

DISPOSAL OF MATERIALS IN URBAN FREEWAY CONSTRUCTION

Glen R. Watz, Michigan Department of State Highways

•THIS paper will present some of the problems of disposing of materials in urban freeway construction and discuss some of the means used by the contractors to cope with the problems. This should also shed some light on factors contributing to the constant rising cost of the construction. Keep in mind that, by specification, all material not specifically designated for use on the project becomes the property of the contractor.

The material to be disposed from freeway construction can be grouped into 4 major categories: trees, stumps, and other vegetation; concrete pavement, curbs, sidewalks, and foundations; earth excavation; and junk and debris. Until recent years, trees and stumps caused no particular problems because they could be bulldozed to the middle of the right-of-way and burned. The only inconvenience was that of obtaining a burning permit from the local governmental agency. As the people became more conscious of air pollution, burning permits were no longer issued. The organic material then had to be hauled to the city dumps where burning was permitted. This too passed, and areas on which burning could be done were found in the neighboring communities. Eventually, no place within an economical haul distance could be found, so the contractors turned to burying the material in the bottom of worked borrow areas. This method requires haul distances sometimes of 40 miles to the disposal site.

The most recent innovation for the disposal of trees and the like is a chipper that will handle trees up to 21 in. in diameter. Anything larger than this must be split into a size the machine will take. This operation, along with the stump chipper, reduces the entire tree to chips that may be disposed of in the city dumps. Much of the material is lost within the right-of-way and is mixed and disposed of with the excavation. Oddly enough, little of the timber is used for firewood or lumber. The market is so unpredictable that it is not a bidding consideration.

Methods are now being pursued to develop a market for the wood chips to be used as a mulch. Recent reports indicate that wood chips may be an excellent mulch for erosion control, and this fits very nicely with the present emphasis on control of water pollution.

The toughest disposal problem is posed by the concrete rubble created by the removal of pavements, sidewalks, curb, and foundations. If this material is not massive and contains no reinforcing steel, it can be salvaged and run through a crusher to produce coarse aggregate for paving mixes. Even this simplified disposal method is not without its shortcomings. With all the zoning, noise and air pollution, and other "anti" ordinances, the contractors often have trouble keeping up with the changing of the times and moods of the people.

The rubble or so-called "hard stuff" that cannot be reduced to a usable size must be disposed of in other ways. Infrequently, there will be a fill area on the project of such size that will permit the incorporation of some of this material. Generally, the material has to be hauled away.

Hauling is an expensive operation because weight is the prime consideration, and capacity loads, in relation to volume, cannot be hauled. Free dumping areas for rubble are never found. People just do not want a field or ravine full of large blocks of masonry, concrete, and reinforcing, especially when the vacant land surrounding the urban areas is a potential development site.

Where the contractors are able to buy dumping privileges, the restrictions are very rigid. The material must be spread and interspersed with earth to form a fill much the same as required for highway construction. The situation is such that most contractors try to maintain 2 or 3 dump sites to provide adequate areas over which to spread the material and keep the operation moving. Again, hauling distance is a very important factor as some of the dump sites are 40 miles from the project.

Where the situation permits, the rubble will be hauled to the sand pit being worked for the project. Although this generates some saving because the contractor is able to haul in both directions from the pit, part of the saving is expended in that the material must be piled someplace on the project, out of the way of construction, and later rehandled for loading when the sand operation is being carried on.

Although the junk and debris category is not necessarily the most troublesome, it is the most aggravating and is created by the "midnight dumpers." This material grows on the right-of-way every night throughout the term of the contract and often for some time thereafter.

The people in the vicinity of a project find a very convenient disposal ground for all the junk that has been accumulating and is otherwise difficult to dispose of. This debris ranges all the way from sacks of garbage to kitchen stoves, refrigerators, and even abandoned automobiles. It is not uncommon to find loads of trash and garbage, an indication that commercial haulers do not object to using the right-of-way as a convenient accessible dump. On one particular job this material was reported to average about 1 ft deep over the entire area. Prior to opening one short stretch of highway in the downtown area of Detroit, 3 stripped and abandoned automobiles were seen on the roadway.

Because of the nature of this debris, most of it has to be hauled to and buried in the bottom of the sand pits along with the concrete rubble. When the quantity warrants the work involved, the metal objects go to the salvage yards and the automobile bodies to the crusher. One contractor reports that, depending on the size and location of the project, from \$3,000 to \$10,000 are included in the bid prices for excavation just to dispose of the junk and debris.

Most expressways in urban areas are constructed as depressed sections, and all of the excavation material is waste. Occasionally, a situation will develop where some of the excavation material can be used to construct embankments. However, this is rare. Although seams of granular material are at times found in the excavation, the contractors do not find it economical to salvage the sand because the magnitude of the operation prohibits the changes necessary to do the selective grading and stockpiling.

During the early part of the expressway construction in Detroit, dumping areas for sound earth were relatively easy to come by. Vacant lots were in abundance, and those who owned the floodplains along the rivers were more than happy to receive the earth on their sometimes inundated property and thereby to salvage it for a more profitable use. Generally, this type of dumping involved no payment. Occasionally, the contractor would receive up to \$1.00 a cu yd for material in small lots as opposed to paying as much as 25 cents a cu yd for dumping rights in large volumes.

Now the situation has changed. Most of the vacant lots are full, and those that are not are too small to accommodate the large hauling units. The floodplains have come under the close scrutiny of the Corps of Engineers, the State Department of Natural Resources, and county government. The current rules and regulations effectively preclude these areas as dump sites.

As the availability of the local sites waned, the disposal problems were compounded. To economically haul greater distances, contractors purchased larger hauling units. What started out to be an operation with 5- and 7-yd trucks has now developed into hauling with 15- to 18-yd loads on the triple or quadruple axle units and 30- to 35-yd loads on the trains. These hauling units require an area about three times their length, or up to 180 ft, in which to maneuver, so large dump sites are needed. The open spaces of adequate size are farther out, and this increases the haul distance. Earth is now being hauled as far as 20 miles from the project.

Most of the mining and dumping is controlled by local ordinance. Ecology is now in the foreground, and every low spot does not automatically provide a disposal site.

The local agencies have restrictions on hauling activity, and haul routes must be established before work commences. The quality of the local road systems does not always permit the shortest direct route to the dump site. The contractor has the responsibility for making arrangements for the haul roads, and this means he must post a bond to ensure repair of the route used. As the construction proceeds farther out from the downtown areas, better roads are found and haul-route problems tend to decrease.

The populace is becoming more and more intolerant with the inconveniences created by trucking, noise, congestion, and dust. Noise and congestion are difficult to control, but the dust problem has made it necessary for the contractors to purchase sweepers, especially for city streets, to keep the dust at a tolerable level.

In the past 5 years the cost of excavation has about doubled. Because trucking represents more than two-thirds of this cost, the increase can be contributed directly to much higher labor rates and longer hauling distances. In the event that the design of a given section of expressway lends itself to balanced grading, trucks are necessary because the city prohibits the use of scraper type of equipment.

I stated earlier that all excavation becomes waste to the project. That does not mean that it becomes waste in the strictest sense because nearly all of it is put to some use that benefits either an individual or a community as a whole. No market, as such, exists for the earth, so it is disposed of as a mutual benefit to both parties, the contractor and property owner. When it is convenient, the highway department will designate areas where the contractor may dump the material. This may be an embankment area for future construction or on the right-of-way of existing facilities. Some examples of this include filling a wide depressed median to provide an effective glare screen, removing and backfilling an old interurban railway, and filling the median of a divided roadway. The drainage course was tiled, and the backfill greatly enhanced the safety aspects of that section of roadway. The contractor was required to furnish the work and materials necessary for turf establishment in all of these cases.

Some community improvements made possible by the availability of free fill dirt are parks and parking lots along the river front, golf course and civic center at the Southgate Recreation Area, a community bicycle track, and a township-sponsored combined pistol range and ski hill. Land, or perhaps area would be a better word, was available for these projects, but they would not have been economically feasible if borrow had to be purchased to establish a suitable grading elevation.

Many areas are filled for no particular purpose; others are planned industrial sites. One site had about 10 million cu yd deposited on it, and now a church and many homes appear there.

Most local governments no longer permit holes to remain after a sand mining operation, thus the contractors restore these areas to the original elevation with waste material. The land is then returned to some profitable use such as building sites and, in some cases, agriculture.

Not all land fills turn out to the satisfaction of all concerned. Certain problems developed where a contractor purchased 300 acres of land and stripped the sand from 4 to 8 ft deep. The backfilling operation left a house setting on a sand island. Of course, it did not take long for this sand to fill with water. The water created no end of trouble with the basement and sanitary drain field. To date, the situation has not been corrected satisfactorily.

A little searching will reveal a disposal site for earth. Getting the material from the expressway construction site to distant disposal sites is the real challenge that causes the construction costs to soar.