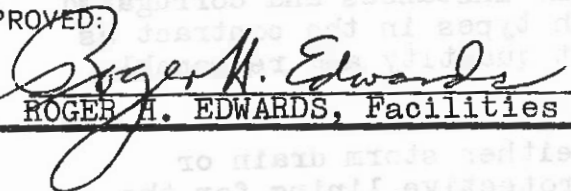


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TO: MODIFIED BY EI 84-030 EFFECTIVE 4/19/1984 Director, Preliminary Plan Review Bureau	<h1>ENGINEERING INSTRUCTION</h1> <p>NEW YORK STATE DEPARTMENT OF TRANSPORTATION</p>
SUPERSEDED BY EB 97-039 EFFECTIVE 7/1/1997	SUBJECT: ROUGHNESS COEFFICIENT FOR CORRUGATED METAL PIPES Subject Code: 7.26-2
Distribution: <input checked="" type="checkbox"/> Main Office <input checked="" type="checkbox"/> Regions <input type="checkbox"/> Special	Code: EI 74-93 Date: 10/9/74
APPROVED:  ROGER H. EDWARDS, Facilities Design Subdivision	Supersedes: EI 73-73

As part of the continuing review of the durability of corrugated metal pipes, the Engineering Research and Development Bureau has recently performed detailed inspections of both paved invert and fully paved pipes.

These inspections have supported our previous conclusion that asphalt placed solely in the inverts of pipes does not last for the life of the pipe. The asphalt placed in fully paved pipes does, however, have much better adhesion characteristics and can be expected, under normal conditions, to last for the assumed 40 year life of the pipe.

On this basis, then, we are superseding EI 73-73 and establishing revised design criteria as follows:

1. Storm Drains - (Closed Systems with no likelihood of being subjected to a scouring or abrasive effluent)
 - a. Use Mannings "n" of 0.013 for fully paved corrugated metal pipe.
 - b. For metal pipes with paved inverts, use a Mannings "n" appropriate for the corrugation configuration. The commonly accepted values are 0.024 for 2-2/3" X 1/2"; 0.027 for 3" X 1" and 0.032 for 6" X 2".

2. Culverts
 For all corrugated metal pipes regardless of whether unpaved, paved invert or fully paved, use the appropriate "n" value given in paragraph 1b since culverts are subject to scour.

Please check the hydraulic analysis on all projects which are scheduled for letting after April, 1975. If the pipe sizes were established on the basis of Mannings coefficients differing from those given in this instruction prepare a new analysis and a new cost comparison.

Subject: ROUGHNESS COEFFICIENT FOR CORRUGATED METAL PIPES

Where this new analysis indicates that previously designed metal pipe sizes are larger than required, revise the P.S. & E. to provide the smaller size metal pipes. If the cost comparison previously supported another type of pipe and now justifies metal, revise the P.S. & E. to show the newly designed metal pipe. When the cost comparison for a project indicates that concrete (or other type) is more economical in some instances and corrugated metal in others, you may include both types in the contract as long as this results in a significant quantity and reasonable price for each.

When paved invert pipes are used in either storm drain or culvert systems, the design of the protective lining for the downstream channel should be based on the higher initial velocity that will exist while the paving is still intact. Use a Mannings "n" of 0.019 for all paved invert pipes regardless of corrugation configuration. For fully paved storm drain or culvert systems, design the channel protective lining using an "n" of 0.013.

As mentioned previously, this review of the longevity of asphalt paving in corrugated metal pipe is part of a continuing study and additional data may dictate supplemental or modifying instructions be issued on this subject in the future.

The Report on Design submitted with the P.S. & E. should include a summary of the analysis of alternate pipe types including hydraulic and economic data. A concluding statement giving the basic reasons for the pipe type selected should be given.

PREL.	FINAL
CONCEPTUAL	LANDSCAPE
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