Case Studies

Of course, every community hopes it never has to use its disaster debris management plan, but when a disaster does hit, prepared communities can recover more quickly than other communities. Below are disaster debris case studies from an earthquake, a flood, and three hurricanes. These case studies include examples of situations in which planning paid off, as well as circumstances in which the lack of planning slowed recovery.

Los Angeles, California
The Northridge Earthquake

The city of Los Angeles relied heavily on recycling to manage debris from its January 1994 earthquake. In response to the earthquake, city staff negotiated with FEMA to designate recycling as the preferred method of debris management. The city developed contracts with existing businesses to recycle clean source-separated materials and worked with more than nine businesses to develop processing capacity for mixed debris. By midsummer, the city was able to recycle about 50 percent of the earthquake debris collected each week. By July 1995, the city was recycling over 86 percent of the debris collected, totaling over 1½ million tons.

Collection and recycling

The city of Los Angeles did not have a plan for debris management prior to the earthquake but quickly developed debris management procedures after the disaster. The day after the earthquake struck, the city instituted a curbside debris collection program, which did not include recycling. C&D debris under normal conditions makes up 10 to 15 percent of the Los Angeles waste stream. Prior to the 1994 earthquake, one local company processed 150 tons of C&D waste per day. After the earthquake, the city picked up as much as 10,000 tons of C&D waste per day. City officials updated an existing list of licensed, insured debris removal contractors and asked them to attend an orientation and to sign hastily drafted contracts for debris removal.

At first, contracts for debris removal were only two pages long and contracted for one week of work. These early contracts allowed the city to begin removing debris quickly, yet did not include recycling or other requirements such as subcontracting parameters. Contracts ultimately grew to 22 pages. The city assigned each contractor a grid of streets to clear. City inspectors (pulled from other assignments) monitored contractors and kept records to determine whether debris in each area was collected within seven days of being set out. When contractors expended their total contract amounts, city officials placed them at the bottom of the list of approved contractors and called them again when their turns came.

After two months of negotiation, FEMA allowed the city to include recycling as a debris removal method. This decision was based primarily on the city's local policy supporting recycling and a recycling pilot that documented a potential 82 percent recycling rate. Contractors began separate collections of wood, metal, dirt, concrete and asphalt, and red clay brick. The city required the contractors to send any debris that could not be separated to facilities that recycled at least 80 percent of the mixed debris.

Most of the materials collected were recyclable. Recyclers crushed concrete and asphalt (mixed with up to 15 percent dirt) and sold it for use as sub-base in roads. They reused dirt as landfill cover and soil amendment. They ground and screened wood, selling fine pieces

by the cubic yard for landscaping and coarse pieces for cogeneration fuel or compost. Recycling facilities either ground up brick for use on baseball infields or chipped it for use in landscaping. Scrap metal dealers recycled metal waste.

By December 1995, four facilities were capable of recycling mixed debris. Two of them used an automated process that screened out fine debris and sent the remainder along a conveyor belt where workers removed and separated wood, brick, metal, and trash by hand. A vibrating screen removed any dirt left in the remaining stream. At the end of the process, only clean concrete and asphalt were left.

City officials also ensured that debris would be recycled by providing training and incentives to haulers. For example, city officials required haulers to develop a recycling plan that included scouting for recyclables and dedicating trucks to a given type of waste, so that debris separated at the curb did not become mixed in the truck. The city also created a contract performance incentive that placed source-separated recycling higher than mixed recycling. With these efforts, the city expanded its C&D recycling capacity by a minimum of 10,300 tons per day. Immediately after the earthquake, all debris was disposed of in three landfills. Just over a year later, the city had added 18 recycling facilities and one landfill. This expansion helped to meet a long-term goal to increase recycling of routine C&D waste.

By the end of the program, the city had recycled almost 56 percent of all materials collected since the day of the earthquake for less than the cost of disposal. The city demonstrated that when sufficient recycling facility capacity exists, a recycling rate of over 86 percent can be achieved. This total would have been much higher, in fact, had the city implemented recycling in the beginning of the recovery effort. To prepare for the possibility of future disasters, Los Angeles has issued an RFP for a contingency contract for various waste management activities, including the use of sites in the event of a natural disaster.

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Communication

Soon after the earthquake, officials placed news stories and advertisements to inform the public that they could leave debris for pickup on the street in a pile as wide as a parked car. At first, the city allowed residents to leave mixed debris at the curb. Later, city officials asked residents to separate the following materials: concrete and asphalt (these could be mixed), dirt, red clay brick, wood, and all other material. Residents had been accustomed to the relaxed requirements that allowed them to set out mixed debris, however, so crews of specially hired city workers distributed doorhangers requesting residents to separate their debris. Where residents still did not separate debris into its recyclable components, work crews preceded the debris haulers and separated the debris. When residents placed yard trimmings or other non-earthquake-related debris on the curb, workers left doorhangers explaining why these materials had not been picked up and giving directions on how to dispose of the materials. In the first eight months after the earthquake, debris haulers collected 122,000 truck loads of debris.

The city relied on both residents and city staff to determine which locations needed debris pickups. A telephone bank, staffed by English-, Spanish-, and Korean-speaking operators, fielded requests for pickups from residents. Staff entered the address of each caller into a geographic information system database and regularly produced maps showing areas needing pickups. At the same time, city inspectors supervising the debris management work reported streets where debris had accumulated.

Outside assistance

Los Angeles was largely self-sufficient in managing its earthquake debris. If the quantity of debris had been greater, the city would have asked for assistance from USACE (through FEMA), the state of California, and other states. Other agencies provided some assistance. The California Office of Emergency Services provided a liaison to FEMA and issued emergency regulations expanding permit hours for solid waste facilities.

FEMA funded the debris recycling program, including paying recycling facility tipping fees, as well as the costs associated with hiring data entry staff and contracting with a consultant to manage recycling efforts. For the period of May 14, 1995, through July 15, 1995, the average tipping fee to use the recycling facilities was $21.55 per ton versus $24.92 per ton for disposal facilities, resulting in an average savings of $3.37 per ton. In addition, recycling saved the city transportation costs since recycling facilities were closer to the devastated areas and many had shorter lines. California's Integrated Waste Management Board helped Los Angeles obtain this funding by writing a letter to FEMA stating that recycling was state policy. Los Angeles, like every community in California, has been required to submit a plan for source reduction, recycling, and composting under the state's Integrated Waste Management and Litter Reduction Act. FEMA determined that since Los Angeles had a recycling policy prior to the earthquake, the city did not need to demonstrate that recycling would save money in order to obtain FEMA funding.

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