Acid Assisted Demolition

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In our project, we examined the use of acids in the building demolition industry. Many structures from the mid 20th century are nearing the end of their lifespan for safe and effective use. As of now, the most common methods of demolition are the use of explosives and wrecking balls. These both create tons of extra waste and devastate the surrounding environment. Along with the pollution they cause, these methods are also quite costly, while acid is available in industrial quantities for as little as $20 a liter. To possibly aid in the demolition process, we believed that acids would be able to significantly weaken the internal structure of building materials, consequently lessening the number of explosives and the environmental effects that accompany it. With this goal in mind, we tested nitric, sulfuric, and hydrochloric acid with eight common building materials from mid 20th century buildings. All acids were in small 200mL quantities and at a constant 2M concentration. Every material was in relatively small amounts - around 10g. We exposed the materials for 10 days in each acid (One set of materials for each acid) and took measurements of both the materials and the solutions to determine if any significant reaction occurred. Mass was calculated throughout the trial, and afterwards, we physically tested it with a hammer and pliability test to determine the structural aspects of the materials and if our acids had weakened them in any way. Electronic probes took conductivity an pH readings daily to determine if a reaction had taken place and how significant that reaction was. Analyzing all of our data brought the conclusion that there is a practical application of acids - particularly nitric - in assisting with the complicated process of building demolition.

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