

# SUMMARY REPORT ON VANDALISM AND PASSENGER SECURITY IN THE TRANSIT INDUSTRY

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This paper summarizes the findings of a study on crime, vandalism, and passenger security on urban transit systems. The study's major goals were to appraise the national scope of transit crime and vandalism and to explore means of controlling the problems and make suggestions on the basis of the research findings. The emphasis in this summary is on means of controlling the problems. Several ideas to control transit crime and vandalism are discussed: the use of materials that are specially fashioned to withstand criminal and vandal acts on transit; procedures and tactics to protect transit passengers, employees, and properties and ways to detect and deter offenders, keep them under surveillance, and apprehend them when necessary; mechanical and electronic devices, as well as features of stationary sites, for assisting police and security forces in their duties; programs for involving the community in formulating anticrime and vandalism measures and programs for maintaining a liaison with educational authorities and personnel; the methodical cultivation of good relations with police, courts, and the media; and the attitudes of the public toward transit crime and vandalism to ascertain whether fear of crime and vandalism influences passenger decisions to use urban transit. Suggestions for further research on transit crime, vandalism, and passenger security are also given.

•IN 1970, the Urban Mass Transportation Administrator wrote to the American Transit Association suggesting that a study be undertaken concerning the cost and forms of vandalism on urban transit systems and the problems pertaining to rowdyism and passenger harassment. As described in another paper (1), UMTA agreed to fund such a project, and the vandalism and passenger security (VAPS) research team presented a draft report for UMTA review in August 1973.

This paper is a summary of the main items in that report. Because the methodologies used in accumulating and interpreting data varied widely, this summary is limited to findings. The VAPS report had two basic goals: to appraise the national scope of transit crime and vandalism and to explore means of controlling the problems of crime, vandalism, and rowdyism and make specific suggestions on the basis of the research findings.

Controlling transit crime and vandalism involves various approaches: resistant materials, deterrence, protection, surveillance, apprehension, dissuasion, community involvement, cooperation with educational authorities, coordination with institutions, and analysis of passenger attitudes. The general opinion among those working to overcome transit crime and vandalism is that none of these approaches can be successful on its own and that the most effective means of combating crime and vandalism is the sustained use of a combination of all approaches. Because of cost considerations, however, the problem becomes one of selecting those approaches that are best suited to local conditions and budgets.

The findings on the scope of transit crime and vandalism (1) and the findings on passenger attitudes toward transit crime and vandalism (2) are presented elsewhere.

## VANDAL-RESISTANT MATERIALS

Although the following remarks apply to both rapid transit and bus systems, for convenience, the discussion will speak only of buses.

One way that bus systems can cope with the vandalism problem is to utilize materials in vehicles and stationary sites that resist breakage by vandals. Broken windows, which account for much of the cost, ripped seats, and graffiti are the three main items in bus vandalism costs. Safety glass is customarily used in bus windows, but more systems are trying break-resistant acrylic and polycarbonate plastics.

For systems subjected to only a small amount of vandalism to windows, tempered safety glass is safe, adequate, and low-cost. Acrylic is substantially more break resistant than safety glass, but it is more expensive initially. Polycarbonate has superior break resistance because of its softness and flexibility (ordinarily it will not be penetrated by thrown objects although it may show dents or bubble-like impressions), but it costs even more than acrylic. Both acrylic and polycarbonate are prone to scratches unless coated with an antiscratch material such as "Abcite."

When purchasing new vehicles, transit systems should methodically decide which materials are suitable for their individual situations. Systems evaluating the merits of various window materials might set up a long-term (5-year) total cost projection that would include initial installation costs, estimated vandalism and other maintenance costs, and additional inputs such as estimates of possible injuries and effects on patronage.

Damage to seats accounts for the second highest vandalism cost in most bus systems; most damage is caused by cuts in vinyl seat coverings. To combat such damage, many systems are introducing hard seats, usually of fiberglass. Compromise seats with hard shells and cushions that can be easily replaced if damaged are also being tried. Although hard seats are impervious to slashes and rips, their smooth surfaces are vulnerable to graffiti markings, and they have the disadvantage of being difficult to clean. Some bus systems are trying chemical coatings on the hard surfaces to facilitate cleaning.

Graffiti, the third item in vandalism costs, are usually found on bus interior panels, on interiors and exteriors of transit vehicles, and on any accessible surface of stationary sites. Several solvents and cleaners are on the market, but their effectiveness varies not only with the type of marking but also with the surface material being cleaned. Certain materials used in manufacturing paneling, such as melamine and coated acrylic sheeting, are more readily cleaned than others. Because bus systems frequently do not maintain detailed records of graffiti costs, they have insufficient bases for judging whether the graffiti problem is large enough to justify the expense of special paneling materials. Actually, the problem is even broader; many bus systems do not know the dimensions of their entire vandalism problem because of inadequate records. Transit systems that have more than a minimal amount of vandalism should consider keeping accurate, timely records of the levels and types of vandalism experienced. These records could provide guidance on whether to replace standard materials with more costly, resistant materials.

## DETERRENCE, PROTECTION, SURVEILLANCE, AND APPREHENSION

Among the technological aids used to help control and deter crime and vandalism in transit vehicles are special devices for communication. Some devices can transmit communication one-way and undirected, as in a public address system through which an official can communicate with an entire station. Another type of public address system is one-way and directed and allows communication with selected areas of a station. There are also devices that can transmit two-way communication to an individual, as between a security monitor and a passenger or employee who utilizes an emergency telephone. A sophisticated form of two-way individual communication is the automatic vehicle monitoring (AVM) system that enables transit personnel to maintain control over buses on the streets and at the same time provides for bus-to-control center communication in the event of crime or other emergency.

UMTA has arranged for tests of several types of AVM systems over the past few

years. An outstanding example is a demonstration project in which the Chicago Transit System (CTA) installed a proximity AVM system on 500 of its buses.

The purposes of AVM are set forth in a study prepared by the Mitre Corporation: "The purpose of an AVM system is to provide the means of ascertaining the location of each of the vehicles in a large fleet, and at the same time provide a two-way voice and a digital communication capability, the latter to include a silent alarm. . . ." The various types of AVM systems presently available are dead reckoning, phase trilateration, LORAN, proximity, inverted proximity, pulse trilateration, triangulation, and others in which the driver is the location sensor.

The proximity AVM system tested by CTA consists of a series of signpost transmitters of 300 ft (90 m) or less propagation range, each uniquely coded to identify transmitter location. Broadcasts from the signposts are relayed by the vehicle over the standard land mobile communications band to the control center, which identifies the vehicle's location from the individual signpost code.

In the event of emergency, the driver can either summon help by voice radio or can press a button to activate an alarm that cannot be heard or seen on the bus but is very audible and visible at bus system headquarters. A computer interprets the alarm as run number, route, bus number, location of signpost transmitter, distance, and direction and enables the console operator to identify and locate the bus and alert the police by direct telephone.

Many bugs were disclosed in the AVM system during the test period, and there were many false alarms. An evaluation study by the Transportation Systems Center of U.S. DOT observed that emergency alarms were handled with efficiency, although the dispatcher was very cautious and had to refer to voluminous printed schedules to ensure that the data in the monitor console was correct. It was expected that the dispatcher's response to alarms would improve with time and experience. CTA was sufficiently pleased with the results and proposed to equip all buses in its fleet with AVM equipment and greatly expand the number of signpost transmitters.

Tests of other types of AVM were carried out in Philadelphia. These tests, however, provided no fresh information regarding the use of the silent alarm.

A form of communication that is gaining wide acceptance is the two-way radio. Deterrence of crime is only one reason for the popularity of two-way radios. Fires, parades, accidents, traffic jams, emergencies of all sorts can be reported promptly to the dispatcher and instructions issued for rerouting. Economies of personnel and telephone operation are realized. Morale is improved because drivers can communicate their problems and listen in on the operations of their fellow workers. Two-way radios also aid in reporting and protecting against crime and vandalism and are useful for reporting criminal incidents in general.

Signals and silent alarms are additional means of combating crime on transit vehicles. A common form of signal is a flashing light that can be activated by bus drivers to attract the attention of police. Obviously the effectiveness of such a signal is closely linked with the density of police patrols.

Alarms are commonly tied in with two-way radios. The most sophisticated is the AVM device already described. Simpler forms transmit coded messages either to dispatchers or to police when the driver presses the alarm button. With all types, the greatest part of the overall response time consists of time required for police to arrive at the scene. Police travel time can be reduced by increasing density of police patrols, giving high police priority to transit alarms, and reducing the number of false alarms. All alarm systems periodically generate false alarms, and if the ratio of false to genuine alarms becomes too high the enthusiasm of the police for responding deteriorates.

Although signals and alarms seem to boost drivers' confidence by giving them a means of signaling for assistance, they offer little prospect of being consistently effective in deterring crime. Criminals have the advantage of surprise, and because criminals are well aware of the existence of signals and alarms, they customarily warn drivers at the outset not to touch anything or make any false motions. The question then becomes whether the driver is willing to activate the alarm at the risk of being injured or killed.

## STATIONARY SITES

Communication and surveillance systems in stationary sites include telephone and radio connections and television monitors. The varieties and combinations of electronic communication and surveillance equipment not only are very numerous but also are continually being modified by improvements in existing technology and the introduction of new concepts. Because all such technology adds to transit system costs, an important question is whether the crime problem is sufficiently serious to warrant the cost of a particular electronic device to combat it. Aside from their effect on crime, harassment, or vandalism, such devices have no effect on the speed, comfort, or convenience of the ride.

Another important consideration is the human factor. An electronic system usually involves audio, motion, or light detection that initiates some form of alarm, but, although such devices can identify vandals and possibly discourage them, they cannot apprehend them. The effectiveness of any electronic or mechanical system rests on the human factor, i.e., the rapidity with which humans can respond to the alarm.

Wired communications in stationary transit sites (subway stations, elevated platforms, bus terminals) include public telephones, police telephones, and transit system phones. There is some movement toward making all phones more readily accessible to the public for emergency use: For example, all pay phones in New York City's subway stations were adapted, in December 1972, to coin-free use for calls to the police emergency number. (Other wired forms of communication are public address systems and alarms.)

Radio communications in stationary transit sites include personal walkie-talkies, to link with personnel in stations and moving vehicles, and lossy line, to overcome transmitting-receiving difficulties encountered in subways.

Electronic surveillance in stationary transit sites consists essentially of closed-circuit television. Nonrecording television is monitored by personal observation intermittently or continuously, depending on the availability of personnel. If continuous monitoring is maintained, the element of fatigue will increase demands on manpower to keep up alert coverage. Video recording reduces monitoring manpower requirements and assures that pertinent facts are available for recovery as needed, but video recording cannot react to criminal incidents. The human element is still necessary to initiate an appropriate response.

Electronic communication devices, whether for vehicles or stationary sites, do not replace the police officer but merely help him in his duties. Whether two devices will help him more than just one depends on the environment and the problems. Although cost considerations are important, investments in anticrime manpower and equipment cannot necessarily be justified on the basis of offsetting the costs by increased passenger revenues, especially in the short term. Intangible effects can be more important to a public service institution than tangible effects. Passenger goodwill and high employee morale can contribute to the well-being of the entire community.

In stationary sites, communication devices are supplemented by a host of devices for directing passengers into designated areas, preventing them from entering certain locations, deterring and detecting perpetrators of criminal acts, and helping to apprehend offenders. These devices range from the commonplace, such as a fence, to the highly complicated, such as an ultrasonic detection device.

Access and passenger flow controls consist of structures, devices, or arrangements that help the transit company guide people where it wants them to go and keeps them out of places that it does not. Fixed fences, immovable barriers, locked doors, and one-way gates are commonplace examples. More sophisticated are movable barriers and adjustable gates that can be arranged in nonpeak hours to cut down on accessible station areas, herd waiting passengers together, and reduce areas to be patrolled. Turnstiles (gates that unlock on insertion of a coin) are a familiar form of access-control device. Recently developed turnstiles are the ticket-in, ticket-out gates used by BART (San Francisco) and PATCO (Philadelphia), which scan tickets for entry, exit, and amount of fare paid or due.

Exit-blocking devices are contrivances or arrangements that impede the escape of

the criminal until police can arrive. Locking certain doors after peak hours to reduce the number of exits is an everyday example. A sophisticated variant of this consists of electronic remote control that enables a television monitor to lock exits as the fleeing criminal tries to get away. A danger in using such exit-sealers, however, is that caging the criminal can endanger other people. Exit-blocking devices are sometimes combined with other equipment, such as videotape recorders that take photographs of the offender.

A wide assortment of devices is available for protecting fixed premises, such as storerooms, against intruders. Audio detection devices set off an alarm when noise rises above a preestablished pattern or level. Motion detection devices trigger alarms when an unusual motion disturbs the transceiver's wave pattern. Electromechanical systems operate on wires or switches hidden in windows, doors, or drawers. Opening a "loaded" window activates an alarm. Electronic fences have antennae that set off an alarm when an object comes within 3 ft (1 m) or other specified distance. Manufacturers offer special provisions for foolproofing because false alarms are a recurring problem with many of these devices. Sometimes such provisions are unavailing; it is difficult, for example, to render electronic fences invulnerable to false alarms triggered by birds and animals.

Many transit systems are recognizing the importance not only of equipping stationary sites with crime-deterrent devices but also of incorporating security features in stationary site design. Thus, many systems are remodeling old stationary sites and designing new ones to maximize features that help protect passengers and employees from transit crime and vandalism.

In the words of one transit executive: "The primary purpose of all of these measures is to make people visible. By making passengers more visible to other passengers, security and other personnel, and the outside world, criminal acts can be stopped before they begin. In the event that they do occur, improved visibility will make it easier and faster to take corrective action." In view of this, some suggested security measures are

1. Make fences, parapets, gates, and windbreaks more transparent;
2. Minimize the number of structural columns in platforms and lobbies;
3. Locate collectors' booths to optimize sight lines;
4. Avoid twisted or dog-leg corridors;
5. Install mirrors or closed-circuit television to provide surveillance over areas not directly visible from collectors' booths;
6. Provide high levels of illumination for indoor and outdoor spaces;
7. Concentrate passenger waiting and circulation areas;
8. Minimize the number of station entries to ease supervision and concentrate pedestrian activity;
9. Close off nonpublic and abandoned facilities;
10. Locate entries to public toilets in easily supervised areas, inside the paid area if possible; and
11. Make transit cars more transparent so that it will be easier to see into or out of them.

As with stationary sites in general, shelters at bus stops require good exterior and interior visibility to discourage crime. Bus shelters should stand clear, unconcealed by other structures, and substantial portions of their walls should be constructed of transparent materials to provide full view of the inside. At least two exits should be provided to give patrons escape routes from molesters. Materials and construction should be strong to provide fullest potential resistance to vandalism.

#### POLICING PROCEDURES

According to the President's Commission on Law Enforcement and Administration of Justice, preventive patrolling by visible and mobile policemen is universally thought of as the best method of controlling crime, but little is known about the most effective way of deploying and employing a department's patrol force. Lack of knowledge about the extent to which different patrol techniques result in arrests and lead to fear of

arrests has meant that many operational patrol decisions are made on the basis of guesswork or logic rather than facts.

On transit systems, the effectiveness of patrolling and surveillance lies in deterring criminals rather than apprehending them, for it is seldom that a man patrolling or a man assigned to keep an eye on a station actually spots a crime in progress. The greater the coverage by patrolling and surveillance is, the more effective the deterrence will be, but the factor of cost-effectiveness must be considered. Because few police departments or transit companies can bear the expense of assigning large numbers of men exclusively to transit security duties, control of crime on most transit systems depends largely on rapid response to incidents. In rapid response, good communications play a key role.

Providing protection for bus passengers and drivers presents different problems from those of rapid transit because there are few stationary sites and surveillance of buses is difficult. Adoption of exact fare by most bus companies has greatly eased the problem of robbery of drivers, but assault, robbery of passengers, and harassment and other rowdyism remain.

The relative ineffectiveness of silent alarms and flashing lights in high-crime areas has led bus companies to try other deterrents. Policemen riding on school buses, police cars following selected buses in high-risk areas, private guards being hired where local police forces are too small to spare men to ride on buses, unarmed transit personnel accompanying the driver on certain runs, paid and non-paid volunteers riding, and (with one system only) bus drivers being permitted to qualify as special policemen and carry firearms are examples of alternative deterrents to crime and vandalism on transit.

A few rapid transit systems have used man-and-dog teams in subway vehicles and stations with good effect. There seems little potential, however, for use of dogs in bus systems. Large rail systems have obtained satisfactory results by using helicopters for surveillance.

#### COMMUNITY AND EDUCATIONAL PROGRAMS

Transit systems have sought to deter vandalism by means of public relations programs and maintenance of a liaison with local schools and educational authorities, government agencies, and community action groups.

These educational and community programs follow the general pattern of cultivating good relations with personnel of potential influence with juveniles and keeping in touch with young people themselves to nip vandalism in the bud. One transit system, for example, arranges monthly meetings with local police and fire department and school officials. Another system has developed a plan in conjunction with county authorities to employ underprivileged teenagers in an origin-and-destination survey. A third hires inner-city youths as summer tour guides. Coordination with school officials and community groups has enabled another system to utilize monitors on buses serving schools.

Numerous systems are committing resources to educational presentations in elementary and high schools. Typically, speakers address the students in classrooms or the assembly hall for 15 to 20 minutes. This is followed by a slide show in which problems of vandalism and other misbehavior are worked into the general theme of concern for the students' safety. A short question-and-answer session allows for student input. Giveaways are used to stimulate interest, the type of gift varying with the age of the students. (One system, for instance, provides a demonstration bus ride and free comic books.) To focus students' attention, questionnaires are sometimes distributed afterward for the students to complete. Analysis of the responses sometimes reveals information of use in formulating operating procedures.

A system in New Jersey, for instance, uses questionnaires, talks, and slide shows with students as young as the second grade. The responses may not be very meaningful as an indicator of student reactions, but they do furnish some measure of guidance for speakers in preparing future presentations, and the questionnaires keep the children interested in the presentation and help prevent the talk and exhibits from being quickly forgotten.

In contrast to systems that leave school relations to haphazard presentations by lower

echelon employees, a number of systems designate an employee to devote at least part of his regular duties to cultivating good relations with school authorities and youngsters. This employee assiduously nurtures channels of communication with school principals, officials, and students. Need for such employees varies from one community to another with the intensity of the vandalism problem.

A bus system in Washington, D.C., employs professional football players in the off-season to build up relations with school children through their hero image. A Seattle system suggests that a high school that trains its students in television production write scripts and put on shows about student behavior on buses. Systems in New York, Cleveland, Oakland, and elsewhere periodically invite students to visit system repair shops and garages to see what it takes to keep the buses in running order.

A bizarre aspect of relations between the community and transit system is the problem of the defacement of transit rolling stock and stationary property by graffiti. Although found nationwide, graffiti have been concentrated in two cities particularly, Philadelphia and New York, both of which have made intensive efforts to cope with the problem but without much progress. As of June 1972, Philadelphia was spending about \$1 million annually to remove graffiti from school walls and buildings, and a large transit system's costs for removing graffiti from its rolling stock and stationary sites were almost \$100,000. New York's total graffiti bill for 1972 was estimated at \$10 million, of which more than 27 percent was for vehicles and property of the city transit authority.

Deterrent measures in both cities have been a blend of enforcement, persuasion, and education. Police have made numerous arrests. Paint retailers have asked store managers to put spray cans out of reach of the public to reduce theft of paint. City authorities issued strong statements against graffiti, television and radio stations ran anti-graffiti spot announcements, boy scouts and other volunteers devoted weekends to cleaning graffiti from buildings and vehicles. Schools held classroom discussions on graffiti, and city-wide contests awarded prizes for children's anti-graffiti posters. In Philadelphia a graffiti-alternative workshop for graffiti scrawlers was initiated with the support of the University of Pennsylvania and several foundations. In spite of all these measures, however, both cities still had a long way to go to overcome the graffiti problem.

### INSTITUTIONAL COOPERATION AND CONFLICT

Urban transit systems function in an environment that involves interfaces with riders, government members, police officials, officials of the judiciary, personnel of educational establishments, labor union leaders, and representatives of the media. Each group has its own duties and objectives, some of which coincide and some of which conflict with those of each other and those of transit systems. How transit systems get along with such institutions is an important element in maintaining service to the public and combating transit crime and vandalism.

Although precise figures are lacking, indications are that the percentage of systems that maintain their own security forces is very small throughout the industry. A system that contemplates maintaining its own security force must be prepared to allocate relatively sizable funds for the purpose. Whether or not it is advisable for a system to maintain its own security force necessitates consideration of the effects of such specialization, the benefits to be derived, and the disadvantages that may result.

According to a study by Stanford Research Institute, although a special transit police force increases the operating cost of the transit system, no data have been found to demonstrate that such increased cost will be supported by savings from less vandalism or theft or from the revenues created by increased ridership. If the special force must protect the property and passengers of a company that operates in several different political jurisdictions, there is the problem of defining legal authority for enforcing local ordinances. An attractive career system must be developed to recruit high-quality personnel. The advantages of having one's own special police force should be compared with other alternatives such as hiring off-duty policemen for occasional seasonal employment or contracting with local police to provide certain services. It seems advisable to organize a separate, specialized transit police force only in the largest

companies and then only when demand for security services clearly exceeds capabilities of local police forces: when the company operates in different government jurisdictions and the crime problem is serious.

The typical transit system does not maintain its own police forces but relies on community police forces to furnish security. Because of the multiplicity of tasks confronting them, police forces often assign low priority to coordination with transit systems. Accordingly, it is to the systems' advantage to pursue a conscious program of cultivating police goodwill and coordinating with them to assure protection of transit interests.

One element that can seriously disturb good relations is for the police to form the opinion that the transit system is unwilling to prosecute. Because the police view prosecution as the logical consequence of criminal investigation and apprehension, they are liable to be reluctant to continue cooperating if the transit system declines to prefer charges against apprehending criminals.

Although transit systems are concerned about all types of crime that may affect their patrons and employees, their greatest concern is with lesser crime, particularly vandalism because, with the preponderance of incidents of vandalism over serious crime, it is vandalism that is likely to lead systems to day-to-day contacts with police and judiciary.

Because most vandals are juveniles, the majority of transit systems' dealings with the judiciary are at the juvenile court level. Thus, in cultivating good relations with the judiciary, transit systems' emphasis is necessarily on the juvenile court. The burden on juvenile courts throughout the United States is extremely heavy; the Task Force of the President's Commission noted: "It is apparent that responsibility for meeting the problems of crime rests more heavily on no other judicial institution." To the courts, transit vandalism is just one more contributor to the heavy workload. Hence, if a transit system is to secure its share of a court's limited time and resources, it must work actively with court and probation personnel, not necessarily to obtain the conviction of every apprehended juvenile but to help steer these youths to constructive pursuits.

Another institution that should be actively courted by transit systems is the media. Do media encourage crime and vandalism by publicizing criminal incidents? Transit system management tends to think so, but media men do not agree. Scholarly opinion is that the question has not been decided. Nevertheless, transit management in general prefers to deemphasize incidents of transit crime and vandalism. For example, respondents from one transit system asserted that a strong upsurge in graffiti occurrences took place after an article on the subject appeared in a city newspaper. Another correspondent wrote: "We feel that too much emphasis on vandalism [in the media] might create a public impression of 'unpleasantness—inconvenience' in riding buses."

It was concluded that transit systems and mass media may have sets of interests that conflict with each other. There is a divergence of opinion about how much publicity should be given to some types of news and how sensational such publicity should be. To consider transit-media relations in terms of generalities, therefore, is unlikely to lead to joint cooperation toward common goals. Because of the gap between the respective positions, transit systems should cultivate good personal contacts with media to establish an atmosphere conducive to compromise and negotiation to reconcile conflicting interests.

#### FURTHER RESEARCH

Crime is a big subject. The President's Commission acknowledged (3), "The Commission did not—it could not—find out 'everything' about crime and the criminal justice system. It became increasingly aware during its work that, far from seeking to say the last word on crime, its task was rather a step in a long process of systematic inquiry that must be continued and expanded by others."

Like its predecessor, the vandalism and passenger security study did not find out everything about transit crime and vandalism. It, too, is a step in the process of systematic inquiry that must be continued and expanded by others.

The report shows the following gaps in knowledge that require new or continued research:

1. The collecting of statistics on transit crime and vandalism should be continued on an annual basis, and the data should be systematized and standardized to facilitate comparisons and study of trends.

2. Extrapolations of the number of criminal incidents and the totals of vandalism costs on a national basis should be refined and extended.

3. Data on transit properties' experience with types of damage-resisting materials should be accumulated.

4. Many before-and-after projects are possible in technical and in social areas. Some questions that may be pursued in these projects are (a) Does installation of a device such as two-way radio on buses result in a decrease in vandalism incidents, an increase in apprehension of offenders, or other changes? (b) Does a steadily pursued program of presentations to school children lead to a perceptible change in juvenile behavior on school buses? (c) Does use of a particular type of paneling show significant improvement in facilitating removal of graffiti?

There are almost limitless possibilities for controlled experiments. Cost-effectiveness studies of available technological aids are needed. If, for example, a transit system spends \$1 million to install an automatic vehicle monitoring system, can it expect to offset the investment through higher revenues, reduced costs, and increased social benefits to passengers and employees and if so, over what period of time? Who are the vandals? Identification of those who vandalize buses and rapid transit trains should be a great help in planning ways to get at the root of the problem.

More work needs to be done on the question of public attitudes toward transit crime and vandalism. Studies are needed to confirm or refute the hypothesis that fear of crime and vandalism actually is affecting ridership of urban transit. If the hypothesis is found to be valid, studies are needed to quantify the resulting loss in revenues to gauge the seriousness of the problem.

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