HDPE CORRUGATED PIPE
SUCCESS OR FAILURE?

Last fall the American Concrete Pipe Association made available copies of the fall 1996 issue of Uni-Bell PVC Pipe News. This issue contained important information and observations concerning cracking and buckling problems involved with some corrugated HDPE pipes. One of the most publicized installations involved a deep-fill project in Pennsylvania.

Consumers may be interested to know that as a result of the cracking and buckling problems, AASHTO has been asked to reconsider the deletion of the requirement for Hydrostatic Design Basis rated material. Such reconsideration includes a proposal which would require material stress qualification tests that are claimed to be correlated to the long term mechanical properties of the material.

While the intent is to correct the material deficiency currently allowed by AASHTO standards which are evident by circumferential cracks, liner buckling and liner de-bonding after only a few years in service, we question whether the proposal is a satisfactory replacement for the prior HDB test requirement. This proposal reduces the test duration from 30 hours to only 4 hours in evaluating the materials resistance to slow crack growth. This represents **a most significant reduction in performance requirements.** Is not the key to testing for performance potential to provide assurance the products will perform as anticipated, rather than reduce the test requirements so basically all products would be acceptable? The PE material used for throw away shampoo bottles would likely meet such reduced test requirements. It is also our understanding that, **while research may be underway, there has yet to be correlation with the long-term material properties, established by the HDB tests.**

A few questions relevant to the performance of HDPE pipe produced using non-rated materials are:

- If the aforementioned Penn DOT study was a most successful installation claimed by some HDPE pipe manufacturers, then, **why did Professor Selig report that cracks in the HDPE lengthened with time and the HDPE liner de-bonded** from the outer HDPE corrugation in some areas?

- How can a manufacturer promote that its corrugated HDPE pipe performs well at fill heights of more than 100 feet (as done in a N-12 product brochure) in view of the results of the Penn DOT studies and numerous reports of in-service **continual increase in circumferential splitting and wall buckling? Does such splitting and buckling support successful**

performance? Is not the statement "the pipe has remained virtually unchanged over the past three years" **contrary to the facts**?

- What is the manufacturer's definition of performance? **When Professor Selig was asked, "as to whether the products would have performed** if buried under a hundred feet of fill and sold to a customer", he responded, "If the application had been as a drainage pipe with the embankment, **NO**."

- If, in fact, the Penn DOT study was "**designed to fail**" (as another HDPE pipe manufacturer later reported in their response to the Uni-Bell PVC Pipe Association challenges), why did the manufacturer **tout the success** of this deep buried project, with absolutely no mention of the trial nature of the installation? **Does not cracking, buckling and delamination represent failure rather than success?**

- How can a service life of over 70 years be claimed when such overwhelming data presents **failure of the material in less than 6 years? HDB rated material**, which **was not used, is only evaluated for 50 year** material properties and ductile behavior, **not 70 years.**

- Can "**ease-of-installation**" be claimed for a product that is **extremely sensitive to backfill compaction for performance?** Did not the Penn DOT project install the 24" diameter pipe using a 2 foot thick band of crushed rock, compacted to 100% completely surrounding the pipe, **yet it still failed?**

- If HDB-rated resins are unnecessary, then **why did the time dependent failure occur**? Rated materials have known long-term mechanical properties. Professor Moser stated such cracking would not likely have occurred **if HDB rated material was used.**

- Is it not the **responsibility of engineers to maintain quality standards** rather than reduce test requirements that could allow acceptance of products that are known to have poor material characteristics?

Given the many questions raised about the long-term performance of HDPE pipe in service, **would it be prudent engineering** judgment to install HDPE pipe under highways and other structures for which **you could be held liable** in case of product failure?

While we support realistic test studies and endorse the development of appropriate material testing, we are strongly opposed to ignoring the concerns such studies bring to light and relaxation of product and/or material performance test requirements designed to protect the owners, taxpayers, and general public.