TECH TIPS

FROM NASSCO

PART 2

This is the second in a series of articles by NASSCO's Technical Advisory Council (TAC) discussing the health and safety aspects of styrene in cured-in-place pipe (CIPP) method renewal.

WORKING WITH CIPP IN ENVIRONMENTALLY SENSITIVE AREAS

By NASSCO Technical Advisory Council Member Christopher Macey, P.Eng.

This is the second in a series of articles by NASSCO's Technical Advisory Council (TAC) discussing the health and safety aspects of styrene in cured-in-place pipe (CIPP) method renewal. While the initial article reviewed the history of styrene use and focused on styrene emissions, this article focuses on project planning and execution to mitigate potential deleterious impacts to the environment when conducting CIPP work in and around environmentally sensitive areas.

As noted in the first article in this series, the CIPP industry looks forward to the next 50 years of buying an even longer life cycle for our aging infrastructure. To facilitate this requires not only a better understanding of styrene emissions but a more holistic understanding of management of styrene and all substances we work with, such that the implementation of rehabilitation works neither harms humans nor the environment around us. NASSCO is committed to providing sensible best practices that promote sound environmental stewardship while funding research to evaluate the challenge of building the next generation of infrastructure by integrating science with continuous improvement processes matched appropriately to the complex problems we are trying to solve.

Environmentally sensitive areas can cover a broad spectrum of habitats. One of the most common areas we face, however, is in works where CIPP residual products could potentially come in contact with water courses or any other water habitats bearing fish or other sensitive species. While the management of styrene emissions is usually focused on odor management and worker safety in areas that need to work in close proximity to residual styrene pathways in air, styrene management in environmentally sensitive areas needs to focus on potential free styrene pathways that may enter the environment directly or by simple rainfall runoff processes. While each environmentally sensitive area is unique and has thresholds that will vary based on the species of concern and the assimilative capacity of the waterway or water body, suffice it to say, fish habitat typically have considerably lower thresholds for potential harmful effects from work in close proximity than typical human exposure limits. When the exposure risks are greater, we need to elevate our approach to appropriately match the environment.

In CIPP work in typical urban settings on sewers conveying sanitary sewage, the risks are readily manageable and project planning is usually limited to a balance of housekeeping issues and other techniques focused on airborne styrene emissions such as those that evolved out of 2020 studies from Trenchless Technology Center's (TTC) "CIPP Emissions Phase 2: Evaluation of Air Emissions from Polyester Resin CIPP with Steam Cure". When the pipes being rehabilitated, however, shift from sanitary to storm sewers or the surrounding work area changes from the urban setting to wetlands or nature rich environment with diverse species present beyond humans, our planning and management of construction needs to change and be appropriately matched to the workplace environment.

Matching the technique to the problem is not a "one-size fits all", it requires planning, careful delivery and project execution and monitoring to verify that mitigative efforts have been successful.

Standard methods that are typically employed for styrene management should include:

Sites that directly interface with surficial drainage courses should be assumed to be an active fish habitat. Therefore, acceptable styrene discharge levels should be matched to the environment based on appropriate detailed studies of the receiving environment or measurable levels of discharge should not be permitted in the absence of such studies.

Styrene management plans need to be developed, more typically focused on free styrene pathways. Alternatives methods of control may include:

- Use of styrene-free resins.
- Use of on-site treatment systems where hot water curing methods are used. Properly designed mobile treatment systems are now readily available to reduce discharge limits to very low levels if required.
- 100% condensate capture, removal of any residual free styrene and off-site disposal at a legal discharge facility where steam curing methods are utilized.
- Confirmation that no residual free styrene is present that could be discharged to the environment where UV curing methods are used.
- Special tube selection to mitigate the ability of free styrene to be discharged to the environment.

Styrene management plans need to include sufficient details on:

- Required limits to be regulatory compliant for discharge based on the proposed resin selection, curing method, and discharge location for steam condensate or cure water, storm water, etc.
- The means, methods, and techniques employed to mitigate styrene levels to within acceptable limits for discharge to the environment, including:
  - Resin selection to eliminate or mitigate styrene levels.
  - Cure considerations to mitigate excessive styrene volatilization.
  - Handling considerations post cure to mitigate levels discharged to aquatic or other environments that may be deleteriously impacted by excessive styrene levels.
  - Monitoring to be employed to confirm discharge levels are consistent with the styrene management plans stated discharge limit objectives.

When the workplace moves away from pure sanitary sewers and outside of the normal urban setting, styrene management for CIPP projects needs to be elevated while still adhering to traditional styrene emission standards. Fortunately, there are numerous tools, techniques, and product variations that can be used to appropriately match our work to the specific work environment. We just need to do it!

TECH TIPS IS A BI AVAILABLE IN THE FULL VERSION MONTHLY ARTICLE ON TRENDS, BEST PRACTICES AND INDUSTRY ADVICE FROM NASSCO'S TRENCHLESS TECHNOLOGY MEMBERSHIP PROFESSIONALS

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