters) via continuous gyro compass

**Vertical orientation:** (+/- millimeters - centimeters) via hydrostatic water leveling system
Mobilization TBM
Starting procedure Drilling Process
Launching Seal

Special - U - Neoprene

movable
Welding Pipestring 48"
Lay-out pipestring
48”
Lay-out pipestring 48”
Energy, controlling and slurry pipes inside the pipeline
Tunnel kart
Alignment possibilities

- One entire pipestring
- Pipestring in 2 or 3 parts
- Shorter tube sections
Receiving pit
Advantages Direct Pipe:

- Suitable for almost any kind of soil
- Low risk on coating damage
- Small working area required
- A minimal volume of slurry is required and the amount of excavated material is minimised
- Pipestring can also be laid in parts
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