Junk cars are not only an eyesore but also an important environmental hazard. Reducing and eliminating this problem is an important part of environmental management. The New York program is discussed.

HEALTH, SAFETY AND ECONOMICS IN THE JUNK CAR CYCLE

William G. Wilkie, P.E.; Dwight F. Metzler, P.E., F.A.P.H.A.; and David L. Archibald, B.S.

The junk car has often been classified with billboards and roadside litter as an eyesore. This is true, but it ignores the health and safety hazards which make junk cars a prime environmental problem.

Junk cars consist of glass and rusted metal, broken springs, unemptied gas tanks, jagged edges from torn fenders and bumpers, and other hazards to the children who delight in playing in them. In addition, abandoned wrecks provide excellent harborage for rats looking for dry shelter and nesting materials, and for mosquitoes and stinging insects.

In addition, derelict autos are a wasted resource. They have potential value as scrap metal and their recycling conserves resources.

Size of the Problem

More than 90 million vehicles are registered in the United States and approximately 7 million are taken out of service each year. Derelict auto bodies have been steadily accumulating and estimates of the total number on a national basis range from 9 million to 25 million.

In New York State almost 7 million vehicles are registered and approximately 500,000 are retired annually. Along with the estimated 600,000 auto hulks that have accumulated within the State, there is a yearly increase of about fifteen per cent.

<table>
<thead>
<tr>
<th>Junk Car Distribution*</th>
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<tbody>
<tr>
<td>Auto Wrecking Yards</td>
</tr>
<tr>
<td>Graveyards</td>
</tr>
<tr>
<td>Scrap Processors</td>
</tr>
<tr>
<td>Abandoned</td>
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<thead>
<tr>
<th></th>
<th>Urban</th>
<th>Rural</th>
<th>Total</th>
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<tr>
<td>Auto wrecking yards</td>
<td>28.0</td>
<td>45.0</td>
<td>73.0</td>
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<tr>
<td>Abandoned</td>
<td>6.0</td>
<td>12.0</td>
<td>18.0</td>
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<tr>
<td>Scrap processors</td>
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<td>Graveyards</td>
<td>0.7</td>
<td>2.3</td>
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<tr>
<td>Total</td>
<td>38.2</td>
<td>61.8</td>
<td>100.0</td>
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</table>

* U. S. Bureau of Mines.

Junk cars have been a problem for some time, but recently they have been escalating at an unprecedented rate. The
problem is further complicated by the abandonment of vehicles that have outlived their usefulness. The reason usually given is that auto wreckers no longer pay individuals for old hulks, and in many areas a fee is charged for accepting them. As a result, some owners merely remove the identification from their cars and abandon them.

The average life of a modern automobile is approximately seven years.\(^\text{18}\) When the disposal or automotive scrap cycle is working smoothly, cars pass from their last owner to an auto wrecker, then to a scrap processor and to a scrap buyer. The scrap buyer uses the scrap for steel production, for manufacturing new automobiles, and for making many other items. This type of reuse or resource recovery should serve to minimize production costs and increase use of raw materials.

The auto wrecker plays an important role in the scrap cycle. Usable parts of a car are removed for resale. Remaining parts having value in the non-ferrous scrap market, such as the battery, radiator, heater core, generator, starter and electric motors, are removed and the hulk is prepared to meet specifications of the scrap processor. Preparation usually includes the removal of upholstery, floor covering, glass and rubber. The method most often used to remove these materials in the past was by open burning. With the passage of air pollution control regulations, open burning is no longer allowable so that hulks usually have to be stripped by hand—a comparatively slow and expensive procedure.

**Diminished Value for Salvage**

The largest factor contributing to the increasing accumulation of junk cars is the diminished value for salvage. This is affected both by changes in the scrap metals market and the economics of handling vehicles prior to actual processing operations.

The scrap market is dominated by the steel industry, which is the largest consumer of scrap. Pig iron and steel scrap are the two basic sources of ferrous material. Iron one is first treated in blast furnaces to produce pig iron which is subsequently used in steel-making. Pig iron is preferred because it has a constant, predictable metallurgical quality, while automotive scrap usually contains objectionable impurities such as chromium, copper and rubber.

Scrap steel is considered in two categories: *home scrap* and *purchased scrap*. Home scrap is the excess portion of a steel production run; this is the preferable material. Additional scrap from other sources is purchased.

There are two types of purchased scrap, *prompt industrial* and *obsolete*. Prompt industrial scrap is that which is left over from fabricating operations and is the most desirable purchased scrap. Most obsolete scrap contains contaminants that are difficult to remove and is used only if insufficient home scrap or prompt industrial scrap is available.

Obsolete scrap from bridges, old ships and boilers is much preferred to automotive scrap. Baled or compressed auto bodies have a much lower preference rating because of a high percentage of undesirable materials.

The price paid for ferrous scrap metal by steel mills has been declining for 20 years. This is primarily due to a decrease in open hearth furnaces. Steel production by the open hearth process uses approximately 40 per cent scrap steel and 60 per cent pig iron, and up to 65 per cent scrap can be used. For many years, more than 80 per cent of all steel produced in the United States was by this process.\(^\text{11}\)

Steel production from the basic oxygen furnace has increased tremendously during the past decade as illustrated in Table 1. The basic oxygen process uses a much lower percentage of scrap, averaging 30 per cent. The rapid growth in
the use of the basic oxygen process has had a large impact on the scrap market, and this growth is expected to continue.

Electric furnaces have recently been used to an increasingly greater extent. Since they can use up to 100 per cent scrap, their increased use will tend to offset to some degree the reduction of scrap use in the basic oxygen furnace. The over-all result during the next few years might well be that the percentage of scrap used will remain fairly constant. The total amount of scrap used will depend upon the amount of steel to be produced.

Besides the steel industry, the foundry industry is the second major consumer of scrap steel. It now accounts for about 30 per cent of all scrap consumption, and its production is expected to increase greatly over the next few years.

The major foundry furnace in operation today is the cupola, which is charged with pig iron and steel scrap. Percentages used are dependent upon their relative prices. Higher scrap prices would tend to make the foundry use smaller amounts of scrap and larger quantities of pig iron. A trend has occurred in recent years away from the cupola toward the induction and direct arc processes, which allow more flexibility and use a higher percentage of scrap. This trend is expected to continue and should increase scrap consumption.

Foundries offer scrap processors an attractive market, being more numerous and widely spread than steel plants. They also pay a relatively high price for high quality scrap. But they require a high grade scrap, pointing to the need for improved processing equipment and techniques in the scrap industry.

As indicated previously, auto hulks have been processed for many years by either burning to remove rubber, plastics, upholstery and other contaminants, or by more expensive hand-stripping of these materials. The engine and transmission were then removed and sold for cast iron. The heavy steel in the frame was cut off with an acetylene torch and sold as #1 heavy melting scrap and the remaining metal was compressed in a baler and sold as #2 bundle. The #2 bundle, which represents a substantial portion of the weight of a vehicle, is one of the least preferred of all grades of scrap due to the high percentage of contaminants remaining even after burning or hand-stripping.

Shredding or fragmentizing of automobile hulks is a fairly recent innovation and produces a quality product suitable for electric furnace operations because of the small size of the fragments. The use of fragmentizers offers many benefits since it overcomes the

<table>
<thead>
<tr>
<th>Year</th>
<th>Open hearth and Bessemer</th>
<th>Basic oxygen furnace</th>
<th>Electric</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1957</td>
<td>92.4</td>
<td>0.5</td>
<td>7.1</td>
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</tr>
<tr>
<td>1960</td>
<td>88.2</td>
<td>3.4</td>
<td>8.4</td>
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<td>1963</td>
<td>82.3</td>
<td>7.7</td>
<td>10.0</td>
<td>100.0</td>
</tr>
<tr>
<td>1964</td>
<td>77.9</td>
<td>12.1</td>
<td>10.0</td>
<td>100.0</td>
</tr>
<tr>
<td>1965</td>
<td>72.0</td>
<td>17.5</td>
<td>10.5</td>
<td>100.0</td>
</tr>
<tr>
<td>1966</td>
<td>63.6</td>
<td>25.3</td>
<td>11.1</td>
<td>100.0</td>
</tr>
<tr>
<td>1967</td>
<td>55.6</td>
<td>32.6</td>
<td>12.3</td>
<td>100.0</td>
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</tbody>
</table>
need for burning car hulks prior to processing.

Radiators, generators, starters, batteries and tires are required to be removed before cars are accepted for fragmentizing. Gas tanks are also removed to avoid explosions. Motor blocks, transmissions and differentials can be processed but are usually removed because they command a better price when sold as cast iron than when sold as scrap steel. Most of the upholstery and padding must be removed but this can be easily accomplished by cutting and ripping out most of the cloth and cotton batting. Paint, rust, undercoating and accumulated dirt are removed during the fragmentizing process.

Material leaving the fragmentizer varies in size but usually from the size of a tennis ball to that of a flattened basketball. The ferrous metals are then magnetically separated from the nonferrous metals and the nonmetallic materials. Nonferrous metals may be hand-separated from the nonmetallics, depending upon the extent of salvage provided and fluctuations in the market price for the salvaged material.

Fragmentizers produce a high grade scrap which commands a price equal to or greater than #1 heavy melting scrap. The product is acceptable to scrap buyers and future demand for it should be high.

Other economic factors complicate the problem and contribute to a diminished value of auto hulks for salvage. Labor costs are increasing for the auto wreckers, as for everyone else. But the auto wrecker is dealing with a difficult labor market. The industry is considered to be an undesirable tenant in most communities and the labor force is characterized by high turnover. Short-term employment hinders the development of skills necessary for economic operation. The economics favor the storage of hulks rather than hand-stripping them. Autos are therefore kept in their yards for longer periods; and, as inventories increase, storage area is reduced. The auto wreckers begin to discriminate against accepting hulks that offer little in the way of resalable parts.

In spite of the problem of decreasing storage area, wreckers may still be unwilling to transport hulks to a scrap processor. Transportation costs are rising and a fluctuating scrap steel market leads to the hope that scrap prices will rise to higher levels and old hulks in dead storage will become more valuable.

As inventories continue to build, new outlets are sought. In many areas the least expensive solution is to either move to another location, leaving the accumulated hulks behind, or to rent or buy low-value land for the storage of stripped hulks.

The storage area or abandoned yard becomes an automobile graveyard where old hulks rust away. The increasing number of graveyards, as well as the increasing size of existing ones, scar the countryside, many of them in the least desirable places, exposed to public view. They tend to be near urban areas because of the proximity to potential consumers and reduced cost of transportation.

Also contributing to the problem are a lack of public interest and a lack of proper regulatory control to ensure that cars are not abandoned or accumulate in the wrong places. Until recently, the public has been apathetic about the increasing number of derelict vehicles. Public awareness is now on the increase and this should be stimulated to lend impetus to corrective measure.

Many states have laws that prohibit the abandonment of motor vehicles. In too many cases, however, these laws are either unenforced or unenforceable. Un-

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With the adoption of electronic data processing in motor vehicle registration, New York State and several other states are overcoming this problem. EDP systems can assist in reducing the rate of future accumulation of abandoned cars. However, they are of no value in reducing accumulations of cars abandoned prior to the institution of the EDP system.

Many municipalities have local laws or ordinances that prohibit the accumulation of large numbers of junk cars on private property. These laws, in many cases, have not been enforced—either due to governmental apathy, or the lack of public demand for action. Coupled with this are nonuniform auto wrecker licensing procedures which foster fringe operations and excessive, highly visible inventories.

**Programs Initiated Thus Far**

Several areas throughout the country have initiated junk car programs. These programs range in scope from a limited local effort to some which are statewide.

In 1969 Maryland provided for a bonus of $10.00 to licensed scrap processors for each car which is processed into steel scrap. The $10.00 bounty started July 1, 1970, and the program is financed by increasing the annual title fee by $1.00 for each vehicle. In addition to providing statewide licensing requirements for scrap processors and auto junkyards, an attempt is made to reduce excessive inventories of junk cars more than seven years old that are stored longer than 18 months. The $5.00 assessment is for each six month period of storage beyond the 18-month limit.

Laws prohibiting the abandonment of motor vehicles were also toughened. The fine for motor vehicle abandonment is $200.00.

The intent of the Maryland program is to reduce the number of cars in unproductive storage and to reduce the abandoned vehicle problem. The program appears to be successful, but a complete assessment might better be postponed. The Maryland approach was hailed by many to be the most satisfactory solution to the junk car problem, and many suggestions were offered proposing that New York State also authorize a $10.00 bounty. Many claims were made citing the accomplishments achieved by the financial incentive provided—but the same accomplishments were evident more than six months before the bounty provision became effective.

Vermont has taken a different approach by supporting action by local government. The municipality must first inventory all junk cars within its boundaries and report the results to the State Department of Motor Vehicles. It then collects all the junk cars at one or more central locations. This may be done at municipal expense, by the owners of the vehicles or by groups such as volunteer fire departments, service clubs, or PTAs. Once the cars are assembled at central locations, the state contracts for their removal by a private concern.

Since the initiation of this program in 1968, Vermont has entered into 32 contracts and has removed 13,151 cars. The cost of the program has been approximately $10.00 per car.¹

Chicago has initiated a junk car program in accordance with recommendations of the Institute of Scrap Iron and Steel. The program consists of legislation which allows the police department to tow cars directly from the abandonment site to a scrap processor, so long as the car is inoperable, badly damaged or stripped of certain parts and has a value of less than $100.00. In the first nine months of operation more than 10,000 cars were removed by this method.

A number of programs have been in operation in New York State. The most comprehensive county program was car-
ried out in Columbia County. This is a county having a population of about 50,000 and covering an area of 643 square miles. The county is essentially rural in character, having only one city, which, together with the adjacent suburban towns, accounts for about half the population.

The county health department conceived of and implemented a junk car program using funds from the State rodent control program. Use of such funds was approved on the basis that junk cars constitute rodent harborage. The Health Department, assisted by sanitation trainees from a State Health Department training course, surveyed the county and determined that between 8,000 and 10,000 junk cars should be removed.13

A private firm was contacted and arrangements were made for centralized removal of the cars from the county. A car crusher was installed in the City of Hudson on the shore of the Hudson River. Health Department personnel then arranged with outlying towns to establish central collection points where cars could be stockpiled and then transported to the crusher by means of auto carrier trailers that were owned by the crusher firm. Cars were transported to the central collection point and directly to the crusher by individuals, service groups, volunteer firemen and others. When necessary, to cover the cost of transportation, a fee of $5.00 per car was paid.

This project was quite successful and a total of 12,000 cars were removed from the county at a cost of $20,000. The results compare favorably with those from any similar program in other areas.

The car crusher is still in operation in the City of Hudson and continues to receive cars from Columbia County and neighboring counties. The cars are now being brought in without the $5.00 financial incentive.

In Schoharie County, another upstate New York rural area, a similar approach has been used by a group of towns. Unlike Columbia County, Schoharie County is not on a major waterway with its economic advantages, so a different method has been employed. Uniform ordinances have been adopted by the towns establishing heavy fines for junk cars located outside of licensed junkyards. The fines are levied after a period of time when a portable car crusher will travel to various central collection points. Cars must be brought to these central collection points by the owner, although arrangements have been made for tow-truck operators to give special rates for this purpose.

At the central collection points, the cars are stripped by town employees (paid from federal funds for training chronically unemployed personnel). The stripped cars are crushed and are then loaded on flatbed trailers and taken to fragmentizing plants located approximately 175 miles distant.

Several other counties and local governments in New York State have initiated junk car programs similar to those just cited. These have been developed in some cases by the local health departments, by private organizations or by municipal boards.

Until recently, New York City had the most extensive and severe vehicle abandonment problem in the nation. More than 52,000 cars were abandoned in New York City's streets during 1969 and this figure is expected to increase to over 70,000 during 1970.

Abandoned vehicles were formerly confiscated and towed away by the New York City Police Department and costs were prohibitive. During the past two years the city has contracted with private towing firms who now pay the city a small amount (21 cents) for each car removed. The city has thereby turned a costly project into an income-producing operation. However, this is not possible in rural areas where abandoned cars are far apart.
Realistic Goals

From past experience in New York State and other areas it would seem that the future accumulation of junk cars can be prevented through regulation, while many, if not a majority, of cars presently abandoned can be retrieved without special financial incentives.

To prevent abandonment of cars in the future, we favor a system in which the vehicle owner would continue paying the registration fee yearly until he obtained a certificate showing that the vehicle had been properly turned in. Such certificates could be made available through car dealers, wreckers, and central collection points. Transportation of disabled vehicles to the wrecker or collection point would be the owner's responsibility.

There would have to be at least one exception in this system—the individual who wishes to keep a vehicle for parts and is willing to store it safely. However, from an administrative viewpoint, we believe this system is most economical and simple in operation. Alternatives such as charging for disposal of the car in the purchase cost, or the straight enforcement of a prohibition on abandonment would probably be more costly and less acceptable.

I should mention that we do favor the prohibition of vehicle abandonment, with a reasonable penalty fine, in order to give local health officials a mechanism for the speedy removal of attractive nuisances.

In addition, some control must be gained over excessive inventories at auto wrecker yards. The Department is preparing legislation to establish State standards for screening and containment of auto hulks, and it is continuing to investigate inventory standards. If realistic standards for auto-wrecker inventories can be established on a State or regional basis, and such standards can be adjusted for market fluctuation, New York will draw up model legislation. Much research is still needed in this area.

Removal of Cars Presently Abandoned

Step one of our program to remove cars presently abandoned has been tested in various areas of the State and will now be introduced wherever the full cooperation of local government can be obtained.

The program is totally voluntary. The only cost borne by the county or municipality is the establishment of a central marshalling point where all junk vehicles are accepted without charge.

Local citizens' groups or service organizations are encouraged to adopt a program of making an inventory of junk cars within a specific area. The organizations, which may be conservation groups, the Junior Chamber of Commerce, student groups or any other civic-minded bodies, to record the location of the vehicle, give it an identification number and note whether or not it has wheels and can be towed.

Once the extent of the problem is known, auto wreckers and scrap processors are called in. These commercial operators with mobile car crushers will indicate the vehicles they will dispose of without charge, and those which will require consolidation to a central point.

The economics of the individual situation vary widely. In one case, a wrecker may be willing to pick up only four cars in one place, while in another case he may require a minimum of 20 cars. The variables are the scrap market, value of the junked vehicles for parts, distance to the nearest fragmentizer, difficulty of the terrain, and even the operator's willingness to oblige.

In some cases the civic organization may realize a very modest monetary return for the junked cars, but usually there will be little or no payment from the commercial operator. The continued involvement of service groups in an oper-
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ation of this nature is based upon the satisfactions of dealing with a very tangible environmental problem in a direct manner and in a situation where progress can be easily measured. Citizens and organizations have amply demonstrated their willingness to get involved in environmental clean-up, at least on a short-term basis, in the past.

The State’s role is to set up a model program, provide public information and survey materials, and advise as to legal and other considerations.

Many of these materials have been developed in our State program, while others are in the process of development.

The Final Step

It is inevitable that not all cars will be removed in a wholly voluntary program. Cars deposited singly, in remote areas, or where terrain is difficult, and vehicles without wheels may require some financial incentive to help meet the costs of transportation to a central point.

To cover this final phase of the program, a one-shot operation, will require special legislation. The transportation cost incentive would be on a sliding scale, varying with distance, and prices and other factors. This incentive would represent a realistic estimate of the minimum subsidy necessary to get the job done. It could be revised upward if necessary.

Even if we assume that half of New York State’s 600,000 abandoned cars are not picked up during the voluntary portion of the program, and if an average incentive of $5.00 per car is necessary to pick up the rest, the total amount would only be 1.5 million dollars—a one-time assessment of 25 cents for each car registered in the State, if financed this way.

Summary

New York State has taken a conservative approach to the abandoned vehicle problem with no regulatory legislation passed as yet. The goals are to remove the maximum number of junk hulks, and prevent more from accumulating, through voluntary action and incentives, rather than compulsion and penalties. Part of the program, however, will involve the publicizing of the State’s ability to locate the last owner of abandoned cars through EDP and the ability to take action through an anti-abandonment law which is projected.

Reducing and eventually eliminating the junk car problem is an essential part of environmental management. We expect that the combination of voluntary action, limited financial incentives and legislation will clear the New York landscape of this blight.

REFERENCES

Case for the Health Security Act

Two proposals for national health insurance—President Nixon’s National Health Insurance Partnership, and the Health Security Act which has strong congressional support—are being widely discussed in Washington and around the country. The Health Security Action Council presents its argument in favor of the latter in a four-page pamphlet entitled Health Security vs. Nixon Health Plan: A Brief Analysis. It is a useful clarifier, whichever side you are on.

Characteristic aspects of both plans are printed in blue, followed in each case by Health Security pluses printed in red. For example, a paragraph in blue type—“Both recognize the importance of health maintenance and the possibilities of reducing costs through early preventive care”—is followed by a paragraph in red type: “Only Health Security removes all barriers to timely care by eliminating deductibles and coinsurance and by assuring the patient that he will not be billed by the doctor.” (Available from Health Security Action Council, 806 15th St., N.W., Washington, D. C. 20005.)