

Current Registration Practices for Heavy Construction Equipment

FAZIL T. NAJAFI AND CHARLES R. SCHERER

Heavy construction equipment loss is on the rise. In 1989, in Florida alone, loss from stolen heavy construction equipment reached more than \$9 million in value. A study was undertaken to identify current state practices and laws governing the administration of heavy construction equipment. Part of the objective was to determine whether registration has helped reduce equipment loss. By means of a questionnaire states were asked to identify registration problems and costs associated with equipment registration. The study also considered input from manufacturers, insurance companies, contractors, and law enforcement officials regarding the feasibility of registering heavy construction equipment. Various equipment identification procedures were studied to identify meaningful alternatives to equipment registration that could reduce equipment loss. The survey indicated that construction equipment owners are against equipment registration. One suggestion is that the state could include heavy construction equipment with existing motor vehicle registration. This could be done by requiring a photograph of the equipment at the time of registration along with product identification number or manufacturer's statement of origin. As an alternative, each state could work closely with equipment owners and private companies. A combined effort could help develop a centralized data base to keep equipment records and to facilitate the recovery of lost equipment.

The construction industry is essentially a service industry, whose responsibility is to convert plans and specifications into finished products. The impact of construction affects not only the economy of the state, but that of the nation as well. In the United States, the construction industry accounts for annual sales of more than \$400 billion, which is approximately 11 percent of the gross national product (1). There are more than 1 million construction companies in the United States. These companies vary in size from small proprietorships that employ one or two persons to large design and construction firms that employ thousands of employees and handle work worth billions of dollars. Construction equipment and heavy machinery are essential components of the construction industry. Regardless of the size of the company, the loss of construction equipment is a serious problem.

In the United States, the loss of equipment is on the rise. The Florida Department of Law Enforcement estimated that over \$9 million worth of equipment was lost in 1989. The Associated Equipment Distributors estimates that the stolen heavy equipment represents a billion-dollar-a-year industry (2). Unlike automobiles, construction equipment is not required to be registered. Nationwide, the manufacturers of the construction equipment claim that they can control losses from theft by using the Uniform Commercial Code (UCC) titling

procedure. However, identifying and tracing the equipment is extremely difficult because of a lack of uniformity in the placing of identification numbers. Furthermore, equipment is frequently sold without documentation, thus making it more difficult to distinguish ownership. In addition, there are no standards or common procedures for reporting the theft of equipment once it is stolen.

The objectives of the study were (a) to identify the existing state procedures regarding heavy construction equipment titling and registration (HCETR); (b) to survey the current practices and laws regarding HCETR; (c) to gather input from construction equipment manufacturers, insurance companies, contractors, and law enforcement agencies regarding the feasibility of HCETR; and (d) to develop a management approach for the equipment identification process.

REVIEW OF OTHER STATE POLICIES

A questionnaire (Table 1) was prepared and mailed to 50 states. It was found that only a few states have a titling and registration procedure for heavy construction equipment. California, Connecticut, Colorado, Maine, and West Virginia are among the few states with policies for registering construction equipment (Figure 1). In these states the equipment is registered as "special" equipment, which differs slightly from the normal vehicle registration procedure.

The only pieces of equipment that require registration in most states are dump trucks. Dump trucks are not registered under a heavy equipment policy, but under the normal vehicle registration procedure because most of the time they use public highways.

California and Pennsylvania also register construction equipment as special equipment. California defines special construction equipment as any vehicle used primarily off the highways for construction purposes. Because of their length, height, and weight, these vehicles may not move over the public highways without a permit. Special construction equipment also includes any vehicle that is designed and used primarily for highway grading, paving, earth moving, and maintenance. This equipment also includes railroad construction equipment and machinery, portable air compressors, air drills, asphalt spreaders, bituminous mixers, and bucket loaders.

Pennsylvania defines special mobile equipment as any vehicle not designed or used primarily for the transportation of persons or property and only incidentally operated or moved over a highway, including but not limited to ditch digging and well-boring apparatus and earth-moving, road construction, and maintenance machinery. The term "special equipment"

Department of Civil Engineering, University of Florida, 345 Weil Hall, Gainesville, Fla. 32611.

TABLE 1 SAMPLE OF QUESTIONNAIRE INQUIRING INTO THE STATUS OF STATE REGISTRATION OF HEAVY CONSTRUCTION EQUIPMENT

- 1) STATE: Alabama
- 2) EXISTENCE OF STATE STATUTE REGARDING REGISTRATION: Yes _____
No xxx
- 3) THE TYPE OF EQUIPMENT REQUIRED TO BE REGISTERED: Only required to register Dump Trucks.
- 4) DOES THE STATE RECOMMEND THE REGISTRATION OF EQUIPMENT?:
YES _____ NO xxx Registration fees are dedicated for highway construction and repair. It would not be equitable to charge fees for equipment not using the highways or for incidental use.
- 5) PROBLEMS WITH THE REGISTRATION OF EQUIPMENT: Alabama law provides that UTILITY TRAILERS be titled and registered. A "Trailer" is defined as "every vehicle without motive power designed to carry persons or property wholly on its own structure and to be drawn by another motor vehicle." Thus problems are encountered in determining if portable equipment is to be registered as a utility trailer.
- 6) THE METHOD USED FOR DETERMINING THE COST TO REGISTER A PIECE OF EQUIPMENT:
 - _____ A. Related to the replacement cost of the equipment
 - _____ B. Related to the initial cost of the equipment
 - _____ C. Set fee related to the type of equipment
 - _____ D. Related to the weight
 - _____ E. Related to the axles
 - xxx F. Some other means

Utility Trailer \$3.00

Dump Truck is based on Gross Weight (Max fee = \$845)
- 7) THE METHOD RECOMMENDED FOR DETERMINING THE COST TO REGISTER A PIECE OF EQUIPMENT:
 - _____ A. Related to the replacement cost of the equipment
 - _____ B. Related to the initial cost of the equipment
 - _____ C. Set fee related to the type of equipment
 - _____ D. Related to the weight
 - _____ E. Related to the axles
 - xxx F. Some other means.

Flat fee for off the road equipment \$5.00
- 8) AMOUNT OF EQUIPMENT LOST TO THEFT EACH YEAR IN THIS STATE:
\$7,000,000
- 9) WOULD THE REGISTRATION AID IN RECOVERY OF STOLEN EQUIPMENT?:
YES xxx NO _____ Because the recordation of the equipment by serial number could be accessed by law enforcement officials.

TABLE 1 (continued on next page)

TABLE 1 (continued)

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- 10) PROBLEMS WITH THE IMPLEMENTATION OF A NEW PROCEDURE REQUIRING COMPANIES TO REGISTER THEIR EQUIPMENT:
- TITLE PROBLEMS
- A. Proving ownership of older equipment would be a major problem. Under Alabama law, the owner could be required to obtain a surety bond based on twice the retail value of the equipment.
- B. Obtaining a manufacturer's serial number or VIN may be very difficult. The serial plate may have been removed or mutilated or the equipment might not have ever had an identification number. Assembled equipment (made from parts of salvaged equipment) could be a substantial problem.
- REGISTRATION PROBLEMS
- A. Finding the equipment annually to install the decal or tag could be a problem for large companies.
- GENERAL PROBLEMS
- A. Identifying the equipment subject to registration. Would equipment with the axles or tires removed be subject?
- 11) HOW TO REQUIRE A COMPANY WITH PROJECTS IN SEVERAL STATES TO REGISTER THEIR EQUIPMENT: Motor Vehicle registration/reciprocity compacts may need to be amended to include equipment and to provide for intrastate use of that registered equipment.
- 12) SHOULD COMPLIANCE BE VOLUNTARY TO A STATUTE REQUIRING HCETR?:
YES _____ NO xxx Would be confusing to lien holders, law enforcement, and to the general public.
- 13) SHOULD REGISTRATION BE A YEARLY EVENT OR ONCE IN A LIFETIME?:
YEARLY _____ ONCE IN A LIFETIME xxx A permanent registration plate would be the simplest procedure.
- 14) COSTS ASSOCIATED WITH THE DEVELOPMENT AND IMPLEMENTATION OF A HCETR PROCEDURE:
- A. Modification of title database
- B. Modification of registration database
- C. Changes in title application and title forms
- D. Changes in registration receipt
- E. Additional title and lien examiners
- 15) METHOD USED TO FINANCE THE COSTS OF THE REGISTRATION PROCEDURE: N.A.
- 16) ADDITIONAL COMMENTS PARTICULAR TO THIS STATE: N.A.
- 17) CONTACT PERSON: Robert B. McCain, Director
Motor Vehicle Division
P.O. Box 104
Montgomery, AL 36130
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FIGURE 1 States requiring registration of heavy construction equipment.

does not include house trailers, dump trucks, truck-mounted transit mixers, cranes, shovels, or any other vehicles designed for the transportation of persons or property to which the machinery has been attached. Other states use similar methods for identifying equipment to be registered.

Problems Encountered with HCETR

As indicated by several states, a major problem is obtaining the proper proof in identifying and establishing the actual owner of a piece of equipment. Because of this problem, it is possible that the stolen equipment could be registered and sold later in the open market. In other words, equipment could be stolen, registered legally, and then sold back to the original owners. Another problem is the nonuniformity in placing equipment serial numbers, which makes the identification of equipment extremely difficult. Every manufacturer places its serial number in a different location. As a result of such nonuniformity, law enforcement officers are often unable to locate the serial numbers. It is also difficult to identify the actual owner.

Another problem is the notification of new policy to owners who must register their equipment. Because of large numbers of equipment and the lack of ownership information, the enforcement of law would be difficult. Without law enforcement, the implementation of the equipment registration program would defeat its purpose. For the enforcement officials to identify construction equipment, it is important to issue the owners some type of identification plate. Having the tag is proof that the equipment has been registered. Some states suggested the use of an assigned number for each piece of equipment, similar to the procedure used for placing numbers on boats.

A physical inspection of the vehicle to certify the validity of the registration would also be difficult. The equipment is distributed throughout the state and bringing each piece of equipment to the registration bureau would create problems for both owners and the bureau. California requires a photograph of each piece of equipment instead of physical inspection. The photograph also allows them to determine whether the vehicle is being registered under the correct category.

Several states have complained of the lack of cooperation from the construction industry. Construction companies are reluctant to register their equipment because of the fees associated with registration. The construction companies own

many types of equipment and are reluctant to pay fees for each piece of their equipment. They believe that equipment registration is a hassle and that it will not benefit them. Therefore, the industry would lobby against any proposed legislation mandating the registration of heavy equipment.

In Tennessee, the companies sell their equipment informally to avoid paying sales tax. Colorado also had a similar loophole allowing the equipment owner to avoid paying the registration fee.

Registration Costs

In the questionnaire, the states were asked to identify the method they used to calculate their registration fee. The following procedures were cited to set construction equipment registration and relate fees to

- Replacement cost of the equipment,
- Initial cost of the equipment,
- Type of equipment,
- Equipment weight, and
- Number of axles.

Figure 2 shows the methods that are currently in use. Most of the respondents use a set fee method that is related to the type of equipment. A set fee related to the weight of the vehicle was the second most popular method.

Figure 3 presents the methods recommended by the states in calculating HCETR fees. As the figure indicates, 41.7 percent of the states relate the fee to the equipment weight, and 38.9 percent use a set fee procedure.

Although 50 percent of the states do not recommend the registration of construction equipment (Figure 4), almost 39 percent believe that registration could possibly facilitate the recovery of stolen equipment (Figure 5). There were no data available to specifically relate increase in the recovery rate of stolen vehicles to the registration procedure.

Figure 6 shows the Class A sample registration used in the state of Maine (3). Maine uses similar sample registration procedures for each class of equipment (e.g., snowplow use only). A few other states have similar registration policies.

INPUT FROM INDUSTRY AND LAW ENFORCEMENT OFFICIALS

The following views have been expressed by the equipment manufacturers, construction companies, insurance companies, and law enforcement officials regarding registration and titling of heavy construction equipment.

Manufacturers

The majority of manufacturers are against construction equipment registration; in their view, they will not benefit from equipment registration. The manufacturers of heavy equipment have a list of suggestions that could help distinguish one piece of equipment from another. To discourage the loss of

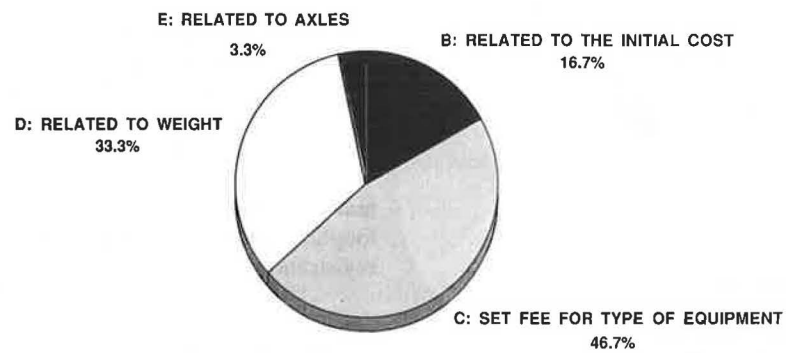


FIGURE 2 Method used to calculate registration fees.

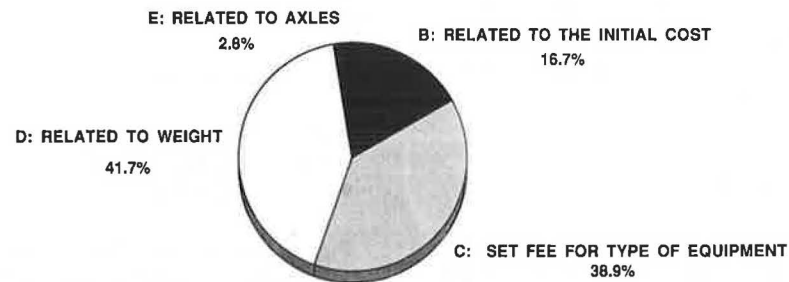


FIGURE 3 Recommended method to calculate registration fees.

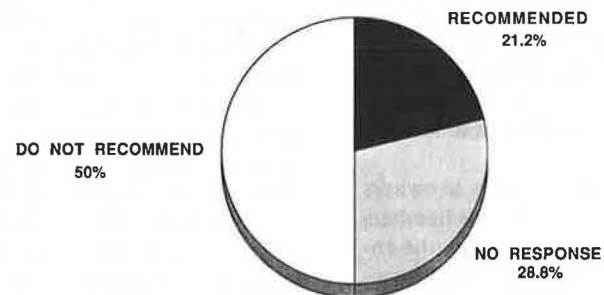


FIGURE 4 States recommending heavy/construction equipment registration.

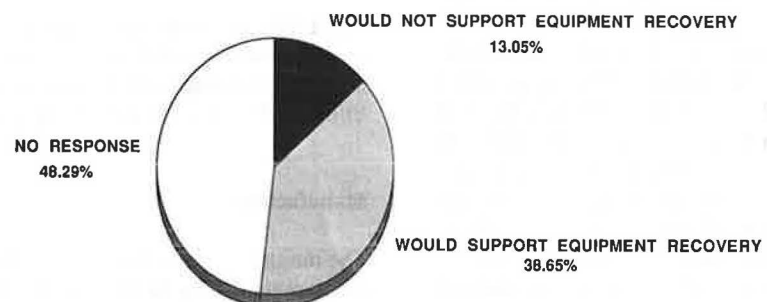


FIGURE 5 State responses regarding the recovery of stolen construction equipment.

Self-propelled Well Drillers and Self-propelled Air Compressors

STATE OF MAINE VEHICLE REGISTRATION
EFFECTIVE DATE IS VALIDATION DATE BUT NOT PRIOR TO

MAINE RE-REGISTRATION? ☒ YES ☐ NO ☐ HOUSE TRAILER ☐ CAMP TRAILER

EXPIRES: 2/29/89 CLASS R REGISTRATION NUMBER 26731

VEHICLE IDENTIFICATION NUMBER 1HTTCCXFTA2202467 COLOR YE YEAR 85 MAKE INTL MODEL F5070 RATE \$329.00

STYLE WD Number of Tires 8 AXLES 4 HORSEPOWER 50,000 FUEL ☐ GAS ☐ DIESEL ☐ OTHER

NAME BEST WELL DRILLERS

MAILING ADDRESS WATER STREET, BONEDRY, MAINE 04331

LEGAL RESIDENCE BONEDRY, MAINE 7869433 3

MODEL NUMBER 3,036,25 AMOUNT OF TAX \$ 3,036.25

CR NO CREDIT SUB TOTAL TRANS CHG EXCISE TAX BAL EXCISE TAX DATE 2/14/88 LEGAL RES CODE 2222

TO APPLICANT

1 Answer all questions on the reverse side of this copy
2 If name or address changes from that given on this registration, you must notify the Secretary of State within 10 days in writing
3 Registration void unless machine validated or stamped with state seal

APPLICATION MVR 4

- Key Points:**
- 1) Self-propelled vehicle (equipment permanently mounted on a traction unit or motor chassis)
 - 2) Subject to partial inspection
 - 3) No title required
 - 4) Use regular registration form, MVR-2
 - 5) February expiration
 - 6) Class code "R"
 - 7) Has tractor plate
 - 8) Based on gross vehicle weight, use farm truck rates
 - 9) Pays excise tax
 - 10) Needs Fuel Use Decal if registered for more than 26,000 pounds g.v.w. and uses diesel fuel

FIGURE 6 Sample of Class A Registration in the State of Maine.

equipment and to aid the recovery process, the following measures are recommended (4):

- Assigning a unique, nonduplicative product identification number (PIN) to each machine (Figure 7).
- Indelibly etching or imprinting the PIN, or a derivative of the PIN, in a concealed location directly on a permanent structure of the machine.
- Assigning unique, nonduplicative serial numbers to major components and attachments of the machine. These serial numbers may be derivatives of the PIN.
- Establishing a record-retention system that, upon request, will expeditiously provide cross-reference PINs and attachment serial numbers of machines.
- Providing tamper-resistant manufacturers statements of origin (MSO).

Caterpillar Company's manager of product safety in Orlando, Florida, states that the registration of the equipment would increase the cost of operation with little or no benefit and with detrimental effects on financing and mobility. In Caterpillar's experience with law enforcement officials regarding recovery of stolen equipment, the registration has not proven to be an aid in the recovery.

Darrell E. Wolbers, with J.I. Case of New Jersey, takes a similar stand and does not recommend that the industry be

Your Company Manufactured in _____

Name

Model No. 425A

Product Identification Number * 8747414 *

Your Company Manufactured in _____

Name

Component / Attachment

THIS IS NOT A PIN (PRODUCT IDENTIFICATION NUMBER) PLATE

Model/Name A129F ENGINE

Serial No. * 5669304 *

FIGURE 7 Product identification and component/attachment serial numbers.

required to register their equipment. He believes that the banks and tax collectors benefit the most from registration of heavy construction equipment.

Case provides a manufacturers certificate of origin (MCO) for all rider-operated, self-propelled construction equipment (Figure 8). The MCO is printed by the intaglio process, which is tamper-resistant. The MCO meets the standards of the American Association of Motor Vehicle Administrators and can be used to secure a title in any applicable jurisdiction. Case, like most manufacturers, places a concealed PIN on all rider-operated machines. Case believes that the MCO and concealed PIN effectively aid in the recovery of stolen construction equipment more than titling and registration. Also, Case contends that the MCO and PIN effectively deter the stealing of construction equipment.

Insurance Companies

Most equipment is covered under a blanket policy; items of high value are listed separately. Included in the list is the type of equipment, purchase price, date of acquisition, and insured value. Insurance is usually required for all equipment that is financed by a chattel mortgage. Establishing the ownership of this type of equipment is extremely difficult without the existence of a title. The majority of insurance companies favor the establishment of a registration procedure. Insurance companies would incur no costs in the development of state registration and would benefit only if registration decreased the theft rate.

Contractors could benefit from reductions in the insurance premiums, and insurance companies believe that rate reductions are possible if registration increases the recovery rate of stolen equipment. However, the insurance companies do not have data to support the fact that construction equipment registration has reduced theft rates. Another problem is that the stolen equipment is sold back to the market with great professional skills, which makes the insurance companies reluctant to offer significant reductions in premiums.

Contractors

In general, contractors are against registration of construction equipment because they believe that equipment registration would not benefit their business. The equipment owners do not wish to pay registration fees in addition to high insurance premiums. However, they strongly support the idea of protection against theft, but offered no concrete solutions to prevent or reduce equipment loss.

Law Enforcement Officials

Special Agent Robert Nye of Miami, who specializes in the recovery of heavy equipment, believes that a registration program would not be effective because the level of compliance would be low. He suggests that state laws be passed to require each company owner to clearly place the company name and phone number on each piece of equipment. According to Nye,

MANUFACTURERS CERTIFICATE OF ORIGIN	
case	
The undersigned authorized representative of the company, firm or corporation named below hereby certifies that the unit described below is the property of the said company, firm or corporation and is transferred on the above date and under the invoice number indicated to the following Distributor, Dealer or other purchaser.	
Name and Address of Distributor, Dealer or other Purchaser	
Description of Unit	
Product Identification Number (pin) / Serial No:	
Model Designation/Type of Unit:	
Engine Serial Number(s):	
It is further certified that this was the first transfer of such unit in ordinary trade and commerce.	J. I. CASE COMPANY <hr/> (Signature of Authorized Representative) <hr/> Racine, WI 53404 City-State
JC0134924	
KEEP IN A SAFE PLACE - ANY ALTERATION OR ERASURE VOIDS THIS CERTIFICATE	

FIGURE 8 Manufacturers certificate of origin.

TABLE 2 CONSTRUCTION EQUIPMENT STOLEN UNITS AND COSTS DATA, 1987 (5)

State	Units Stolen	Value (\$ thousands)
Texas	3,189	75.8
California	1,071	29.2
Oklahoma	486	7.2
Florida	440	8.1
Michigan	326	7.0
Arizona	316	8.8
Illinois	313	7.1
Georgia	274	4.0
Ohio	261	4.6
Missouri	184	2.4

these laws would accomplish many of the same things that HCETR would accomplish, but at a fraction of the cost. However, this practice might not have the most practical results because these markings could be removed by professional thieves.

THEFT STATISTICS AND EQUIPMENT COSTS

Table 2 presents data on stolen construction equipment compiled from the Federal Bureau of Investigation and the literature search (5).

Figure 9 presents stolen equipment units in 10 states. Figure 10 shows the number of units that were recovered in each of the states. Figure 11 represents the percentage of stolen units that were recovered. California is one state that requires equipment registration; its recovery rate is 78 percent, which is the second highest. It can be seen from Figure 11 that the percentage of stolen units recovered is higher in Arizona than in other states. Florida's recovery rate for the same period was 53 percent. This recovery rate dropped to 42.1 percent in 1989, according to the Florida Department of Law Enforcement. Florida ranks sixth in the recovery rate. The total dollar value of equipment stolen in Florida in 1989 was \$9,640,991. The total dollar value of the recovered equipment was \$3,971,991.

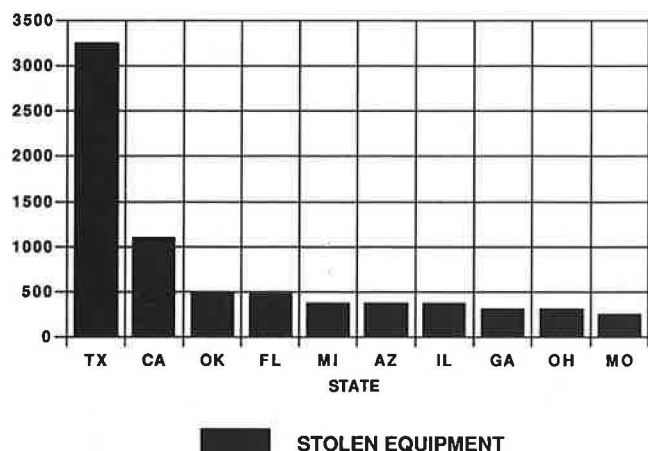


FIGURE 9 Construction equipment units stolen in 1987.

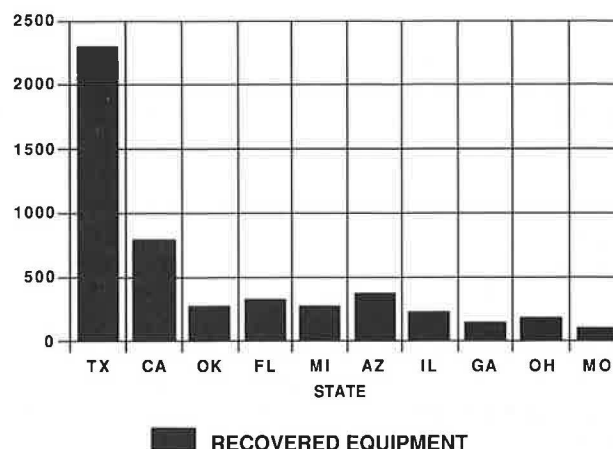


FIGURE 10 Construction equipment stolen units recovered in 1987.

California is the second highest state in the recovery rate of stolen construction equipment. The recovery rate also depends on such factors as the relative importance of the construction industry in a certain state, the effectiveness of the various police agencies, and the means in which stolen equipment can be sold.

STATE HCETR IMPLEMENTATION COSTS

Costs associated with implementing a heavy construction equipment registration procedure are related to many factors. These costs include combining the HCETR with existing motor vehicle registration; modifying the state data base, printing title forms, and applications; providing inspections; hiring additional employees; providing plates; and notifying equipment owners. All of these costs will vary depending on the type of procedure implemented. The majority of the states responded that the costs of implementing this type of program would be minimal, primarily because the number of automobiles registered is much greater than the number of construction vehicles.

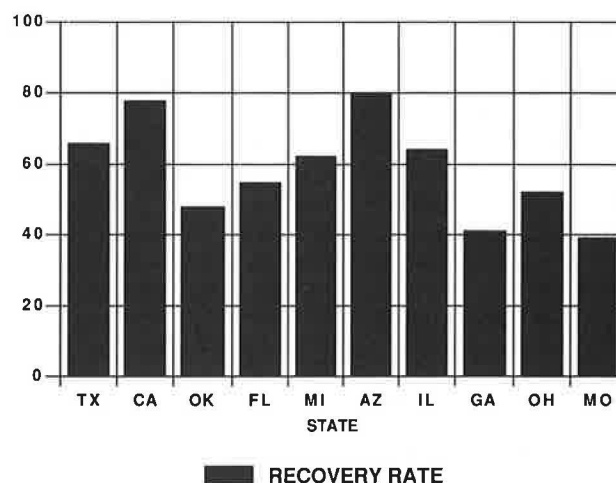


FIGURE 11 Percentage of construction equipment stolen units recovered.

The construction equipment inspection is the largest cost associated with equipment registration. It would be difficult to bring each piece of equipment to the registration site. Operation costs would increase if inspectors had to go out and verify each piece of equipment. Informing equipment owners about registration would be the second largest cost because it requires advertising and mailing. The cost of employee training would be minimal because the registration procedure would closely follow the existing automobile registration.

Cost data for a specific registration procedure for heavy construction equipment are available only from California. Initial capital costs were reported as minimal because the registration program was a simple extension of the current vehicle registration procedure. Also, the California policy has been in effect since April 10, 1958. According to J. Counselman of California, the cost for an initial registration is \$7 per registration. Cost of renewal of an existing registration is \$3. If Florida adopted this type of procedure, the cost would be similar. The initial cost would include the issuance of an identifying plate that must be affixed to the equipment at all times.

ALTERNATIVE EQUIPMENT IDENTIFICATION PROCEDURES

There are several alternatives for implementing a heavy construction equipment registration policy. Several private companies have programs that would allow for the identification of stolen machines. These companies are TRASE, Micro-Identification Dots, LoJack, and the National Auto Theft Bureau (NATB).

TRASE

TRASE (Theft Resistance Against Stolen Equipment), a company operating out of Boca Raton, Florida, specializes in the registration and labeling of heavy construction equipment. The company charges a flat fee of \$250 per year to the companies that are willing to use its services. There is also an initial fee of \$150 per piece of equipment to weld an identification number in a visible place on the machine. Large decals displaying the TRASE logo and a phone number are also supplied. With this system any law enforcement agency can call a toll-free number 24 hours a day to verify the status of any suspected equipment. Upon receiving a call, the company contacts the owner of the vehicle to verify the location of the machine. Calling and verifying takes an average of 3 minutes. This allows a police officer to stop a suspected thief from stealing the equipment. The company reports that several machines were recovered at Port Everglades in Fort Lauderdale using this system.

Micro-Identification Dots

Micro-Identification Dots are small dots $\frac{1}{16}$ in. in diameter that are capable of holding up to seven lines of material used for identification. These dots can be decoded with a 30-power magnifying glass. These dots can withstand temperatures up

to 400°. A customer places several dots on the machines in various locations and sends a list to the company with the location of the dots. The company also supplies the machine's owner with large decals to warn thieves that the machine is protected by hidden identification dots. When a machine is recovered, the dots allow the owner to identify the equipment. No data are available on the effectiveness of this program.

LoJack

The third program is LoJack. When a machine equipped with a hidden LoJack is stolen, the serial number of the equipment is reported to the police. The LoJack is then triggered to broadcast a silent radio signal that allows police to track the stolen vehicle. The company reports a 98 percent recovery rate on automobiles in Massachusetts. The cost of installation of LoJack is approximately \$600 per piece of equipment. This method has not been used in any other state.

National Auto Theft Bureau

NATB operates a data base that compiles equipment theft information. This system operates 24 hours a day. The data base also allows for cross-indexing of PINs and numbers on subassemblies. Off-line searches can also be conducted. For instance, if a loader is discovered without identification numbers, the computer can match similar pieces of equipment that were stolen across the country. The only problem is that only insurers report data to the data base and not all stolen equipment is reported to the insurance companies.

CONCLUSIONS

Florida currently has no state statutes that provide for the titling and registration of heavy construction equipment. If Florida were to implement a registration procedure, the major concern would be to identify the actual owner. This concern exists in many states. The state inspection of each piece of equipment is a large task, is time consuming, and would not be feasible. However, without actual equipment inspection, the Division of Motor Vehicles could not identify the equipment to register it properly. If a piece of equipment is registered without inspection, the level of compliance for this type of procedure would be extremely low. According to J. Counselman, the state of California registered only 8,985 pieces of equipment in 1989. This number of registrations seems very low for a large state such as California, and it seems obvious that the registration procedure is not followed by the majority of equipment owners. The main reason is the lack of proper enforcement. In California, the statistics on the total number of pieces of construction equipment are unavailable. Many of the contractors interviewed in California were not aware that a registration procedure existed. This indicates a lack of efficient administration and coordination among manufacturers, equipment owners, and the state.

According to our survey, many parties that would be affected by the registration procedure questioned equipment registration. They think that the main reason behind this type of legislation would be to collect some type of taxes.

No conclusive evidence was found to support the notion that the registration of heavy construction equipment would aid in the equipment recovery. Another difficulty in the identification of stolen equipment is the removal of identification numbers by the thief. When the identification number is removed, it is very difficult to identify the actual owner.

Costs to the state related to the registration of the equipment are negligible, and the cost debate could be the main reason to implement a state registration program. However, major costs will be incurred in the development of the legislation because the construction industry is strongly against it and they would fight it. Due to the lack of data on lost equipment cost, we were unable to develop a uniform way to report such data. Although the NATB system works well in this respect, it only collects data from insurance companies that are members of this organization.

The only reported benefit of a registration procedure is to aid in the recovery of stolen equipment. However, most manufacturers and equipment owners disagree and believe that registration would not help in the equipment recovery process.

RECOMMENDATIONS

The inquiry into the current registration practice of heavy construction equipment in Florida reveals that the equipment owners are strongly against registration. Our recommendations are as follows:

1. Heavy construction equipment registration should be combined with the existing motor vehicle registration. A photograph of the construction equipment should be provided by each owner along with PINs or serial numbers, location of serial numbers, or manufacturers' statements of origin, and the owner would be issued a permanent tag for the frame of the machine. Construction equipment should be classified under

a designated name, and a code number should be assigned to each class. When equipment is registered, a code number should be issued to be placed on number plates similar to vehicle registration.

2. States could work closely with the equipment owners and private companies (e.g., TRASE). Perhaps cooperation and an innovative approach would inspire the development of a management technique that would reduce equipment loss. If the devised method eventually proved to reduce theft loss or aid in the recovery process, that technique could be implemented through the passage of relevant legislation.

3. New technologies to impede crime should be considered (e.g., LoJack).

4. Heavy construction equipment could be equipped with alarm systems that would be easily triggered when an intrusion occurs.

5. Security devices such as ignition locks, stabilizer arm locks, and fuel shut-off valves should be bought at the time of equipment purchase. These devices can be effective and are small investments.

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