Editorial Comments on IndSTT: 101-2007: Code of Practice for Horizontal Directional Drilling Technique Suiting Indian Conditions

Sl. No.	Clause /Sub clause/ Para No.	Comments	Your Decision (Please put a tick mark)
1.	1.3	Interchange with Clause No. 1.4	Accept / Reject
2.	1.4	Interchange with Clause No. 1.3	Accept / Reject
3.	2.1	Text alteration as under proposed: This pipe installation method is called Horizontal Directional Drilling (HDD). This method is defined as a steerable technique for the installation of pipes, conduits, and cables in an arc shape using a surface mounted drilling rig. This method involves the drilling of a pilot bore which is then enlarged with the use of a reamer prior to installation of the product pipe. Depending on the diameter of the product pipe, and subsoil condition, multiple enlargements by reaming operation may be required. The drilling is performed by the mechanical action of a fluid assisted cutting head.	Accept / Reject
4.	2.2.1	Text alteration as under proposed: BACK REAMER: Cutting head with circular array of cutters and drilling fluid jet. It is attached to the leading end of a drill string at exit point and is rotated and drawn towards drilling rig to enlarge the pilot bore during a pull-back operation.	Accept / Reject
5.	2.2.2	Text alteration as under proposed: BACKREAMING: Enlargement of the diameter of the drilled hole. This operation can be carried out in several stages, product developing on the diameter of the pipe and subsoil condition.	Accept / Reject
6.	2.2.3	Text alteration as under proposed: BENT SUB: Offset section of drill stem just or immediately behind the drill head that effects steering corrections by rotation of the drill string to orient the cutting head.	Accept / Reject
7.	2.2.4	Text alteration as under proposed: BENTONITE: Sodium colloidal clay of Montmorillonite type used for making drilling fluid. Concentration may vary from 30 to 100 kg per m3, depending on the sub soil condition	Accept / Reject

8.	2.2.12	Text alteration as under proposed: CARRIER PIPE: Pipe to be installed for carrying the intended product directly in the ground or within a casing pipe.	Accept / Reject
9.	2.2.13	Text alteration as under proposed: CASING PIPE: Pipe <u>installed for prevention of the collapse of</u> the bore hole <u>and the protection of the carrier pipe</u>.	Accept / Reject
10.	2.2.14	Text alteration as under proposed: CAKE: Lining or film of variable thickness deposited by the mud on the walls of the borehole. Consolidates and waterproofs the <u>wall of drilled hole</u> drilling.	Accept / Reject
11.	2.2.30	Text alteration as under proposed: DRAG BIT: Cutting tool for the mud engines (tender rocks).	Accept / Reject
12.	2.2.87	Text alteration as under proposed: REAMING COFFICIENT: is the borehole diameter <u>after reaming</u> divided by the diameter of the pipe to be installed.	Accept / Reject
13.	3.1	Additional acceptable standards for Steel pipes: <u>ASTM -A106, A314, A135, A333, A381, A671, and A 672</u> <u>API - API 5L</u>	Accept / Reject
14.	3.2 Page 23 Para 4	Text alteration as under proposed: To avoid damage to the HDPE pipe (Necking/ Breaking) due to excessive tensile force applied during the installation of <u>pipe</u> by HDD method, pullback force need to be monitored in real time; a suitable device may be installed to monitor and record the same. Values of tensile force on a time line can be recorded for future inspection for conformity of the same.	Accept / Reject
15.	3.3.4	Text alteration as under proposed: Pipe shall be straight in most cases. The maximum allowable straightness deviation over any 3.3 m length of steel pipe is 3 mm. Likewise, ductile iron, and PVC pipe shall have similar straightness tolerances. HDPE pipe does not need to be straight.	Accept / Reject

16.	3.3.5	Text alteration as under proposed: Pipe shall be without any significant dimensional or surface deformities. All pipes shall be free <u>from</u> visible cracks, holes, foreign material, foreign inclusions, blisters, or other deleterious or injurious faults or defects. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than ten percent (10%) of the wall thickness, shall not be used and shall be immediately removed from the site.	Accept / Reject
17.	3.4	Text alteration as under proposed: The product pipe may be exposed to significant abrasion during pullback. Therefore, a coating to provide a corrosion barrier as well as an abrasion barrier is required. The coating shall be bonded well to the pipe and have a <u>tough</u> smooth surface to resist soil stresses and reduce friction.	Accept / Reject
18.	3.5 Page 25	Bullet point 3 Deletion proposed Bullet point 6 Deletion proposed Bullet Point 7 Additional word proposed as under: • Reduce <u>friction/</u>torque on drill pipe;	Accept / Reject
19.	4.1.3 Para 1	Text alteration as under proposed: When the HDD route is within urban areas where bore hole investigations are not possible, use of shallow geophysical techniques may be considered <u>for 5 to 10m depth</u>. Seismic surveys, ground penetrating radar (GPR), electromagnetic (EM) surveys and electrical resistivity tomography (ERT) can be employed, often in combination. The application of geophysical methods is affected by the soil/bedrock conditions at the site and some techniques may not be appropriate in all situations.	Accept / Reject
20.	4.1.4 Para 1	Text addition as under proposed: <u>Spacing and depth of boreholes may be decided with respect to site specific requirements as per the standard engineering practices or as approved by the owner organization.</u>	Accept / Reject
21.	4.2 Page 30 Last para	Text alteration as under proposed: Adequate supervision and quality control <u>should be</u> provided during execution by personnel having the appropriate skills and experience.	Accept / Reject
22.	5.3.2	Text alteration as under proposed: The Maximum allowable depths for gravity flow networks where invert levels play a major role in fixing the pipeline levels, the maximum depths <u>at no</u> location shall exceed the maximum depths stipulated/designed at the	Accept / Reject

		installation locations. For other networks where the limit depths are not critical, the maximum depth shall be maintained within the stipulated region to retain the maintainability.	
23.	5.5.4	Text alteration as under proposed: Sufficient space shall be allocated to fabricate and layout the product pipeline into one continuous pipe length, thus enabling the pull back to be conducted during a single operation. If space considerations are discovered that make this impossible, the Drill Operator / HDD Driller shall obtain specific alternative instructions from the owner's Engineer.	Accept / Reject
24.	5.5.7	Text substitution as under proposed: Minimum radius of curvature of the installed pipe should be designed to retain the installation stresses within the allowable range of stresses of the pipe as per the pipe manufacturer's specifications.	Accept / Reject
25.	5.5.8	Text substitution as under proposed: Entry angles are limited by design requirements for specification of pipe shall be such that no undue stresses are produced.	Accept / Reject
26.	5.5.9	Text substitution as under proposed: Exit angles should generally range from 5^o (for large diameter steel pipelines) to 10^o. However, when high exit angles are encountered or designed, the pipe must be supported in an elevated position during the pull back operation to prevent the pipe from bending, deforming, kinking or cracking or rupturing.	Accept / Reject
27.	5.5.18	Text substitution as under proposed: Incase of the presence of Sand formation within the drilling trajectory / loss of stable soil conditions, suitable hole stabilizing additives should be used along with the mud so as proper wall cake formation takes place and hole does not collapses on the product pipeline.	Accept / Reject
28.	5.5.19	Text substitution as under proposed: Pipe rollers, skates or other protective devices shall be used to prevent damage to the pipe and protective coating, eliminate ground drag, reduce pulling force, and reduce the stress on the pipe and joints.	Accept / Reject

29.	5.10.2	Additional line at the end of clause as under proposed: For locating the pipes in river crossings reference may be made to clause 5.5.10.	Accept / Reject
30.	5.11 Main clause	Additional line in the introduction of the clause as under proposed: For large diameter drillings, or drillings with low covers, or for drillings at shallow depths, settlement/heaving must be monitored as per the following stipulations:	Accept / Reject
31.	5.12	Increment of the allowable stress value (Specified Minimum Yield Strength) as under proposed: from 90% to 95%	Accept / Reject
32.	5.12	Meaning of 'R' elaborated as under: R = Radius <u>of Curvature</u>	Accept / Reject
33.	6.2 Bullet point No. 3	Altered clause as under proposed: Verify continuous monitoring records indicate bearing and grade of the leading edge of the pipe is consistent with the approved plans, dewatering effort is satisfactory, <u>the removal rate of</u> soil <u>cuttings from the drill hole</u> is consistent with <u>the calculated / expected values</u> and that workers understand the contingency plan.	Accept / Reject
34.	6.2 Bullet point No. 7	Altered clause as under proposed: In case of <u>crossings with shallow depths ensure that</u> the pullback rate does not exceed 3 m. per minute to avoid heaving.	Accept / Reject
35.	6.2	Additional bullet points proposed • <u>Ensure that drilling fluid pressure does not increase abruptly beyond design limits.</u> • <u>Check the entire drilled length continuously for heaving and drilling fluid frac-outs.</u>	Accept / Reject

FORMAT FOR SENDING COMMENTS
ON EDITORIAL COMMENTS ON CODE OF PRACTICE FOR HORIZONTAL DIRECTIONAL DRILLING SUITING INDIAN CONDITIONS IndSTT 101-2007- August 2007

Sl. No. (1)	Clause/Subclause/Para No. of Editorial Comments Document (2)	Comments/suggestions (3)

Note: Please use A4 size sheet of paper only and type/write within fields indicated.