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THE AUTO DISMANTLING INDUSTRY

A Survey of Solid Waste Management Practices in Four Cities

U.S. ENVIRONMENTAL PROTECTION AGENCY

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U.S. ENVIRONMENTAL PROTECTION AGENCY

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AUTHOR'S PREFACE

This report incorporates the results of two studies of the automobile dismantling industry in the United States in 1968: (1) a broad overview of the industry, (2) an analysis of solid waste management practices in four cities which are typical of situations and problems faced by the industry as a whole. Both of these studies were made primarily by Edward W. Hassell, before his retirement from the U.S. Department of Commerce. Editing and correlating of the material were performed in the Bureau of Domestic Commerce, Office of Business Research and Analysis, Metals and Minerals Division, James M. Owens, Director.

Appreciation for assistance on the general description is extended to members of the automobile dismantling and scrap processing industries, the National Auto and Truck Wreckers Association, Inc., the United States Auto Dismantlers Association, and the Institute of Scrap Iron and Steel, as well as to the Bureau of Public Roads, Department of Transportation; the Bureau of Mines, Department of the Interior; the Office of Air Programs, and the Office of Solid Waste Management Programs, both of the U.S. Environmental Protection Agency.

The four-city surveys provide information to help define areas where research and development programs may be required to solve specialized solid waste management problems in the industry. In addition, they provide necessary reference data for broader action programs on the total solid waste management problem of the country.

The U.S. Environmental Protection Agency provided financial support in making these surveys possible.

The following organizations performed the four field surveys:

Company	Study Area
Battelle Memorial Institute Columbus, Ohio	Buffalo, New York
Midwest Research Institute Kansas City, Missouri	St. Louis, Missouri
Southwest Research Institute Houston, Texas	Amarillo, Texas
Ralph Stone & Company Los Angeles, California	Provo, Utah

SUMMARY

National concern with conservation of natural resources and the quality of our environment, has brought attention to those industries directly or indirectly contributing to the reuse or recycling of materials. The automobile dismantling industry is such an industry. Its livelihood depends on the recovery for sale of automobile parts, and in removing the parts it reduces the vehicle to a hulk capable of salvage for its steel content.

In recognition of the importance of this industry in the scrap recovery cycle, two studies were undertaken to gain broader knowledge of the economics of automobile dismantling.* These studies provide insight into the role of the industry in the collection and disposition of junked motor vehicles, and into the various problems related to these activities. The problems include environmental quality--air pollution control, solid waste management, highway beautification--viable scrap markets, and costs of moving vehicles and scrap.

The first study, of the auto wrecking industry on a nationwide basis, focused on the nature and characteristics of the industry and the economics of its operations.+

The second study was designed to obtain further information on the nature of the automobile dismantling business, particularly its solid waste management practices. For this purpose 74 firms primarily engaged in this business in four cities were interviewed regarding their operations. Both studies are based upon operations of the industry in 1968. Methods and procedures for each study are presented in Appendix A.

The immediate objectives of the four-city survey were to analyze automobile dismantling operations and identify, measure, and evaluate the problems associated with solid waste management. The industry comprises establishments primarily engaged in the business of: (1) taking in damaged, junked, or abandoned motor vehicles; (2) stripping them of useful parts; (3) selling the parts and other valuable materials, including the stripped hulk; (4) disposing of the residue, consisting of tires, glass, seats, upholstery, etc.

The surveys gathered information on a wide range of topics, including employment, operating procedures, number of automobiles processed, methods of acquiring junked automobiles, quantities of solid waste generated, solid waste handling practices including storage and disposal, economics of solid waste management, and environmental aspects of automobile wrecking operations.

In the four-city survey, the cities (Amarillo, Texas; Buffalo, New York; Provo, Utah; and St. Louis, Missouri) were selected to represent a cross-section

*Descriptive terms such as "dismantler," "wrecker," and "salvager" are used interchangeably in the industry and are so used in this report.

+In preliminary, unedited form the results of the study on the economics of the auto dismantling industry were published in *Scrap Age*, February 1970. It was subsequently referred to in other publications, and an expanded, unedited version was reprinted in full in: Disposal of junked and abandoned motor vehicles; hearings before the Subcommittee on Air and Water Pollution of the Committee on Public Works, U.S. Senate, 91st Cong., 2d sess., S.4197 and S.4204, Aug. 19 and 26, 1970. Washington, U.S. Government Printing Office, 1970. p.137-235.

of the urban and rural areas, at different population levels and geographic locations. The activity of the dismantlers was measured against their throughput of approximately 35,000 cars.

The following basic facts were collected about the 74 dismantlers visited, their operations, and their solid waste management practices:

1. The firms surveyed consisted primarily of small companies, in terms of size of employment. Eighty-eight percent of the establishments employed from one to six workers. One of every 10 was a one-man operation.

2. Location, land availability, and capital afforded certain dismantlers competitive advantages over others.

3. Dismantlers in the two major population centers were limited in the size of their operations because of the availability and cost of land. Urban dismantlers were particularly affected. Generally, only the urban dismantler had sufficient covered space for warehousing of parts and servicing. However, he did not have sufficient land to retain a large working inventory of automobiles. The opposite was true of the suburban and rural dismantler, both with respect to covered storage space and acreage. As a rule the urban dismantlers: (a) concentrated on handling late-model automobiles whose parts, because of greater demand, could be sold more quickly and at a higher profit than those of older vehicles; (b) used formal inventory control procedures for their salable parts; (c) turned over their inventory more quickly than their suburban and rural counterparts.

4. Dismantlers obtained about 96 percent of their vehicles throughput by purchase. Fifty-five percent of dismantlers' inventories were acquired from insurance companies, 27 percent from private owners, 17 percent from car dealers, and 1 percent from municipal governments and other sources. Dismantlers employing 10 or more workers relied almost entirely on insurance companies for vehicle supply and purchased over half of the insurance company vehicles in the throughput of the sample in the study. Approximately 90 percent of junked vehicles acquired from private owners were taken in by wreckers in the sample employing one to three workers.

5. The rate of turnover among the surveyed firms was dependent upon how soon a vehicle was stripped of desirable parts and the expeditious disposal of the hulk. A contributing factor to the necessity for quick turnover was the urban dismantler's low-acreage yard. The larger dismantlers with seven employees processed over twice as many cars as the smaller firms in the sample; they reclaimed more parts per car, and then processed/disposed of a greater amount of residual materials. The only data on costs available from the four surveys showed that in the St. Louis area it cost a dismantler about $5.75 to dispose of a hulk to a scrap processor and in Amarillo it cost $3 to $4. This is a net cost related to revenue from the sale of the hulk to a scrap processor and the expenditures involved in its disposition. It does not take into account the revenue from sale of parts.

6. The dismantlers operated on the principle that the automobiles they took in should have recoverable parts of a value greater than the costs of acquisition, dismantling and distribution. Therefore, a large number of the dismantlers restricted their operations to automobiles of "recent vintage."

7. The dismantlers interviewed used similar dismantling techniques, sales methods, and overall business practices. They were all affected by local and State regulations. The dismantler, who could purchase better quality vehicles having more salvageable parts, usually was better able to provide a cleaner hulk to the scrap processor and command a higher price for that hulk.

8. Selection of parts for salvage was determined by the age and make of the car, condition of the part, and estimated market demand. Urban dismantlers

could provide faster service for parts than suburban or rural dismantlers because they were closer to the large urban market (repair shops and engine rebuilders), and because the parts were already dismantled.

9. The nonrecoverable waste materials generated by dismantling were an operational problem and a cost of business. The problem was made more acute by ordinances banning open burning. These bans denied the dismantler what was traditionally his cheapest and easiest method of disposing of the combustible wastes and of preparing the hulk for the scrap processor.

10. Approximately 312 pounds of wastes per car were generated in the dismantling of junk cars in the surveyed areas.

11. Few dismantlers had storage facilities for waste materials. With the exception of tires, most wastes were stored on or in the hulks. There was little separation of waste materials from the metal scrap by burning since this had been banned in most areas. Suburban and rural wreckers not covered by city ordinances still burned all or part of their wastes. However, 20 dismantlers indicated that most of their waste was removed in turning over the hulks to the scrap processor.

12. The most prevalent method of removing wastes from the dismantler's yard was by contract; 36 dismantlers reported using private collectors. Private dumps were used as repositories for wastes by 32 dismantlers.

13. Because of their appearance, the dismantling operations surveyed contributed to the overall environmental blight in the study areas. Although they were frequently in industrial areas, in conformance with their surroundings, or in remote rural areas, in too many cases the yards were responsible for aesthetic degradation. Air pollution was a problem in areas that still permitted open burning.

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Function

The automobile dismantler or wrecker is principally concerned about the useful parts he can salvage and sell from the junked motor vehicles he handles. In addition, he sells the hulk, left over after stripping, to a scrap processor, whose function it is to prepare the scrap metal so it can be sold to the iron and steel and foundry industries for reuse. The dismantler must also dispose of the other waste materials generated as a result of his business, i.e., those materials which have zero or negative value and for which recycling is not currently a feasible possibility.

The dismantler makes a contribution to the economy by assuring the availability of replacement parts for the repair of millions of motor vehicles (automobiles, trucks, and buses) in the United States. Without these parts, older model vehicles would probably not be repaired. In addition, dismantlers are the primary--and in many areas the only--depositories for junked cars.

In 1968, an estimated 33,000 companies with about 132,000 employees were engaged in the dismantling business.[1] The industry is characterized by a large number of small companies, many of them one-man operations.

However, the economic impact of the industry is not small. In 1968, it handled an estimated 9.0 million vehicles, including some 1.3 million which previously had been abandoned and were moved into the scrap cycle as a result of community cleanup campaigns. The industry's receipts from these 9.0 million vehicles are estimated at about $4.8 billion, or $530 per vehicle handled. An average of $280 was paid for each incoming vehicle, leaving $250 per vehicle for operating expenses and profit.

Location

The need for the services of the dismantling industry has spawned its growth in every corner of the country.

Generally, the number of companies operating in a given area or community varies with the population. Urban centers are thus the most attractive locations for auto dismantlers because of their proximity to junk auto and used parts markets. Exceptions to this general pattern occur in some small rural communities where occupational opportunities are limited and incentives for going into the auto wrecker business are apparently greater.

The location of the auto wrecker is typically in an area zoned for industrial use. To a lesser extent, the dismantler may be situated in a retail/commercial, or other zone. "Non-conforming" use by a firm is sometimes permitted when the business was operating in the area prior to zoning. Emphasis on beautification of the environment has created a situation in some areas whereby new licensing applications for this and related industries have

been denied because of envisioned detrimental aesthetic aspects.

Approximately one-half of all auto dismantling businesses are located on Interstate and Federally-aided primary road systems[1] and are subject to the provisions of the Highway Beautification Act of 1965 with respect to screening or removal.

Size

The data collected from the 74 firms canvassed in the four-city surveys in 1968 show that the average automobile dismantling firm (1) employed about four workers; (2) was located on a 7.4 acre site; (3) had storage or covered work space equivalent to a 90- by 50-ft building (although this excludes the firms--almost 25 percent of the sample--reporting no covered storage facility); (4) used approximately four machine-driven pieces of equipment; (5) had a capital investment, excluding automobile and parts inventory, of a little more than $32,000 (Tables 1-4).

This profile indicates a relatively small-scale business operation. Sixty-four percent of all firms surveyed employed three persons or less, and 88 percent employed six and fewer workers, including the owner (Table 1). Approximately 1 out of every 10 firms canvassed is a one-man operation. Moreover small companies (one to three employees) are not restricted to small population areas. In all the cities surveyed, except Provo, the percentage of firms employing one to three workers ranged from 58 to 63 percent; in Provo, 80 percent of the firms were in this size classification. None of the Provo firms had more than five workers.

The one- to three-man firms, almost two-thirds of those surveyed, had the following physical characteristics: (1) a staff of 2.3 employees including the owner; (2) a site of 6.9 acres; (3) either no covered facilities (25 percent of reporting firms) or a small, covered structure of about 40 by 40 ft; (4) a capital investment, excluding inventory, of about $22,800, or two-thirds the average for all firms; (5) more dependence on power-driven equipment, such as various trucks, trailers, cranes, and tractors (4.3 pieces per company) than firms with more employees.

Land is important because it represents storage space for automobiles dismantled or in the process of being dismantled and is a capital investment or rental expense. In the two major population centers of St. Louis and Buffalo, the high cost of land limited the physical size of companies. The 7.4-acre average for 72 survey respondents is misleading, because several dismantlers had very large lots (Table 2). The median size for the 72 respondents was 4 acres, with 25 companies having less than 2 acres of land each.

Because of inconsistencies in reporting among the four cities it is not possible to measure precisely the land differences among urban, suburban, and rural dismantlers. The St. Louis distribution, however, is probably representative. The average urban wrecker there had a lot of about 1.5 acres, the suburban wrecker 5.7 acres, and the rural wrecker 5.9 acres.

Not all dismantlers had covered storage and work space (buildings). The average for 56 companies reporting covered space was 4,614 sq ft; 18 reported that they had no covered work or storage facility. As with land, the average for building space is misleading because several operators had large structures. The median size for the 56 companies with buildings was 1,800 sq ft; 20 operators reported buildings with 1,000 sq ft or less.

The St. Louis data showed differences in covered storage space between urban and rural operations. The average building space for 16 urban dismantlers

was 8,060 sq ft; that for two suburban dismantlers was 670 sq ft; and that for eight rural dismantlers was 1,360 sq ft.

Companies in the 1- to 3-employee group averaged the least amount of building space with only 1,600 sq ft (Table 2).

Capital investment totalled $2.4 million, or an average of $32,100 for the 74 establishments participating in the surveys (Table 3). For the 43 firms reporting capital investment by type the average investment in land and buildings was $24,400 per company (Table 4). Excluding one of the very large dismantlers gives a more realistic average capital investment figure of $20,000. Almost 80 percent of capital investment was in land. The median capital value of site and buildings was $13,500 with 16 of 43 companies reporting capital investment in land and buildings of less than $10,000.

Equipment

Heavy-duty, power-driven equipment including trucks, tractor-trailers and cranes are used by the automobile dismantling industry for moving and hauling the vehicles, both within and in and out of the yard. Trucks are used for delivery of component parts and also for removal of waste material. Small hand-type tools, such as chisels, wrenches, etc., are used in handstripping a vehicle. For greater efficiency, firms able to do so use electric- and air-powered hand tools. Some firms use specialized machinery in pulling/removing the engines. Incinerators capable of burning several hulks at once, to remove waste and provide a cleaner hulk, are also being used by some wreckers. Such machinery as balers, shearers, and car flatteners are used by those dismantlers who have diversified their business to include a related function in the scrap recovery cycle. A description of incinerators and other equipment listed above is presented in Appendix B.

Equipment used in the collection and routine operations of wreckers' yards in the four-city survey accounted for only about 10 percent of the total capital investment. The reported costs of equipment averaged out at $528 apiece, but this figure is hardly plausible since a good portion of the typical wrecker's equipment is old and usually put together by the dismantler himself. Accounting for the high average was the number of large pieces of equipment used by wreckers with other business interests. For example, two companies in the Buffalo area had balers, which are more expensive than the lighter pieces of wrecker equipment. Other wreckers offer towing service separate and distinct from their dismantling operations. As a rule, these firms use later model tow trucks for this purpose. All 74 reporting companies provided information on the equipment they used (Table 5).

Car Source

There appear to be no particular price variations in acquiring junk vehicles due to geographic location. The controlling factor in virtually all instances appears to be related to two aspects: condition of the vehicle in question, and the competitive situation surrounding sources of supply for acquisition of vehicles in any given area. For example, where junked vehicles are plentiful with few dealers competing, prices are likely to be very low. If, on the other hand, vehicles are scarce and dealers plentiful, then prices paid are likely to be high regardless of the geographical area of activity.

The vehicles for dismantling come from several sources, including: private individuals, automobile dealers, insurance companies, and State and local agencies which have impounded vehicles, many as a result of programs to collect abandoned vehicles.[2] Insurance company auction pools where wreckers bid for vehicles are the primary sources for the auto wrecking dealer. Automobiles from insurance company auction pools have the highest value to a dismantler. The increased importance of the auction pool as a source has contributed to a substantial increase in the cost of acquiring late model vehicles in relatively good condition for parts salvage. State and local agencies are also becoming more important as sources, especially in areas where impounding and/or towing of abandoned vehicles is practiced.

Most dismantlers prefer late-model vehicles because there is a bigger market for their parts. The dismantler reserves the right to reject vehicles, especially early models with any damage to the body, even if they are delivered to his yard.

The rate of acquisition, as well as of disposition, of junked and abandoned vehicles by auto wreckers depends upon several factors other than the number of cars annually removed from service. Among these are proximity to scrap markets for junk bodies, prices for auto scrap, prices for used parts, processing costs, State safety inspection laws, and availability of labor. All of these play a part in determining how many vehicles a dealer will acquire in any given period.

Trends in some of these factors can help to offset each other. For example, declining prices for auto scrap metal and increasing restrictions placed upon open burning of automobiles have made dealers hesitant about taking in older vehicles while the steady price level for used parts of the older models has tended to counteract that reluctance.

Statistics compiled from the responding companies in the four-city survey show insurance companies were the major source in the study areas in 1968, providing 55 percent of the vehicles (Table 6). Establishments employing 10 or more workers accounted for 52 percent of the automobiles acquired from insurance companies. Wreckers in the larger population centers tend to rely more on insurance companies as a source of automobiles than do the smaller communities. This is a tentative conclusion based on the reports from three of the four survey cities which showed the following purchases from insurance companies: Amarillo, 17.7 percent; Provo, 8.3 percent; St. Louis, 72.7 percent.

Private owners were the second largest source of vehicles in the surveyed cities. About 90 percent of the vehicles acquired from individuals were taken by wreckers with one to three employees. These smaller wreckers were also the major purchasers of automobiles acquired from new and used car dealers.

The smallest dismantlers (1 to 3 employees) acquired 46 percent of their working inventory from individuals and 28 percent from insurance companies, while the larger wreckers (4 or more employees) used insurance companies as their primary source for junked cars.

Operational Characteristics

Once he has a vehicle, the dismantler can handle the vehicle in one of three ways:

1. Dismantle it at once, store the parts for future sale, dispose of the waste material, and sell the hulk fairly quickly; this method was generally used by the urban dismantler, who had little vehicle storage space. Labor costs for the stripping operation depend upon the efficiency and equipment of the worker and the hourly wage rate. Moreover, even with efficient labor it was difficult to do a stripping job completely acceptable to the relatively high standard set by scrap dealers for avoiding contamination from nonferrous metals, principally copper. Most wreckers avoided hand stripping unless no other alternative was available.

2. Store it as is, then remove the parts as needed; this was the most commonly used method because it required less labor, and in most cases involving this type of handling, storage space for the vehicle was not a problem. Dismantlers in suburban and rural areas, generally were able to operate in this manner because of their more spacious yards. The hulk was disposed of when all salvageable parts had been removed. This could cover a time span of up to a year or more.

3. Reduce or eliminate the dismantling process altogether, making little or no attempt to reclaim any parts; storing the vehicle for eventual removal to a scrap processor. This handling method usually was employed when it was apparent the value of recoverable parts, if any, was negligible. Vehicles handled in this manner probably have been accepted by the wrecker as a public service.

The method by which the dismantler chooses to operate is determined by the area of his land, the condition and age of the vehicle, the size of his inventory, the scrap processor's location and type of operation, and the scrap metal market situation.

After the parts have been removed from the vehicle, the dismantler disposes of the hulk. If he is fortunate, he may find a scrap processor who will take it as is, with upholstery, seats, and other waste materials. There are, however, very few opportunities for such easy disposal. A processor having a shredder operation with incinerator attachment is most likely to buy this kind of hulk. In most cases, the dismantler will further strip the hulk to make it acceptable to the processor.

Baling and shearing operations usually prefer a preburned hulk, unless they have their own incinerator facilities.

In the past, open burning of the hulk was the least expensive and most widely used disposal method for waste material. Increasing restrictions on open burning because of air pollution controls now sharply limit the use of this convenient method in many areas.

Hand stripping, a second method dismantlers use to remove waste materials, is being more widely used in areas that ban open burning. The expense of hand stripping in some marginal operations precludes this alternative as not being economically feasible. Also, as stated above, it is difficult to strip a hulk to meet the standards set by some scrap processors.

A third method for removing waste is to burn the hulk in an incinerator to clean it. The high cost of special incinerators which would meet air pollution regulations has limited the switch to this controlled incineration.

A final step in getting a hulk ready for sale may be reduction in its volume. This is often done by flattening it so it can be shipped via flatbed truck, or by compacting it into bales. Bales are sold directly to steel mills or foundries.

If the dismantler cannot sell the hulks at a profit, he either hauls them to a "graveyard" or lets them accumulate in his yard until the market improves. These accumulations are aesthetically displeasing; they constitute one of the major environmental problems associated with the automobile dismantling industry. According to the U.S. Department of the Interior,[3] the dismantling industry inventory of junk cars in 1965 was equivalent to about one and one-quarter times the annual throughput. (In contrast, the scrap processing industry's inventory of junk cars was less than one-tenth of throughput.) The industry's inventories are increasing, rising from an estimated 6.6 million in 1965 to an estimated 12 million in 1970. These inventories represent unused resources, while contributing to environmental blight.

It has been noted that the dismantler's decision to keep hulks hinges on the high costs of preparing and transporting them to processors, relative to the current price of scrap. Preparation costs are on the rise because of the previously mentioned air pollution restrictions which ban open burning and regulate incinerator emissions. More economical transportation techniques, i.e., competitive advantage in freight rate structure and adequate rail equipment, or shorter distances between dismantlers and scrap processors, could help reduce inventories. Transportation costs can be critical in rural areas because the nearest processor may be several hundred miles away.

Operating characteristics of the firms surveyed in the four cities followed rather closely the patterns described above for the industry generally.

The auto dismantlers in the four cities surveyed were in operation five and one-half of six 8-hour days per week. An exception was the rural wrecker who remained open on Sunday to sell parts. In general, the firms recognized the usual legal holidays.

A situation which is causing some apprehension among small dismantlers is that one source for their inventory, i.e., the abandoned automobile, as a result of community cleanup programs is being taken directly to collection depots and/or the scrap processor for handling, bypassing the dismantling function.

The highest profits came from the dismantling of late-model cars and the resale of their component parts. Dismantlers reason that owners of newer automobiles have a larger investment to protect and will be likely to pay more money for replacement parts than owners of older cars. The profit margin that the dismantler expects to receive from the automobile, and his profit reliance, are contingent upon the value of the automobile.

The dismantlers' rationale follows these lines. If a 1969 Ford has been severely damaged in an accident to the rear end, the front end parts are salvageable. These parts are only 2 to 3 years old and have a high resale value. A dismantler expects a high profit margin on such a car, and his profit reliance will be on the sale of these salvaged replacement parts to be used in other late-model Fords.

Of the 74 companies reporting, 33 practiced the theory that late-model automobiles are the most profitable to handle (Table 7). Of the 33 firms that imposed age restrictions as a purchase criterion, 15 would not accept cars more than 5 years old; eight would accept 1962 models; two would take 1961 models; five would take models from 1960; and three would accept late 1950 cars. Each of the five wreckers employing 10 or more workers had model-year restrictions.

One wrecker would not accept foreign automobiles because of the limited market for parts in his area. Other restrictions encountered in the four surveys include: (1) no foreign cars except Volkswagens were accepted; (2) only impounded cars were accepted; (3) only unburned wrecks were purchased.

In accepting cars, dismantlers were concerned only with those damages that affected the utility or value of the individual parts. The most serious damages are those to the most valuable parts--engines, engine parts, and transmissions. Wreckers accepted automobiles with parts already removed if those remaining were valuable enough to justify dismantling and distribution costs.

Wreckers did not usually purchase cars if: (1) the company had an agreement to collect and keep free of charge those vehicles turned over to it by the local government (only four agreements were reported for 74 companies); (2) the recoverable value of the parts was so low that the wrecker would handle it only if the owner gave him the car. In most instances, towing charges were deducted from the price the dismantler paid for a car.

Vehicle Inventory

A summary of inventory data collected in the four-city survey showed that 40,220 vehicles were being held by 72 wreckers, or 559 per company (Table 8). The median was 260; 24 firms were holding less than 200 vehicles and 13 had inventories in excess of 1,000.

Firms employing one to three workers had an average inventory of 486 vehicles compared with 687 for firms with more than three workers. However, the small firm had more vehicles completely dismantled and awaiting disposal-125 per firm, compared with 100 per firm for the larger companies.

The rate of inventory turnover for a wrecker is determined both by his ability to process vehicles with desirable and marketable parts and his ability to dispose of dismantled, space-consuming hulks. The large, urban wreckers, who were more discriminating in the types of vehicles they purchased, turned over their vehicle inventory faster than the rural dismantler. Urban wreckers employing 10 or more workers turned over their vehicle inventory more than once a year (Table 9). With the exception of those firms with one to three workers, each size group turned over their inventory at least once a year. The smaller dismantlers processed approximately 60 percent of their inventory in a year and turned over their inventory completely in about 20 months.

Parts Storage

As a rule, those wreckers who dismantled cars soon after acquiring them stripped them of everything that they thought could be sold at a profit (engines, engine parts, transmissions, doors, windshields, batteries, radios, radiators, body parts, and tires). Much of the resalable parts were placed in working storage. Forty-seven of the 74 companies surveyed stored some or all of their parts inventory under cover, i.e., in buildings (Table 10). The largest establishments store, on the average, about 48 percent of their parts inventory under cover. Firms have instituted various inventory control systems for parts location, ranging from card index files and telephone longlines and

telex systems within a certain area, to inventory reports included in trade journals. However, some firms have virtually no inventory control except for damaged autos on hand.

Throughput and Capacity

Industry sources indicate that the average dealer usually disposes of about as many units as he takes in during the year. While a wrecker may not necessarily dispose of a given vehicle within a year, it does suggest an annual disposal rate equivalent to about one year's purchases.

It should be noted that there is an important relationship between the total number of motor vehicles removed from registration (scrapped) each year, and thus theoretically available to the auto wrecking industry, and the number of vehicles actually taken in by the industry. An estimated 7 million vehicles were scrapped in 1968,[4] compared with 9 million taken in by the wrecking industry. Thus, the industry vehicle take-in rate during 1968 appears to have not only matched the junked vehicle rate, but to have also cut into the enormous national backlog of abandoned vehicles.

Various reasons can be given for appreciable variations between the scrapped vehicle rate and the vehicle take-in rate of the auto wreckers in some States. The auto wrecking industry itself, in a given state, might be especially active and aggressive in taking in vehicles. Local zoning regulations might be more lenient in one State than in a nearby State, thereby influencing junk vehicles to move to areas where inventory storage might be more available. Public pride in the quality of their environment may prompt citizen action in cleaning up their communities of abandoned automobiles, thereby moving these vehicles into the reclamation cycle. Restrictions on open burning of vehicles by auto wreckers to prepare them for the scrap metal market may cause junked vehicles to move from one area to other less restrictive areas. Finally, location of auto wrecking yards in relation to scrap handling and disposal facilities might have some effect upon the junk auto inventory of dealers in some States.

In 1968, 70 wreckers in the four cities reported processing 34,700 automobiles for an average of 496 per company. Companies employing more than six workers processed the most vehicles per firm, but the smaller companies with from one to six employees processed 75 percent of the total.

Many wreckers were not in a position to evaluate what effect 1968 price increases for body scrap would have on their business. A more favorable scrap market would tend to clear out dismantled hulks and motivate wreckers to invest in more junked cars.

Forty-five establishments estimated their capacity at 28,393 automobiles (Table 11). The 45 companies were operating at an average 90.2 percent of their rated capacity; however, 28 reported that they were operating at what they believed to be capacity.

Prices

Although dealers may get some obsolete or badly damaged vehicles for little or nothing, many dealers report that it is not unusual to pay $500 or more for a late-model, junked vehicle with many salable used parts.

It is common practice, at least for the low-profit dismantler, to work backwards from the price of scrap in setting the price he will pay for a vehicle. If scrap prices are low, the dismantler rejects marginal-value cars, accepting only those that will yield enough revenue from the sale of parts to cover acquisition, dismantling, and disposal costs. When this happens, owners frequently abandon vehicles, and the local government is faced with the abandonment problem. This is the case noted in the survey in St. Louis, Missouri, where derelict cars picked up by the city outnumber those considered salvageable by the area's dismantlers.

Environmental Aspects

Solid Waste Generation. Among the major problems of the industry are those associated with environmental quality improvement programs of the Federal, State, and local governments. These include (1) increasingly stringent controls placed upon burning of scrap automobile bodies, with its resultant air pollution; (2) disposal of the great volume of waste accumulated in the course of the industry operations, including such things as seats, upholstery, scrap tires, and other materials; (3) economic problems caused by the inability with present technology to convert efficiently much of the waste materials generated by the industry; (4) appearance of the area.

In dismantling the average vehicle the auto wrecker must deal with a substantial amount of waste byproducts. For example, dismantling and analysis of a composite typical automobile (1954-1965 vintage)[5] shows 374 lbs of nonmetallic materials. While some of this material, chiefly glass and tires, is recovered for resale, it is estimated that about 295 lbs is actually waste materials with no presently recoverable value.

The industry accounts for a small part (approximately 1.2 million tons) of the some 110 million tons of industrial waste generated in the United States.[6] However, because of its nature, auto wrecking waste is an important factor in solid waste management in many communities.

The appearance of an automobile dismantling operation is of concern to the public and the industry. Fencing tends to give the yard a tidier appearance, but because the primary purpose is security, the fencing is generally not attractive. Legislation has partially corrected the problem near major Interstate and Federally-aided highways, but the cover-up achieved by screening is not the best solution. In industrial areas, dismantlers' operations may be in harmony with their surroundings, but in rural and other areas away from industry, dismantling yards along with auto graveyards are frequently major offenders to an aesthetically pleasing environment.

Air pollution is another environmental problem. Although open burning is being outlawed in many areas, it continues to be relied on in numerous rural areas. New incinerator developments[7] for controlling the particulate emission to an allowable level is gaining interest among the higher capitalized dismantlers although few such facilities are in existence. Enclosed burners currently in use for disposing of the non-metallic materials also fail to meet modern air pollution standards generally under adoption by municipalities.

The control of pests and rodents is a continuing problem to the industry, particularly in suburban and rural areas where the inventory

of vehicles is large. In the cities surveyed, however, health hazards were at a minimum, as reported by health department officials.

Dismantling operations do not use process water, hence water pollution is not a problem associated with this industry.

Safety hazards do exist. Yard equipment, i.e., cranes, trucks, etc., can cause injury. In those yards which do not dismantle cars as they are received, but stack the vehicles for later removal of parts, there is a particular safety hazard in working among the stacked cars. Protective clothing, such as safety glasses, hard-toed shoes, and particularly gloves, are sometimes used. A possible safety factor concerns the attractive nuisance which an unfenced yard may present to children. Federal regulations regarding fencing where they apply, control this possibility, but these regulations have little application in rural areas away from major highways.

Noise pollution is common to many dismantlers. This problem is difficult to correct because the machinery used by the industry is inherently noisy when it operates. Compacting, smashing, or flattening vehicles before they go to processors is another source of noise.

The 74 establishments generated an estimated 5,422 short tons of solid waste materials (excluding metal scrap) in 1968 (Table 12). This is equivalent to 312 lbs for each car processed.

Because of space limitations, storage of waste materials was a serious problem for most dismantlers. With the exception of tires, which dismantlers were frequently unable to dispose of, solid waste was stored principally on or in automobile hulks. A few dismantlers used trailers to store waste for short periods, but the weight and volume generated required frequent trips to landfills or dumps to clear the area.

With few exceptions, the dismantlers indicated that they did little separating or processing of waste materials before disposal. Most combustible materials were usually left intact in the car, and other wastes added to the hulk. As a general rule tires and gas tanks were removed and stored separately. In the St. Louis area, the varying requirements of companies serving as outlets for scrap steel determined how clean the hulks would be for disposition. Thus, an Illinois shredder who did not require clean hulks, except for the removal of seats and gas tanks, was the principal outlet for dismantlers in the urban areas that prohibited open burning, found a purchaser for their hulks in an Illinois steel company that took only hulks which had been burned to remove nonmetallic parts. The steel company was closer to the metropolitan area than the shredder and also paid a better price.

Solid Waste Management. Disposal of waste materials constitutes a serious problem and expense for the individual wrecker, and the cumulative impact of the industry's waste materials presents a challenge to community waste disposal facilities.

If the dismantler has the space, he may temporarily store the wastes on the premises, which makes his yard even more of an eyesore. If municipal or private disposal facilities are available, he can use them, adding to his cost. Many dismantlers put the wastes in the hulks. This reduces the dismantler's direct costs for waste disposal, but it also reduces the price the scrap processors will pay for the hulk, since the waste disposal has now become their burden.

Methods of removing the solid waste materials from the dismantlers' yards varied from area to area in the survey. Municipal collection services were used by only two dismantlers; private collectors were used to haul all or part of the waste generated by 36 dismantlers; and some hauled their own wastes (Table 13). Still other burned or buried their wastes or left them on or in the hulks and thus minimized waste haul.

Disposal facilities available to other commercial or industrial activities are accessible to wreckers and include landfills, dumps, and incinerators. More often than not, however, an area did not have a full range of disposal facilities. Wreckers in the four areas stated that private dumps were the most commonly used disposal facility (Table 14). In the Amarillo and Buffalo areas, dismantlers resorted to stuffing their hulks with wastes and giving or selling the hulks to scrap processors. Nine dismantlers still practiced open burning of their wastes because they were outside the jurisdiction of local restrictive ordinances. One dismantler buried his waste material in his own yard.

With the exception of the dismantlers in Provo, Utah, all dismantlers disposed of their hulks. The Provo area lacked a scrap market, so hulks were accumulating in the wrecker yards.

Of the 14 St. Louis firms that estimated their costs of waste disposal, 11 paid an average of $380 a year to private contractors for the service. Of the 19 firms that removed their own solid waste (Table 14) three reported an average cost of $270 for the year. The cost of disposing of waste materials for Amarillo wreckers was estimated to be approximately 67.5 cents per dismantled car, or an average cost of $147 per company per year.

The cost of waste disposal is a contributing economic factor in the dismantler's decision concerning types of automobiles he will accept. A dismantler who, for example, bought in 1968 a wrecked 1968 Pontiac for $1,400 looked upon a $5.75 disposal cost as inconsequential, in view of the profit anticipated from the sale of parts. On the other hand, a dismantler who took in a 1953 Pontiac for nothing looked upon a $5.75 disposal cost as significant in comparison with his acquisition and dismantling costs and also in comparison with the revenue from the sale of parts.

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APPENDIX A

METHODOLOGY

General Description. Information on the general description of the automobile dismantling industry in the United States was voluntarily furnished to the Bureau of Domestic Commerce by the auto dismantling industry trade associations, which in turn received responses to questionnaires in 1968 from about 1,100 automobile dismantling companies.

Four-City Survey. The selection of the cities surveyed was made to include industry representation from a metropolitan area in each of four major geographical regions of the country, as defined by the U.S. Bureau of the Census; namely, West, North Central, South, and North Eastern. Each of these sections was further divided into Standard Metropolitan Statistical Areas (SMSA). The SMSA's within each geographical area were listed in descending order from the largest to the smallest. All areas larger than St. Louis (1969 SMSA population 2,105,000) were eliminated because of their large size and therefore possibly unique and complex situation. The SMSA's in each geographical area were stratified into thirds by number of SMSA's within the area (i.e., if there were 39 SMSA's within an area, each stratified sample would contain 13 SMSA's). One SMSA was selected from each stratum (the top third, the middle third, and the bottom third) of each geographical area using a population-weighting method. Two conditions were imposed upon the selection procedure: (1) No two SMSA's selected would be from the same State; (2) no two SMSA's would be adjoining each other. If these conditions were violated, a new random selection was made.

Using this technique and making value judgments based upon knowledge of the auto dismantling industry in the particular areas, the following cities were chosen for the study: West--Provo-Orem, Utah; North Central--St. Louis, Missouri; South--Amarillo, Texas; and North East--Buffalo, New York.

For each of the cities, the firms selected for surveying included only those whose largest proportion of business was in auto wrecking and dismantling. Other activities of these firms included scrap processing, auto/body repair, used cars, and scrap metal salvage.

Interviews were conducted both in person and by telephone.

A description of the cities chosen for study and sample size are reviewed below:

1. Provo, Utah. The Provo-Orem Standard Metropolitan Statistical Area corresponds to Utah County, which had a population of 138,000 according to U.S. Bureau of the Census figures for 1970. Detailed information was secured for the 10 *major* auto dismantling yards.

2. St. Louis, Missouri. (1970 SMSA population 2,363,000). Interviews were held with 27 automobile dismantlers in the St. Louis metropolitan area (about 30-35 percent of all dealers in the area). The companies surveyed were grouped according to location: the urban area of St. Louis, Missouri, 17 respondents; the suburban area of St. Louis County, Missouri, two respondents; the exurban (rural) area of St. Charles County, Missouri, three respondents; and the exurban area of Madison County, Illinois, on the eastern side of the Mississippi River, five respondents. These dismantlers had a total throughput

of 10,000 cars per year, which is about two-thirds of the total throughput in the St. Louis area.

3. Amarillo, Texas. The Amarillo SMSA consists of two counties--Potter and Randall--with a total 1970 population of 144,000. The SMSA is generally in the heart of the Texas Panhandle in Northwest Texas. The City of Amarillo straddles the line between the two counties. There were 13 qualifying firms in the Amarillo SMSA, 10 of which were within the city limits. All qualifying firms were canvassed.

4. Buffalo, New York. (1970 SMSA population 1,349,000). The study covered all of Erie County and parts of Niagara and Chautauqua Counties adjacent to the Buffalo, New York, area. Recommendations of 29 firms to be canvassed were made by the New York State Auto and Truck Dismantlers' Association (NYSATDA). Of the firms chosen by NYSATDA, only 25 were included in the survey.

APPENDIX B

SCRAP PROCESSING EQUIPMENT

The roles of the auto wrecking and scrap processing industries within the auto scrap recovery cycle are shown in Figure 1, The Auto Scrap Process. At the scrap processing level several specialized kinds of equipment are used in handling the scrap metal and solid waste generated by the auto wrecking industry. This equipment includes scrap shredders, incinerators, scrap balers, and shears. Auto wreckers as a rule do not operate such equipment. However, there are firms which incorporate both auto wrecking and scrap processing functions. Auto wreckers may operate car crushers and flatteners or these types of equipment may be used by companies which specialize in preparing junk cars for transport to scrap processing yards.

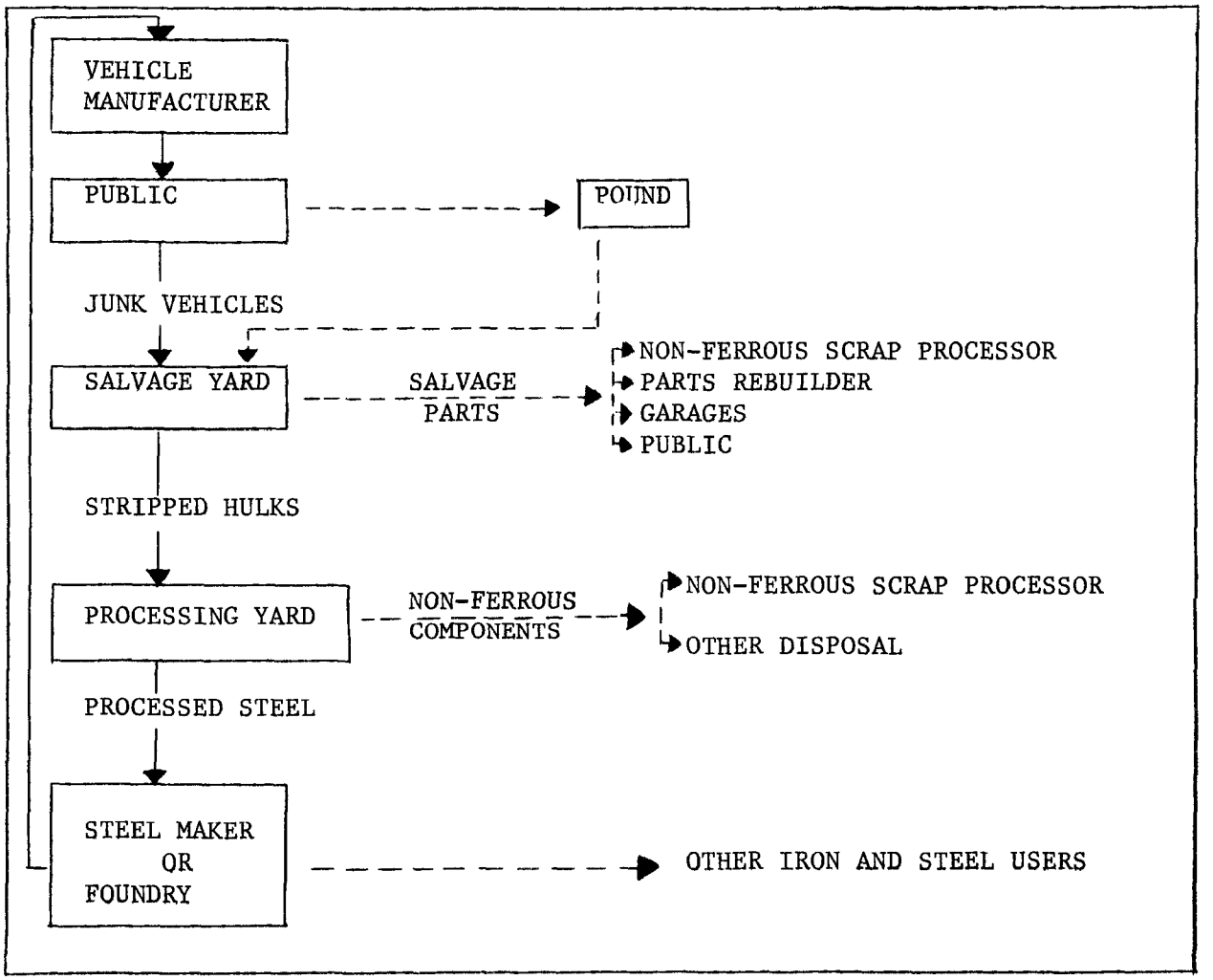

Figure 1. The Auto Scrap Process (adapted from: Ralph Stone & Co., Inc. Copper control in vehicular scrap. U.S. Department of the Interior, Bureau of Mines, 1968.)

Balers. In this operation, the automotive hulk is stripped to varying degrees of nonferrous contamination and then compressed into a cube weighing approximately 1,200 lbs. This is the No. 2 bundle.* Despite the increasing impact of shredders, at present the majority of automotive hulks are still processed with a baler. However, the steel industry and foundries generally look upon this scrap product with suspicion, assume that it is of low quality, and use it only in amounts that will not adversely affect their operations. In fact, many large steel makers have discontinued use of No. 2 bundles altogether, resulting in still further reduction in demand and price. Nonetheless, the baler is still an important factor in the disposal of auto scrap.

Scrap Shredders. The shredder is capable of ripping whole automobile bodies and frames into small-sized pieces of metal at rates up to 120 cars per hour. When scrap from the shredder is processed through a magnetic separation step this segregates the ferrous material from nonferrous material. The end product is a clean, easily handled scrap, relatively free of copper and other nonferrous contamination, preferred to the No. 2 bundle by the steel mills and foundries, who reflect this preference by an increasing demand and price. Many shredders are now equipped with incinerators which burn combustible trash, such as upholstery materials, insulation, and rubber remaining in the junk body. Afterburner devices attached to the incinerator further control particulate emissions. The shredder incinerator can help the auto wrecker cope with air pollution controls.

Shears. Sheared automotive slab is a relatively new development in the scrap industry. The quality of the sheared automotive slab depends basically on the thoroughness of the stripping and inspection preceding the shear operation. The process first compresses the automotive hulk into a rectangular scrap "log," which is approximately 2 ft by 2 ft and up to 20 ft long. The second step consists of feeding this scrap log into a guillotine shear which simultaneously cuts and compresses it into predetermined lengths. The resulting sheared automotive slab is a pillow-shaped, uniform piece of very high-density melting scrap, easy to inspect and convey to the rail car or truck. The total time requirement for the complete shear operation is approximately 40 to 60 man-minutes per ton of product.

Body Flatteners. The body flattener function frequently is separate from that of the auto wrecker and scrap processor. This practical equipment, developed to crush or flatten hulks, makes them easier to handle and less expensive to transport than the bulky, unflattened hulk. The flattener operation consists of three units: a hydraulic press powered by a virtually smokeless diesel engine, a heavy-duty truck to move the hydraulic unit, and a fork-lift truck to lift the stripped auto hulk into the hydraulic press. The press exerts a pressure of some 20,000 lbs and can flatten the car body (stripped

*Bundled No. 2 Steel. Wrought iron or steel scrap, black or galvanized, 1/8 inch and over in thickness, compressed to charging box size and weighing not less than 75 lbs per cubic foot. Auto body and fender stock, burnt or hand stripped, may constitute a maximum of 60 percent by weight. (This percent based on makeup of auto body, chassis, driveshafts, and bumpers.) Free of all coated material, except as found on automobiles (Institute of Scrap Iron and Steel).

of radiator, tires, gas tank, motor and transmission) into a package of scrap metal less than 12-in. thick. One such crusher is reported to be able to flatten up to 200 stripped hulks per day, loading the crushed hulk onto a flat-bed truck at the rate of 27 units per hour. From 25 to 30 such flattened hulks can be transported on a flat-bed truck to the scrap processor, in contrast to some five or six hulks of normal size.

Industry reports a high degree of interest from local government officials in the potential of such flatteners for ridding city streets and public storage needs of unsightly and expensive junked, abandoned motor vehicles. In some instances the equipment operator will offer to process the junked vehicle free of cost to the city, deriving his revenue from ultimate sale of the crushed hulks to the scrap processing industry. This action makes the flattener operation competitive to the auto wrecker. Thus, the flattener could develop into a cheap way to clean up our streets and highways and be a very useful and economical source of scrap supply to the shredder or other scrap processor.

Incinerators. While open burning of junk auto bodies to prepare the steel for the scrap cycle has been practiced for years by auto wreckers, the smoke from the partial combustion of paint, sound deadening materials, rubber, upholstery, wire insulation, and plastic causes many complaints in urban communities.

Local and state abatement of open burning led to the development of auto "incinerators" with somewhat better control over atmospheric emissions. Several types of "incinerators" or burners for handling auto hulks are described below. Few are in operation. Most of these devices are incapable of meeting air pollution standards generally being adapted in metropolitan areas, and also they have been found to be uneconomic by firms of this size predominent in the auto dismantling industry.

Auto incinerators usually have a primary combustion chamber where auto burning occurs. Combustion gases from the primary chamber pass through an afterburner or other control device before discharge to the atmosphere.

Pit incinerators equipped with afterburners and having a daily capacity of 8 to 12 autos have been used by small scrap yards and large auto wreckers. When the afterburners are operated at 1400 F to 1500 F these incinerators are claimed to reduce atmospheric emissions to an opacity level equal to No. 2 Ringelmann.*

Larger batch incinerators are usually garage incinerators with afterburners. Daily capacity of this type of incinerator is about 40 to 45 autos. Properly designed, maintained, and operated, garage incinerators may control visible emissions during burning to an opacity of less than No. 2 Ringelmann.

Continuous operation incinerators are used for capacities of more than 50 autos per day. Such units would be suitable for joint use by several auto wreckers, being much too large for the average

*The Ringelmann number is a measure of smoke density. The range is from 0 (no visible smoke) to 5 (all black smoke). Ringelmann Smoke Chart. U.S. Bureau of Mines Information Circular 8333. Washington, U.S. Department of the Interior, 1967. 4 p. (Revision of IC 7718.)

wrecker. Conveyors move autos through a tunnel-like combustion chamber. Exhaust gases from combustion pass through an afterburner or an electrostatic precipitator before discharge into the atmosphere. A continuous flow of autos through the chamber permits orderly preparation of autos prior to incineration to minimize processing costs. Visible emissions from these incinerators have an opacity equal to or less than No. 1 Ringelmann when the unit is maintained and operated correctly. However, even the continuous tunnel incinerators have been shut down because of excessive operating and maintenance costs, more stringent smoke abatement action and lack of demand for use by the scrap industry.

In view of the cost and technical problems connected with incinerator development, it is highly unlikely that the auto wrecking industry will develop such equipment for its use. However, as the cost of labor for hand stripping increases and restrictions on open burning increase, the auto wrecking industry might seriously consider the economic advantages of joint development of incinerators fully meeting pollution requirements which would be made available to all auto wreckers in the area for an equitable fee. Moreover, if local or Federal Government assistance were made available, it is possible that incinerators for auto hulks could be economically developed. The cost of operation would presumably be derived from fees charged for hulk incineration.

TABLE 1

NUMBER OF ESTABLISHMENTS SURVEYED AND EMPLOYMENT (1968)

Establishment by employment size class*	Number of companies surveyed	Percent distribution of companies	Employment		
			Total	Percent of total	Average per company
1-3	47	63.5	108	34.8	2.3
4-6	18	24.3	89	28.7	4.9
7-9	4	5.4	30	9.7	7.5
10 or more	5	6.8	83	26.8	16.6
Total	74	100.0	310	100.0	4.2

*Employment figures include owner.

TABLE 2

CAPITAL ASSETS OF ESTABLISHMENTS SURVEYED (1968)

Establishment by employment size class	Land			Building			Equipment		
	Number of companies responding	Number of acres	Average size (acres)	Number of companies responding	Area (sq ft)	Average area (sq ft)	Number of companies responding	Number of pieces	Average number of pieces
1-3	45	311	6.9	35	55,435	1,584	47	204	4.3
4-6	18	104	5.8	13	116,595	8,969	18	68	3.8
7-9	4	34	8.5	3	32,400	10,800	4	9	2.2
10 or more	5	87	17.4	5	53,985	10,797	5	23	4.6
Total	72	536	7.4	56	258,415	4,615	74	304	4.1

TABLE 3

TOTAL CAPITAL INVESTMENT (1968)

Establishment by employment size	Number of companies responding	Dollar value	
		Total ($000)	Company average ($000)
1-3	47	$1,072	$ 22.8
4-6	18	578	32.1
7-9	4	49	12.2
10 or more	5	677	135.4
Total	74	$2,376	$ 32.1

TABLE 4

DISTRIBUTION OF CAPITAL INVESTMENT BY TYPE * (1968)

Establishment by employment size class	Number of companies responding	Land and building		Equipment		Total	
		Total ($000)	Average ($000)	Total ($000)	Average ($000)	Total ($000)	Average ($000)
1-3	28	$ 519.4	$ 18.5	$ 70.7	$ 2.5	$ 590.1	$ 21.1
4-6	11	297.0	27.0	70.0	6.4	367.0	33.4
7-9	3	24.8	8.3	3.9	1.3	28.7	9.6
10 or more	1	210.0	210.0	16.0	16.0	226.0	226.0
Total	43	$1,051.2	$ 24.4	160.6	$ 3.7	$1,211.8	$ 28.2

* Values recorded only for companies that reported investment by type as distinguished from Table 3, which recorded total value of investment.

TABLE 5

EQUIPMENT BY TYPE AND NUMBER (1968)

Type	Total	Distribution by size class of establishment			
		1-3	4-6	7-9	10 or more
Tow truck	90	60	23	-	7
Boom (pole) truck	52	34	11	3	4
Flat-bed truck	43	32	8	2	1
Pickup truck	34	19	9	2	4
Trailer	25	22	2	-	1
Crane	15	7	6	1	1
Tractor	14	11	2	-	1
Dump truck	5	4	-	1	-
Scoop	4	3	1	-	-
Bulldozer	4	3	-	-	1
Baler	3	1	2	-	-
Fork lift	3	2	1	-	-
Other	12	6	3	-	3
Total	304	204	68	9	23

TABLE 6

JUNKED CAR SOURCE BY TYPE (1968)

Establishment by employee size	Total	% of total	Individuals			Dealers			Municipal Governments			Insurance Company			Other		
			No. of cars	% of source	% of total	No. of cars	% of source	% of total	No. of cars	% of source	% of total	No. of cars	% of source	% of total	No. of cars	% of source	% of total
1-3	7,498	52.7	3,460	89.7	46.2	1,784	74.1	23.8	126	96.2	1.7	2,103	26.9	28.0	25	100.0	0.3
4-6	2,670	18.7	371	9.6	13.9	625	25.9	23.4	5	3.8	0.2	1,669	21.4	62.5	*	*	*
7-9	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10 or more	4,068	28.6	28	0.7	*	*	*	*	*	*	*	4,040	51.7	99.3	*	*	*
Total	14,236	100.0	3,859	100.0	27.1	2,409	100.0	16.9	131	100.0	0.9	7,812	100.0	54.9	25	100.0	0.2

* Source data not available.

TABLE 7

DISMANTLERS' OPERATIONAL CHARACTERISTICS: INCOMING AUTOMOBILES (1968)

Establishment by employment size	Establishments with			Purchasing practices				
	Model year restrictions	Local government agreements	Free towing	Company purchases		Number of vehicles		
				Yes	No	Purchased	Not purchased	Percentage purchased
1-3	18	-	7	42	5	12,432	1,110	91.8
4-6	8	3	-	17	1	12,245	237	98.1
7-9	2	-	-	4	-	4,048	50	98.8
10 or more	5	1	-	5	-	4,578	-	100.0
Total	33	4	7	68	6	33,303	1,397	95.9

TABLE 8

DISPOSITION OF INVENTORY AND STAGE OF PROCESSING (1968)

Establishment by employment size	Number of companies responding	Total inventory	Company average	Inventory reported by stages of processing *				
				Total	Number in process	Processed as % of class size	Number dismantled	Dismantled as % of class size
1-3	46	22,370	486	17,626	11,875	67.4	5,750	32.6
4-6	17	11,479	675	9,953	7,578	76.1	2,375	23.9
7-9	4	2,370	592	1,620	1,580	97.5	40	2.5
10 or more	5	4,005	801	1,255	1,050	83.7	205	16.3
Total	72	40,224	559	30,454	22,083	72.5	8,370	27.5

* Not all companies reporting their inventory broke down their figures to reflect stages of processing.

TABLE 9

DISMANTLERS' INVENTORY AND TURNOVER (1968)

Establishment by employment size class	Inventory			Throughput			Throughput as percent of inventory
	Number of companies responding	Total	Per Firm	Number of companies responding	Total	Per Firm	
1-3	46	22,370	486	44	13,542	308	60.5
4-6	17	11,479	675	17	12,482	734	108.7
7-9	4	2,370	592	4	4,098	1,024	173.0
10 or more	5	4,005	801	5	4,578	916	114.3
Total	72	40,224	559	70	34,700	496	86.3

TABLE 10

DISMANTLERS' PARTS STORAGE (1968)

Establishment by employment size	Number of companies responding	Parts storage facilities *		Percentage under cover (weighted average)
		Under cover (companies responding)	On car (companies responding)	
1-3	47	24	33	32.1
4-6	18	15	12	26.3
7-9	4	4	2	36.1
10 or more	5	4	3	47.6
Total	74	47	50	32.5

* Some companies reported that they used both covered facilities and the partially stripped automobile for parts storage.

TABLE 11

DISMANTLERS' CAPACITY (1968)
(number of cars)

Establishment by employment size	Number of companies responding	Estimated capacity	1968 throughput	Percentage of capacity by class size	Number of reporting companies working at capacity
1-3	28	12,003	9,732	81.0	16
4-6	12	11,812	11,182	94.7	8
7-9	3	3,738	3,848	103.0	3
10 or more	2	840	828	98.6	1
Total	45	28,393	25,590	90.2	28

TABLE 12

ESTIMATED WEIGHT OF SOLID WASTES GENERATED, EXCLUDING METAL SCRAP (1968)*

Establishment by employment size	Solid waste, 1968	
	Amount (tons)	Distribution (percent)
1-3	2,062	38.0
4-6	1,960	36.2
7-9	656	12.1
10 or more	744	13.7
Total	5,422	100.0

*A total of 75 companies responded; the breakdown by employment size is not available.

TABLE 13

REPORTED METHODS OF SOLID WASTE REMOVAL (1968)

Method	Amarillo	Buffalo	Provo	St. Louis	Total
Private collector	6	13	-	17	36
Self-operated	4	1	7	7	19
Municipal collection	-	-	2	-	2
Total	10	14	9	24	57

TABLE 14

SOLID WASTE DISPOSAL FACILITIES USED (1968)

Location	Companies responding	Number of establishments using			
		Landfill	Incinerator	Dump	Other
Amarillo, Texas	13	4	2	-	7*
Buffalo, New York	24	-	3	7	14+
Provo, Utah	10	8	1	1	-
St. Louis, Missouri	27	-	3	24	-
Total	74	12	9	32	21

* Waste stored in hulks and sold to balers.

\+ Thirteen firms put waste in hulks sold to balers; one stored waste on lot.

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