BUILDING RENOVATION

REUSE, REHABILITATION AND RESTORATION TECHNOLOGY

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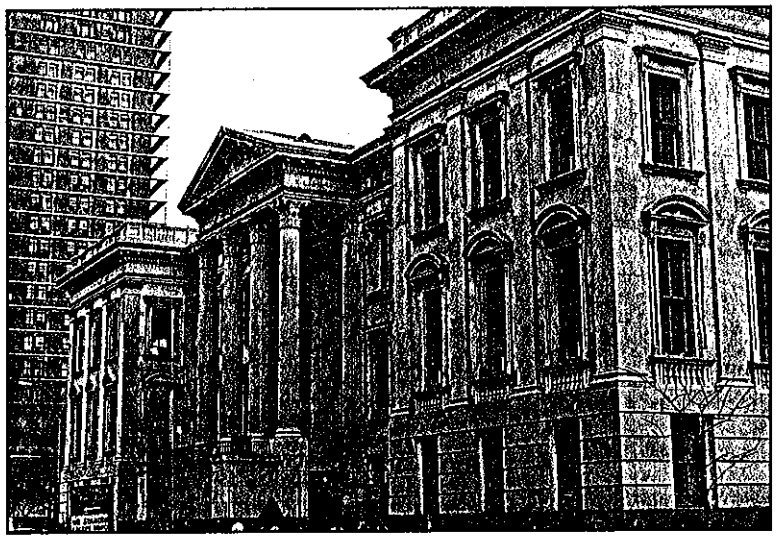
MECHANICS

Cleaning and the Environment

Puddles and quagmires from cleaning buildings are increasingly subject to regulation by the EPA and many local environmental agencies.

It has been estimated that at the end of WWII the US was producing 500,000 metric tons of hazardous waste annually, a figure that has risen steadily through 1985, when the EPA calculated annual production of hazardous waste at 275 million metric tons. Unfortunately, this growth was not mirrored in waste management practices. The result? Most hazardous waste produced in this period was disposed in a manner that posed a serious threat to ecological systems and public health. But if you thought smoke stack industries and "dirty" manufacturers were the only culprits, think again. Many building and renovation projects were quietly contributing to the growing morass by discharging construction and cleaning materials directly into municipal storm water and sewage systems.



The cleaning contractor at New York's Tweed Courthouse constructed a run-off containment system to prevent contamination of groundwater and sewer systems.

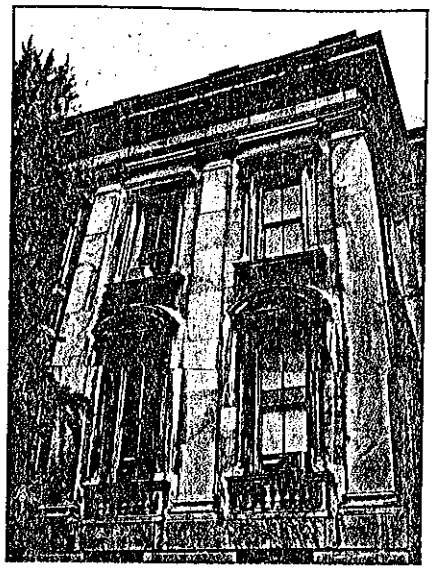
To address the phenomenal growth of the hazardous waste problem, Congress passed the Resource Conservation and Recovery Act (RCRA) in 1976 to protect human health and the environment from damage resulting from improper handling of hazardous waste. The RCRA amended the Solid Waste Disposal Act (1965) and was the first step towards managing hazardous waste from generation to disposal. While the law was only an outline of procedures, amendments and local regulations have since been passed explicitly stating requirements for disposal of hazardous waste.

Initially the focus of the RCRA and EPA regulations was large companies that produced the greatest proportion of hazardous waste—more than 1,000 kilograms of hazardous waste per month. More recently attention has focused on potential health and environmental problems that could result from mismanagement of a large number of Small Quantity Generators (SQG), those generating between 100 and 1,000 kilograms of hazardous waste per month and Conditionally Exempt Small Quantity Generators (CESQG). State regulatory and permit programs for household and small quantity generator hazardous wastes were mandated by amendments to the RCRA made in 1984, and state and local agencies have been updating or drafting directives for the care and disposal of pollutants and hazardous waste. Each state and local municipality is allowed to draft their own plan in accordance with their unique waste management needs. While these plans cannot be more lenient than the EPA regulations they can be more stringent, and in many localities this is the case. Many cities adopted more rigorous regulations concerning the runoff into public sewers, while rural municipalities heightened the restrictions pertaining to running streams and groundwater.

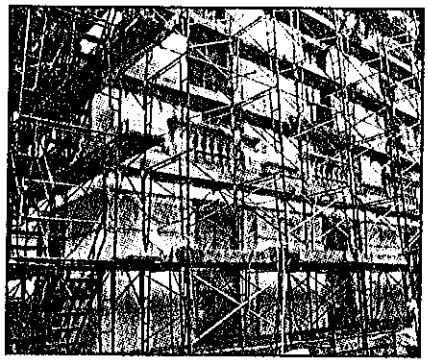
PUBLIC SEWER REGULATIONS

Other legislation that may affect some renovation projects is the EPA's Storm Water Permit Requirement. This law, which went into effect October 1, 1992, was mandated under the Water Quality Act of 1987 and requires that any construction activity that disturbs six acres or more through excavation, grading, modification of terrain, or any combination of these, incorporate a pollution prevention plan. This plan must include a site map showing topography, drainage area, and site characteristics, as well as a listing of all receiving waters. While the EPA does not currently require permit applications for construction sites disturbing less than five acres, a proposal being drafted would require a pollution prevention plan for all construction sites. It should also be noted that each municipality develops and enforces programs regulating sewer and wastewater treatment and a few localities have already adopted regulations for sites less than six acres.

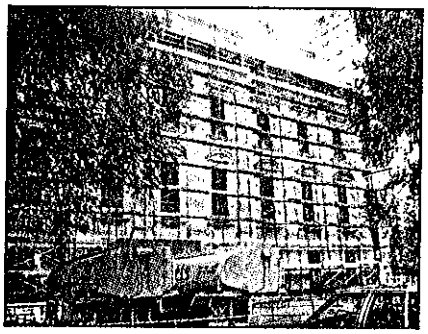
Independent of the size of the project are the regulations concerning run-off into municipal sewers. These restrictions are enforced by the local public works office and vary from municipality to municipality. Sewer codes restrict constituents depending on pH, temperature, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), suspended solids, and temperature. Examples of materials that cannot be discharged down the sewer system



Hydrocarbon soiling at the Tweed Courthouse in New York City was removed as part of a two-year restoration project. Local environmental quality regulations prohibited the contractor from discharging effluents from the cleaning operation into the municipal sewer system.



The contractor constructed a wood framed trough system around the base of the building. Polyethylene sheeting was used to line the trough and contain the cleaning runoff.



The sheeting was positioned with low points or troughs to collect the waste in several pools, which were pumped into storage tanks (the trailers in the photo above) and appropriately neutralized. The contents of the tanks were tested by the EPA and then allowed to enter the sewer system.

include acutely hazardous materials (as determined by municipality); construction materials, straw, shavings, tar, plastic wood, wax, or obstructive solids; flammable or explosive liquids, solids or gases, and petroleum hydrocarbons.

WHAT'S SAFE? WHAT'S NOT?

Information and regulations concerning the safety of individuals handling, or in the vicinity of, hazardous materials used for construction or conservation treatment are readily available from the Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH). This information is also provided by law on the Material Safety Data Sheets (MSDS) available with every commercial product. While these safety standards have been stringently enforced for years, once many hazardous materials have been utilized, and are no longer a direct threat to human health and safety, these occupational regulations no longer apply. But this is far from meaning that small-scale building projects are exempt from further regulation. While a few individual hazards, such as asbestos and lead-based paint, have been and are regulated from removal to disposal, the majority of potentially hazardous substances used in building projects have not been regulated. But, the potential hazards they pose to wastewater and sewer systems have recently received substantial regulatory attention.

While health and safety plans have been required by law for the duration of a building project, the liability of the contractor, architect, conservator, and building owner is now extended through the disposal process of all materials and substances. In past years it was common practice to allow cleaning compounds to flow into public sewer and adjacent ground water systems as they were rinsed from a building. It was believed that the "dilution" of the substances during the rinsing process was sufficient treatment to mitigate the hazard. But this is not always the case, currently the list of what is considered hazardous waste and restricted from disposal through a public sewer or adjacent ground water system includes many compounds commonly utilized or removed during a renovation project. Some of these include:

- Cleaning compounds—acetic acid, hydrofluoric acid, methyl alcohol, toluene, xylene, carbon tetrachloride, methylene chloride, muriatic acid, nitric acids, potassium hydroxide, sodium hydroxide, and calcium hypochlorite.
- Consolidants and stone strengtheners—methyl ethyl ketone, toluene, xylene, and 1-1-1-trichloroethane.
- Rust and corrosion inhibitors—zinc, lead, potassium and strontium chromates, as well as hazardous oxides, amines, and chromates.
- Surface coating residue—lead, arsenic, cadmium, manganese, chrome, and PCBs (phytalocyanine blues and greens). Pigments, such as benzidine-based colorants, may break down into toxic or carcinogenic chemicals. Some natural resin coatings and varnishes also contain hazardous pigments, such as arsenic trisulfide, which is often used in amber shellacs. Because most commercial strippers contain hazardous ingredients, such as methylene chloride, stripping residue often must be treated as hazardous waste.

As more information is being gathered and the potential reactivity of substances in the environment and/or sewer system is understood this list is constantly updated.

Furthermore, in accordance with EPA regulations, substances not listed that have a pH below 2.5 or above 12.0 can not enter any public sewer system. But, many local agencies enforce tougher restrictions; for example, New York City codes restrict any wastewater with pH less than 5.0 or greater than 9.5. Additionally, if a substance is "naturally" of a pH above or below these levels it can enter the sewer system only if its pH is altered as part of the utilization process. A few scenarios in which this condition is met include the use of a two part solvent system in which a second substance is applied that neutralizes the runoff (there are several two-part cleaning systems that are commercially available); in many cases diluting with large quantities of water is not considered acceptable and does not fulfill this condition. Another acceptable scenario entails altering the pH of the solvent as it reacts with components of the soiling. As the regulations become more rigorous and more commonly used materials are restricted from public sewers, alternatives to previous methods of utilization and disposal on