

# Polyurethane to Polyurea Spray-Up Processing – Phase 1

## SUMMARY

Predl Systems is a small company that manufactures manhole liners. The liners act as protective barriers that prevent the degradation of concrete in sewer systems through spalling of concrete, particle abrasion, and microbially induced corrosion. The liners are manufactured using spray-up open moulding methods, providing a simple solution. Traditionally, polyurethane resin has been used as the matrix material, requiring specialized equipment and material preparation. But impending workplace law changes (to limit styrene emissions), ageing equipment, and rising material costs have driven Predl Systems to consider an alternative polyurea resin system. In order to reduce business risk, Predl turned to CRN for help to understand the consequences of their choice, in terms of processing requirements and material performance.

## CHALLENGE

Predl Systems is a small family-operated business located in Burnaby. The company uses, and relies heavily on, composite manufacturing technology. However, Predl has little fundamental understanding of the materials or processes in use. When met with the need for change, due to regulatory and other cost factors, Predl's limited knowledge posed a significant risk. Better understanding of the fundamentals was required.



### **Predl Systems Inc.**

Burnaby, British Columbia

Predl Systems manufactures manhole liners to protect sewer systems from degradation. The company purchases hard plastic tubular liners and manufacture base channels using the spray-up method. The assembly lines manhole systems.

### **Client Contacts**

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CRN blister tank for material exposure tests, simulating warm, flowing water in sewers.

## APPROACH

A two-phase project was initiated by CRN. The first phase focused on a literature review of the current polyurethane material system in comparison to a proposed replacement polyurea system. Phase 2 of the project will perform blister tank moisture degradation experiments to confirm theoretically predicted improvements identified in the literature review phase. The project also acts as a case study for qualification experiments for this product application and design.

## OUTCOME

Phase 1 of the project clarified that differences in chemistry between the two material systems lead to changes in material durability, bonding to concrete structures, and processing time windows (which in turn limits the spray-up time for more complex geometries). With this knowledge, the company can now make more informed decisions as they move towards an industrial solution. The literature review from Phase 1 has also aided in developing a more robust test method for Phase 2.

## IMPACT

Predl Systems now has greater confidence in decision making and in its ability to evaluate new and existing designs as it transitions to the new polyurea material system. Phase 2 of the project will further improve Predl's understanding of the new material system by providing field-performance data.

## CONTACTS

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