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ENGINEERING INSTRUCTION

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

SUBJECT: ROUGHNESS COEFFICIENT FOR C.M.P.

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APPROVED:

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The purpose of this instruction is to establish the roughness coefficient (Manning "n") to be used in designing asphalt paved corrugated metal pipe drainage systems.

A recent review of research and manufacturers data indicates that the asphalt paving applied within a corrugated metal pipe does not last for the life of the pipe. The asphalt paving material tends to separate from the metal surface. Therefore, the roughness coefficient used in designing corrugated metal pipes should not be reduced just because the pipe is to be partially or fully paved with asphalt.

Manning's "n" for unpaved corrugated metal pipe varies with the corrugations. 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". Lower values should not be used even if the pipe is to be paved since this may result in pipes of insufficient capacity within the design life.

This is a serious matter. We are concerned not only with the possibility that drainage systems might be underdesigned but also that the most economical material may not be specified because of improper cost comparisons.

Please check the hydraulic analyses on all projects which specify paved corrugated metal pipe and which are not scheduled for letting before March 28, 1974. If the pipe sizes were established on the basis of a lower roughness coefficient than those shown above, prepare a new analysis and a new cost comparison. If this new analysis indicates that the designed pipe sizes are inadequate but that corrugated metal is still the more economical, revise the P.S.&E. to provide the larger size metal pipe. If the cost comparison favors concrete pipe, revise the P.S.&E. to specify concrete pipe. If the cost comparison for a project indicates that concrete 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.

Although asphalt paving should not be used just to improve flow characteristics, asphalt paved inverts may still be specified to increase durability as outlined on Design Data Sheet 73-7. When paved invert pipes are used 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. Therefore, when computing this velocity use a roughness coefficient ("n") of 0.019 for all paved invert pipes regardless of corrugation configuration.

MDG:JRG:FS