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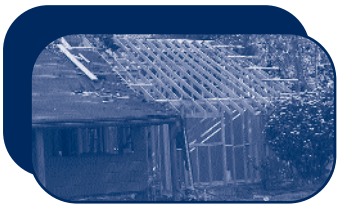
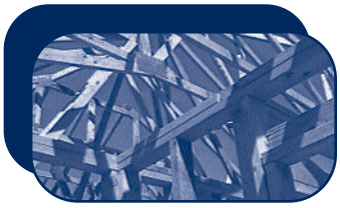
Reducing Theft at Construction Sites: Lessons From a Problem-Oriented Project



by
Ronald V. Clarke and
Herman Goldstein



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REDUCING THEFT AT CONSTRUCTION SITES: LESSONS FROM A PROBLEM-ORIENTED PROJECT

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Ronald V. Clarke and Herman Goldstein

Table of Contents

Abstract 1

Acknowledgements 3

Introduction 5

Background to the Project 7

Defining the Problem 11

The Nature and the Scope of the Problem 13

Risk of Break-ins and Builder Security 15

Selecting and Implementing the Preventive Measures 19

Monitoring Compliance 23

Evaluating the Preventive Measures 25

Summary of the Results of the Experiment 31

Follow-up Action 33

Lessons of the Case Study 35

Conclusion 41

References 43

Appendix 47

Notes to Annex 49

Abstract

A building boom in Charlotte, North Carolina led to sharp increases in the number of kitchen appliances stolen from houses under construction. This paper describes a problem-oriented policing project, extending over a period of more than two years, that was undertaken by the Charlotte-Mecklenburg Police Department to address the problem. A detailed analysis of security practices and risks of theft was made for 25 builders operating in one of the police service districts north of the city. This produced the recommendation that installation of appliances should be delayed until the new owners had taken up residence, thus effectively removing the targets of theft. Twelve of the larger builders agreed to experiment with this approach for a period of six months, though systematic checks made by police throughout the period found that builder compliance was variable. Despite this, analysis showed that delayed installation was an effective policy. Appliance theft declined in the district and there was no evidence of displacement of thefts to surrounding districts. The concluding discussion of the difficulties encountered by police in undertaking problem-oriented projects focuses on the vital role of crime analysis and considers ways to strengthen analytic capacity in police departments.

Acknowledgments

This project was completed under an Advancing Community Policing grant (#97-0C-WX-0060) made to the Charlotte-Mecklenburg Police Department (CMPD) by the U.S. Department of Justice Office of Community Oriented Policing Services.

Most of the work on this project was carried out by Officers Daniel Cunius and G. Eric Rost of the CMPD. They identified the problem of theft from construction sites as warranting attention in the course of their routine patrol work. They subsequently nominated it for more intensive examination and, when the study was approved, compiled much of the needed data, acquired information from builders, participated in all stages of the analysis, monitored implementation of the agreed-upon response, prepared, and presented the findings of the study. Throughout all stages of the project, they were strongly supported by their captain, E. Charles "Chuck" Johnson, who also participated in all stages of the analysis, in engaging the builders, and in presenting the findings of the study. Technical assistance in the compilation and mapping of the data was initially provided by Carl Walter, who also acquired and integrated data from other county agencies. Ryan Jackson succeeded him as the crime analyst assigned to the Charlie One district acquired and integrated the data on certificates of occupancy and developed the computer program for recording compliance. Michael Humphrey provided the technical support for the final stages of the project. Steve Ward, senior Assistant District Attorney assigned to work full-time in the CMPD took a close interest in the project and attended many of the project meetings. The write-up of the project was greatly facilitated by the detailed notes taken on several of the early project meetings by Officer Lisa Carriker.

Dennis Nowicki, the former Chief of Police of the CMPD, initially encouraged taking on this project as a case study in problem-oriented policing. In its final stages, the project has received strong support from the new and current chief of the CMPD, Darrel Stephens. The Director of Research and Planning, Dr. Richard Lumb, was generous in his arrangements for allocation and scheduling of staff time, as was Acting Director, John Couchell. Finally, James LeBeau of Southern Illinois University provided us with valuable statistical advice.

Introduction

Problem-oriented policing was initially advanced as a way of focusing attention on the effectiveness, rather than just the efficiency, of the police. Advocates of problem-oriented policing contend that it is not enough to respond, however efficiently, to incidents as they occur. Rather, with effectiveness as the goal, it is essential that the police identify patterns in the incidents they routinely handle, subject these patterns (labeled problems) to in-depth analysis, and explore new ways of intervening earlier in the causal chain so that these incidents are less likely to occur in the future. These new strategies are not limited to standard police responses that traditionally depend on law enforcement–i.e., on efforts to identify, arrest, and prosecute offenders. Rather, without abandoning the use of the criminal law when it is likely to be the most effective response, problem-oriented policing encourages a broad exploration of other potentially effective responses, alone or in partnership with others, with a high priority on prevention. Thus, by expanding the repertoire of possible responses and settling on a strategy that has the potential for reducing the problem, the ultimate and steadfast goal is to increase effectiveness (Goldstein, 1979, 1990).

Problem-oriented policing is rooted in the increased awareness, reinforced by continually accumulating studies, that substantial categories of crime have been generally resistant to traditional policing methods. For example, car and foot patrols can do little to deter crime occurring in private places. Crackdowns rarely have lasting effects on street crimes. Stakeouts produce few arrests when crimes occur at extended intervals. Fast response is usually of limited value when the offender has departed the scene. Criminal investigation is too laborious and unproductive for all but a minority of serious offenses. And the arrest and prosecution of minor property offenders is often not productive, given the overburdened court systems and the unavailability to a judge of effective sanctions or alternative forms of disposition. These limitations sometimes lead to labeling many of the categories of crime at which the cited strategies are directed as "non-suppressible."

The crimes addressed in this project, thefts from residential construction sites in Charlotte, North Carolina, would fit the definition of non-suppressible crimes. As shown below, they were inherently difficult to deter and they did prove resistant to conventional police methods. However, they were reduced as the result of a problem-oriented project undertaken by the Charlotte-Mecklenburg Police Department (CMPD).

The initial purpose of the project was to illustrate a full, careful application of the problem-oriented policing concept. Once the decision was made to focus on theft from construction sites as the illustrative problem, the second purpose of the project was to enable the CMPD to deal with the problem more effectively by making use of the problem-oriented methodology. This paper reports on what was learned about the problem, describes the effort to reduce it, and presents data showing that the response implemented was effective. In the language of situational crime prevention (Clarke, 1997), this response would be classified as a form of target removal. Thus, this paper not only documents the success of the CMPD in using the problem-oriented methodology to reduce thefts from construction sites. It contributes as well, albeit modestly, to the literature on target removal.

As the project evolved, it provided another benefit of potential value to the larger world of policing in the lessons learned about implementing problem-oriented policing. In name, problem-oriented policing has become quite popular, but the number of efforts that meet the original criteria of the concept is very small (Clarke, 1997a, 1998; Goldstein, 1994a,b, 1996,a,b; Read and Tilley, 2000; Scott, 2000; Scott and Clarke, 2000). This is especially puzzling because the fundamental logic in problem-oriented policing is often quite appropriately described as simple or just plain common sense (Read and Tilley, 2000). This project afforded a unique opportunity to identify some of the factors that account for the small number of full applications of the concept–to identify the factors that, in practice, make a seemingly simple process complex. The opportunity was unique for three reasons:

1. The ambitious nature of the project;
2. The fact that the project had more than the usual support from within a police agency; and
3. The familiarity that the authors, involved as we were in the project, had with the concept (Goldstein with problem-oriented policing and Clarke with situational crime prevention–a concept that in many ways parallels and complements problem-oriented policing).

A major objective in preparing this paper, therefore, was to report on some of the complexities that were found in carrying out problem-oriented policing, to identify the barriers that were encountered, and to outline some measures that need to be taken if the benefits of problem-oriented policing are to be more fully realized.

Background to the Project

Wherever construction is underway, there will be related problems of theft, but these may assume significance for a particular police jurisdiction only during a construction boom. The form taken by the thefts will depend on the nature of the construction which can range from enormous projects for new highways and airports to in-fill housing developments in suburbs. Construction site theft seems never to have been systematically studied, though occasional discussions of the problem can be found in trade journals such as "Construction Equipment," "CONTRACTOR.mag.com," and "Constructor," the latter being the house journal of the Associated General Contractors (AGC) of America (Constructor, 1999; Goldman, 1999; McGreevy, 1999; Snyder, 2000; Stewart, 1998, 2000). These discussions tend to focus on the organized theft of expensive equipment such as bulldozers or backhoes (commonly known as JCB's in the UK). However, this literature draws attention to at least three other forms of construction site theft: theft by workers of tools and materials; after-hours pilfering of lumber and other materials by opportunist thieves, perhaps for their own use; and, in the case of homes under construction, thefts by habitual offenders and others of fixtures and appliances.

The present project started with a focus on the general problem of theft from construction sites, but, in the classic pattern of problem-oriented policing, it quickly became more tightly focused on just one of the specific sub-problems identified during analysis. This was the theft of household appliances, such as ranges (cooking stoves) and microwaves, from newly completed houses.

The project was located in the Charlie One service district, the geographically largest of twelve such districts of CMPD, an agency that provides police service to the City of Charlotte and to most of Mecklenburg County in which the city itself is located. Charlie One covers most of the northern part of the county, an area with an estimated population in 1995 of just over 100,000. The southern part of the Charlie One district includes the Charlotte campus of the University of North Carolina and various office, mall, and light industrial developments. To the north, the district is largely rural with a scattering of separately incorporated small municipalities and lakeside developments. As a result of the booming regional economy, and because of its proximity to Charlotte, northern Mecklenburg county has experienced a large increase in population throughout the 1990s, and, as a consequence, a correspondingly large increase in housing. About one third of the residential construction occurring in the entire area served by the CMPD was in Charlie One.

This construction was mostly in the form of single-family homes built in separate developments or subdivisions (estates in the UK), which were once farms or fields. In March 1999, 66 housing developments were underway, involving 48 different construction companies. This wave of building was expected to add more than 12,000 homes to the housing stock by 2002 and, by 2010, it is estimated that the population of northern Mecklenburg County would grow to about 180,000. This would be an 80 percent increase in population over a fifteen-year period.

During 1998, it became apparent to Captain E. Charles "Chuck" Johnson, who was in charge of Charlie One, that construction site theft in the district was a large and growing problem. For example, of the 485 commercial burglaries recorded in Charlie One during 1998, 109 (22 percent) were break-ins to houses under construction with an appliance taken.[1] Leaving aside the sheer volume of construction, it was not difficult to understand the reasons for this emergent crime wave in the district. The numerous subdivisions were scattered throughout a largely rural district, which made it next to impossible for the police to provide adequate patrol coverage at high-risk periods –in the evenings and weekends–when sites were usually deserted. Because of the high costs, few sites employed security guards or off-duty police and, to encourage casual inspection by potential buyers (and because it would have been difficult to secure entrances), the sites were generally left open. This both afforded the opportunity and the excuse for thieves openly to prowl for targets. When the first residents moved into their homes, they afforded only minimal guardianship of nearby properties because, in the evening, night, and weekend hours, thieves could easily blend in with the employees of sub-contractors who sometimes worked in those hours. During the day, the large number of employees of sub-contractors, casual laborers on site, and delivery personnel made it difficult to maintain site security. Tools and materials were constantly at risk of theft. Finally, the large number of construction firms operating in the district and the large number of site supervisors employed could mean that thieves might be able to find ready purchasers for some of the appliances and home fixtures they stole. Altogether, in the terminology of routine activity theory (Felson, 1998), the construction sites ensured the convergence of many suitable targets for theft, an absence of capable guardians, and a ready supply of likely offenders.

Two of Captain Johnson's officers, Daniel Cunius and G. Eric Rost, had been taking an interest in the problem and, on the basis of discussions with them, he assigned them part-time in May 1998 and then full-time in March 1999 to develop a workable solution. Their plan had three components:

1 Burglary of a home under construction is classified, until it is occupied, as commercial.

- Contacting all existing building site supervisors to discuss their crime prevention practices, provide them with crime prevention tips, and obtain after-hours contact numbers
- Establishing community watch schemes whereby new residents in subdivisions would be urged to report any suspicious vehicles or people
- Undertaking intensive patrols of the construction sites during the evenings and working closely with other officers and investigators to identify and arrest suspects

Elements of this plan–such as the move to a primarily proactive, preventive mode–reflected wider efforts that were being made at the time to establish problem-oriented policing within the CMPD. With grant support from the Office of Community Oriented Policing Services in the U.S. Department of Justice (the COPS Office), Chief Dennis Nowicki persuaded Goldstein to review these early efforts. As a result of that review, Goldstein argued that the CMPD could better develop its commitment to implementing problem-oriented policing if resources were focused on just a few projects in which a more intensive effort was made to address a specific substantive problem. It was suggested to him that, from among the many projects then underway, the Charlie One project on construction site theft would be a suitable candidate for the kind of intensive project he had proposed.

Accordingly, about six months into their project, Goldstein met with Captain Johnson and the two officers involved. The efforts they had already made to obtain a detailed picture of the problem, the relationship they had cultivated with the department's crime analysts, and most important, the enthusiasm and openness they demonstrated were impressive, and it was therefore decided that the project merited the kind of concentrated attention that had been proposed. The offer to make their explorations the subject of a more intensive project was welcomed by Captain Johnson and the two officers. Despite the considerable efforts they had made to arrest offenders through intensive patrols, stakeouts, and working with investigators, little tangible progress had been achieved. Both offenders and the stolen property seemed to vanish into thin air. In 1998, less than two percent of reported construction site thefts were cleared and, while the clearance rate was improving (it rose to about six percent in 1999), it was still at a low level. The few offenders arrested (most of whom were drug addicts) had refused to divulge how they disposed of goods they had stolen. In extensive checks of area pawnshops and flea markets, not one appliance had been recovered out of the 159 stolen from houses under construction in 1998. The Charlie One team was anxious to consider any new ideas for dealing with the problem that might surface from the type of in-depth inquiry that had been proposed.

Soon after this first meeting at Charlie One, Goldstein invited Clarke to join him in advising the project. Clarke's help was sought particularly with the analysis and in identifying possible preventive measures. This was the beginning of a collaborative effort that extended over two years–the time frame greatly influenced by the need to collect data over an extended period and competing demands on the time of some of the project team members (the team now consisting of Captain Johnson, officers Cunius and Rost, and a crime analyst–a position filled during the project in succession by Carl Walter, Ryan Jackson, and Michael Humphrey). Goldstein and Clarke met with the team regularly in a series of short visits. The team was frequently joined in these meetings by Steve Ward, an Assistant District Attorney with senior status in that office, who had been assigned to work full-time with the CMPD. Conscious of the need to reduce the pressures on the criminal justice system, his constant involvement in the project proved vital to its success. The role played by Clarke and Goldstein was essentially consultative–analogous to that of coaches–to explain the process of problem-oriented policing, to help talk through problems, to raise points for further inquiry or action, and to make suggestions about data analysis. This work encompassed five main areas:

- refining the focus of the project
- obtaining a better understanding of the problem
- calculating risks (and relating these to builder practices)
- selecting and implementing a workable solution
- assessing its effectiveness.

Defining the Problem

In the initial meetings, much time was spent on defining the problem. It was decided early on to concentrate on sites being developed for housing and not to cover other kinds of construction sites. While relatively few, these other sites presented a greater variety of problems. Even the residential sites alone presented quite a variety of theft problems. While thefts of heavy equipment were rare, it appeared from the officers' analysis of crime reports and from talking to builders that there were at least three other common forms of theft: theft of lumber and building materials, theft of tools, and theft of appliances from houses under construction.

It was decided to concentrate on the latter, theft of appliances, not because this was the largest problem (the procedures for reporting and recording of construction site theft did not permit this to be determined), but for several reasons. It was a costly and common offense. It appeared that there were some potentially effective ways in which to secure the houses under construction. The large size of appliances and the fact they carry serial numbers afforded the possibility of retrieving those that had been stolen. The other forms of theft seemed more intractable. Lumber and building supplies are often scattered around outside and they are almost impossible to identify as stolen. This is also true of tools. Even when they have serial numbers, the builders seemed not to keep records of them.

Added to these practical considerations, it seemed probable that if thefts of appliances could be reduced, then those of other less valuable property might also decline. This is because the increased risk or difficulty of stealing appliances might dissuade offenders from coming to the construction sites and picking up whatever else they could during their visits.

Once the decision to focus on appliances was made, the Charlie One team embarked on a closer study of the incidents. They quickly found that many of the thefts that they knew to have been reported had not been recorded under the correct category in the system used to collect crime statistics. This discovery required that they pull all the original incident reports of theft from construction sites and re-code those involving appliances–a major undertaking. Compared with the 55 incidents of break-ins to houses under construction reported officially for 1998, they found 109, nearly double the number. They repeated the exercise for later years with similar results.

The team also found that thefts were particularly concentrated on ranges (cookers in the UK), microwaves, and dishwashers. Of the 414 appliances stolen during 1998 and 1999 in the entire Charlie One district, 34 percent were ranges, 26 percent were microwaves, and 22 percent were dishwashers. The remaining 18 percent were distributed among washing machines, dryers, refrigerators, ovens, stovetops, range hoods, air conditioners, and garbage disposal units. Discussions with builders revealed that appliances that were hard-wired (i.e. that were directly wired into the electricity supply, were attached to plumbing, or were built into kitchen cabinets) were less likely to be stolen than plug-in appliances. This suggested that the thieves were not particularly well organized or determined, which was consistent with the fact that at least those apprehended had been habitual offenders with a problem of addiction.

As a result of these findings, the focus of the project was narrowed further to thefts of plug-in appliances from houses under construction.

The Nature and Scope of the Problem

Narrowing the focus of the project resulted in questions being raised about how seriously the problem, which consisted of just over 100 reported breaks-ins in the Charlie One district in one year (1998), ought to be taken, and whether it warranted the time that it was planned to devote to it. In particular, did the number of thefts present an unacceptably high risk of break-ins, given the volume of construction in Charlie One? To answer this question, the crime analyst initially assigned to the project (Carl Walter) sought to find information about the number of houses under construction. He obtained data from the county building inspector's office showing that building permits for 3,130 houses were issued for Charlie One in 1998. On the basis of this figure, he calculated that break-ins resulting in the theft of an appliance were experienced by 3.3 percent of houses under construction (104/3,130 x 100). This was little higher than the risk of reported burglary (2.8 percent) for all households in America in 1995–the latest available comparative data (Farrington and Langan, 1998).

Another way to calculate risks is per builder, of whom there were several dozen operating in Charlie One during 1998. A risk of 3.3 percent translates into a risk of one break-in for every 30 houses. Only the contractors building as many houses as this per year (of which there were 25) could expect to be a victim of a break-in involving theft of appliances. The problem would in all likelihood be concentrated among the largest contractors in this group. There were eight who were building more than 100 houses per year (accounting between them for 82 percent of the building permits issued). Assuming a reasonably equal distribution of risk, each of these contractors might expect to suffer a minimum of three such break-ins per year. The largest contractor, who was issued 385 permits for the year, might expect to suffer 11 break-ins. Did these numbers represent an unacceptably high level risk?

The answer to this question depends partly on the cost of break-ins, which, according to an analysis undertaken by Cunius and Rost of police reports for 1998, averaged just over $750 per incident. Of this amount, 66 percent represented the replacement costs for the stolen appliances, 13 percent was accounted for by the value of other items stolen at the same time, and 21 percent consisted of the cost of damage repairs.

Direct costs of $750 per break-in are not high given the retail price of new houses in the area (averaging about $140,000) and given the one percent of the price that contractors are reported nationwide as

generally budgeting for theft and other losses. In fact, Cunius and Rost had learned from talking with site supervisors while on patrol that the costs of break-ins were of comparatively little concern to most of them. Only the small builders, who saw their profits being eroded, were seriously concerned about the loss of the appliances and the costs of repairing the damage. For others, when losses climbed above budgeted amounts, these could be passed on to future customers in the form of higher prices.

Often more damaging than the direct costs of break-ins would be the administrative costs involved in putting the matter right: ordering a replacement appliance, being available to accept delivery, scheduling repairs, making a police report, and reporting for insurance purposes or for tax write-offs. Sometimes, theft of an appliance and a delay in replacement might also delay a house closing, with associated financial penalties. These indirect costs resulting from administrative action and other consequences of theft can easily account for "anywhere from two to ten times more than direct costs" (Constructor, 1999, page 1).

Another intangible cost of break-ins mentioned by some builders was that the neighborhood in which they were building might begin to acquire an unsavory reputation for crime, which could reduce demand for their houses. However, the concern did not seem to be justified given the large population growth and the relatively low rates of theft. Moreover, thefts at this stage in the development of a neighborhood, absent occupants, are not as productive of continuing fears as they would be in an established neighborhood. The reputation would evaporate with occupancy. Altogether, this analysis of costs gave little reason to think that an appeal to profits would help persuade builders to take preventive measures that were burdensome or expensive. While disappointing to the Charlie One team, this information was helpful in thinking about future action.

A major factor, internal to the police department, supporting increased attention to the problem was the contribution that the number of thefts made to the overall crime rate for the district. In varying degrees, district commanders and their personnel are held accountable for the incidence of crime and especially for substantial increases in crime. The increase in thefts from construction sites was a big negative for a district that prided itself on the traditional measures of its performance. Moreover, the high volume of cases, along with the sense of frustration and futility in dealing with them, had become a source of annoyance to operating personnel. Thus, the desire to do something about theft from construction sites was probably stronger within Charlie One than from any source outside the CMPD.

Risk of Break-ins and Builder Security

A benefit of calculating costs was that this focused attention on individual builders, their losses, and their security practices. Studying other aspects of risk was less fruitful. Hot spot analysis showed that break-ins tended to be concentrated in the southern part of the district, but this is where most construction was occurring. Construction in the more northerly parts of the county was in smaller, more up-scale developments. Assuming that most of the thieves were habitual offenders taking advantage of the opportunities presented by the construction, they would have to travel further to reach these developments. Moreover, more of the appliances in these developments were built into the cabinetry in these more expensive homes. This made them both more difficult to steal and more difficult to sell.

Analysis by time of day, day of week, and month revealed patterns, such as an apparent rise in the spring and early summer and a heavy concentration around weekends, which were not unexpected or which were difficult to interpret because of small numbers. Three makes of appliances (GE, Whirlpool, and Kenmore) accounted for about 75 percent of all appliances taken but these were also the most commonly installed appliances. In few cases were more than one house broken-into and the appliances taken. Most often just one house would be targeted, which again suggests a low level of organization and planning.

There was a tantalizing suggestion that the amount of force used by thieves to gain entry varied among the different builders–thereby suggesting that some were more diligent about locking up–but small numbers of cases made it difficult to be sure of this point.

It was assumed, from the outset, that there would be substantial variation among builders in the risk of break-ins, and early analysis supported this assumption. But by this time in the project, the limitations on using building permits as a measure of the volume of construction in computing rates of theft were becoming more apparent. Building permits measure only planned construction, not that which is actually occurring. Thus a builder might apply for permits to construct 100 homes in a particular subdivision, but only start to build a portion of the houses in that year. Indeed, very few houses in the subdivision might reach the stage of construction when appliances were installed and thus be at risk of break-ins.

Fortunately, the crime analyst involved in the project at this time (Ryan Jackson) learned that a Certificate of Occupancy (CO) had to be issued by the county before a new owner could take up residence. He also established that lists of COs could be provided which could be sorted according to builder and subdivision. Since these were only issued when a house was completed and ready for occupancy, they provided a much better, more timely basis for computing risk than the building permits.[2]

[2] The team was not aware at first that these data existed and moreover could be obtained in a usable form. In undertaking problem-oriented and situational prevention projects, it is often found (by asking the right questions, by probing, and pressing) that needed data are kept by other agencies and that these will be released even if pressure has to be applied.

Calculations of the risk of break-ins based on COs substantially changed the project team's picture of the problem. Swayed by the large number of incidents reported by some of the large builders, the team had been assuming that lack of concern about break-ins on the part of these builders was one source of the problem. The more accurate measure showed that there was still considerable variation among builders in risks, but not necessarily of the same pattern they had previously discerned. The revised analysis revealed that while some of the large builders did in fact have a high rate of theft, others among them–like the smaller builders–experienced little or no theft. Accurate documentation of this variation considerably strengthened the team's hand when later they began to engage the builders in discussions about changing their practices.

While the laborious process of improving the measurement of risk was underway, Cunius and Rost were undertaking surveys of builder security practices. These surveys were undertaken at various times in the project, formally and informally, covering a variety of practices. The subjects that were covered gradually changed, as the needs of the project became clearer. Early on, the officers gathered information on the use of gatekeepers, security guards, or off-duty police officers; fencing and site-entrance gates; posted reward programs for information about offenders; and the use of temporary burglar alarms. Later, they focused on the use of large dumpster-style locked containers on site for the storage of appliances prior to installation, thereby reducing opportunities for theft; removal of the door from appliances to make them less tempting targets; and delayed installation of appliances until close to occupancy. The surveys were coupled with explorations of individual builders' attitudes toward possible new initiatives, such as establishing neighborhood watch schemes for new sites as houses began to be occupied, the use of electronic tracking devices concealed in appliances, and the use of video cameras to monitor the sites after hours.

It proved difficult to make precise determinations of security practice for particular builders because of the broad discretion allowed site supervisors. Thus, a particular supervisor might choose not to follow company policies (where these existed) about receiving and storing appliances prior to installation. It was also difficult to link security practices to particular sites, because supervisors quite frequently were reassigned to other sites or they left to take up employment elsewhere. Consequently, security practices at a particular site might change overnight without the contractor and his top managers becoming aware of the change. Indeed, Cunius and Rost were frequently able to inform senior managers that their beliefs about site security did not match what was actually occurring. This became a problem later in the project when builders were supposed to be changing their practices to conform to police advice.

Selecting and Implementing the Preventive Measures

When the improved risk measures had been developed, thought was given to repeating the surveys of contractor practices in a more systematic manner in an effort to identify best practices. By then, however, the rather intensive mulling over of the newly acquired data led, rather naturally, to a growing consensus among team members as to what would constitute the most desirable workable solution. This was to delay installation of the appliances until the new owners occupied their new home. Adoption of this practice by the industry would effectively remove the opportunity for theft since the owners would provide capable guardianship of the appliances. Very few ordinary residential break-ins involve theft of appliances since these are difficult to carry away and there are many other more tempting targets for theft in occupied homes, such as small electronic items, jewelry, and cash (Clarke 1999).

The surveys of builder practices had shown that some smaller builders who were delaying installation of appliances reported no thefts, but this might have been because they were building too few houses to become statistically at risk. Some site supervisors for the larger builders also said they did this on occasion, but there was no real consistency of practice. In fact, many builders were at first hostile to the idea. Sales personnel believed that having all of the appliances in place made a home more saleable, and that the new owner wanted to see appliances in place before completing the paperwork for purchase. They also believed that the absence of appliances, if attributed to theft, might unnecessarily alarm purchasers about the kind of area they were moving into. Site supervisors felt that the logistics of accepting delivery and installing appliances individually as houses were occupied were considerably more complicated than batch delivery and installation. Some erroneously believed that COs would only be issued by the building inspectors if appliances–including the plug-ins–were in place. Others said that this was a requirement of obtaining a mortgage. Finally, individual installation would mean that builders could not take advantage of the greater likelihood of being able to arrange for tightly-scheduled building inspectors to visit a site and issue COs wholesale. Given the bottlenecks sometimes caused by the unavailability of inspectors, this was a substantial concern.

Instead of turning away from this proposed solution and investing more in exploring other means for securing appliances, the project team decided that the objections to delayed installation of appliances

should be discussed with builders to see if answers could be found.[3] On deeper exploration, the problems proved not to be as intractable as they first seemed. Not all sales people were opposed to the idea of delaying installation until the new owners had occupied the premises, as long as the reasons for this could be properly explained. For some managers, the difficulties and extra costs of individual delivery and installation might be offset by the reduction in thefts and damage and in the resulting delays in closing. The COs could be issued without installation of the plug-in appliances, though problems would remain in the case of hardwired appliances. Even in the case of the latter, building inspectors thought these problems could be resolved. It was unlikely that difficulties would arise with the mortgage companies so long as a CO had been issued.

3 This exemplifies the need for an iterative relationship between analysis and response. As soon as a promising response is identified, its costs and benefits need to be further analyzed. The alternative of comprehensively exploring all available response options runs the risk of losing momentum.

A decision was therefore made at the end of 1999 to seek agreement from the Charlie One builders to institute a policy of delaying installation of plug-in appliances until the new owners occupied the house. It might be difficult to sell this idea to every builder, but the project team would focus on a group of the largest and, to date, most cooperative builders. Builders not involved in this natural experiment would serve as controls and their break-in rates could be compared with those who agreed to the change of policy.

Accordingly, a presentation was developed, which the project team would take to each builder whose agreement was being sought. The presentation, which served as a vehicle for succinctly summarizing the results of the project to date and which was fine-tuned after critiques by Clarke and Goldstein, consisted of several parts: an introduction to the nature and severity of the problem; a description of policing efforts that had been made to deal with the problem; an explanation of why these had met with relatively little success and the change of direction to a problem-oriented policing project; solutions considered but rejected; the need for assistance from the builders and the proposed solution; the expected benefits for builders, police, and local communities; and the plan for monitoring and reporting on the results of the experiment.

It was recognized early on that it was important to gain the endorsement of key officials before going to individual builders and to the local builder's association. The presentation was therefore made to the City Manager, County Manager, City Council Public Safety Committee, the District Attorney, and the Chief Building Code

Administrator. Their endorsement was incorporated into the presentation.

In seeking the builders' agreement to the experiment, they were told that:

- Hardwired appliances would be exempted
- The CMPD would publicly acknowledge responsibility for the delay in appliance installation
- The experiment would begin on May 1 and end on October 31, 2000
- Compliance with the agreement would be monitored by police through checks made on houses close to completion
- If the experiment did not succeed in reducing the rate of break-ins, the experiment would be discontinued

As builders agreed to participate[4], their names were added to the list of those supporting the proposal when the presentation was made subsequently to other builders. An important part of the presentation was a bar chart enabling builders to compare their break-in risks with those of their competitors. (Prepared specifically for each presentation, it did not include the identity of competitors.) The presentation and especially the bar charts invariably impressed the builders with the depth of the police analysis and, according to the project team, helped persuade many to participate in the experiment.[5]

4 Some of those unwilling to participate were large national builders. This suggests that the buy-in of outside interests in a problem-oriented project would depend on several identifiable factors (1) whether the interest (or business) has local roots or is from outside the city–with corresponding degrees of commitment to the welfare (i.e., level of crime) in the local community (2) local customized operations versus a cookie-cutter approach developed by a national corporation to maximize efficiency and, therefore, profits, and (3) possibly the size of the private enterprise. Regarding the latter, a small contractor might not find it as easy to absorb the cost of losses as does the large contractor.

5 It is awkward and somewhat intimidating for police to approach contractors (and other business) people to get them to take steps that will reduce crime. Police officers fear being told that reducing crime is their job and that they should go about doing it. Asking others to act requires exposing the limited capacity of the police. Moreover, police officers are supposed to be apolitical, and sensitive to their use of coercion in their work. Pressing to engage others, from their perspective, draws them into activities some see as improper. The project demonstrates the power of data in equipping the police to engage others. The police often put themselves in the position of complaining that groups or individuals are shirking their responsibilities. But these complaints don't get them anywhere and can put police officers in an embarrassing light. The opportunity to present rigorously developed data should be seen as a major new weapon.

Monitoring Compliance

Ten builders agreed at once to participate in the experiment by delaying installation of appliances until occupancy. Two other builders who had been asked to participate, but who had not formally agreed, were found from the beginning to be complying with the request to delay appliance installation. When asked again if they would agree to be formally included, the builders consented. This increased the total of participating builders from the ten agreeing from the outset to twelve. These twelve builders accounted for about 35 percent of construction in Charlie One in 2000.

As an added measure, the builders also agreed to post decals, to be furnished by the CMPD, on doors announcing in English and Spanish that "Appliances are not in this house!" Cunius and Rost were to monitor the extent to which these participating builders complied with the agreed measures by making regular checks on houses nearing completion to see whether they contained appliances and displayed decals. These compliance checks would be made on all houses in the district, not merely those of the builders who agreed to participate in the experiment. This was decided because it was anticipated that some of the non-participating builders, constituting a control group of sorts, might decide to adopt the measures when they heard about them. Indeed, some of them might already have been delaying appliance installation. Without knowing which of the controls were doing so, it would be difficult to interpret the results of the experiment.

Houses were selected for checks as soon as they reached the pre-completion stage; i.e. kitchen cabinetry was installed, the houses had windows that could be secured, and doors that could be locked. Appliances were rarely installed before this stage, which was reached three or four weeks before completion. The officers would walk around each house to check for decals and would attempt to enter it. If they found it properly secured and they could not enter, they would look through the windows of the kitchen (always on the ground floor) to see whether appliances were present. For each house, they would record whether (1) it was at pre-completion stage, (2) it was secured, (3) decals were posted, and (4) target appliances were present (i.e., plug-in appliances and any appliances that were to be hardwired, but had not yet been installed, thereby making them easy targets for theft).

This task was made easier by a data entry program loaded on their laptop computers devised by the crime analyst (Ryan Jackson). This program not only sped up data entry, but also enabled reports of the results of each round of checks to be provided to each builder. This served to remind participating builders of their agreement and to alert them to possible reneging on the agreement by site supervisors. By the time that the experiment was completed on October 31, Cunius and

Rost had completed 15 rounds of compliance checks involving a total of 8,050 separate checks on individual houses–a truly enormous data gathering exercise.

It quickly became apparent from the checks that some of the participating builders, who had agreed to post decals and delay appliance installation, were failing to comply. In fact, few of them made much use of the decals and one large builder was found to have appliances present in about 80 percent of the checks made at the pre-completion stage. Constant reminders, in the form of the officers' statistical reports on their levels of compliance and personal approaches by the officers failed to correct this situation. As expected, some builders, not formally included in the experimental group, were also found to be delaying appliance installation (though they were not installing decals because these had not been supplied to them). In other words, the boundaries between the participating and non-participating builders had become blurred.

The final tally of checks is enumerated in the Appendix. Builders are listed according to the percent of checks at pre-completion in which no target appliance was found to be present (i.e., in order of their compliance with the recommended practice). Throughout the six months of the experiment, the average compliance was 78 percent for the twelve participating builders; the same computation was 43 percent for non-participating builders. Compliance did not improve much after the first few weeks of the project. Implementation of the preventive measures was therefore only partly successful. There were still many houses in which appliances were present at completion stage, even for participating builders. Of the houses completed in Charlie One during the six months of the experiment, about 41 percent (an estimated 745) contained target appliances during the vulnerable pre-completion stage. In other words, considerable opportunity remained for appliance thefts.

Given that so many houses in Charlie One were still at risk of appliance theft, although significantly fewer than before, one could expect only limited success from the experiment. Burglars would still be able to find appliances if they were prepared to search a little longer. At the same time, it could be expected that builders who delayed installation of appliances until occupancy (whether officially participating in the experiment or not) would reduce their rates of burglary. This preventive measure is a form of target removal, which has been found to be effective in numerous contexts (Clarke, 1997b). The best-known examples relate to cash reduction programs in convenience stores (Hunter and Jeffery, 1997), betting shops in Australia (Clarke and McGrath, 1990), and buses in the United States (Chaiken et al., 1974; Stanford Research Institute, 1970). In each case, target removal in the form of cash reduction resulted in substantial declines in robbery.

Evaluating the Preventive Measures

Accordingly, the evaluation of the experiment sought answers to three questions:

1. Did builders, whether or not they agreed to participate in the experiment, who made it their practice to delay installation of appliances until occupancy, significantly reduce their risks of appliance burglaries?
2. Did builders who made a formal commitment to delaying installation (participating builders), but did not always do so, have lower rates of appliance burglaries than the non-participating builders?
3. Overall, did the experiment bring about a reduction of appliance burglaries in the Charlie One District?

1. Relationship Between Burglary Risk and Delayed Installation of Appliances

If builders never installed appliances before occupancy, they would obviously never lose these appliances to burglary while the house was under construction. Unfortunately, only a few small builders always followed this practice (accounting between them for a total of only 19 completed houses during the experiment–see Annex). Given this fact, it became important to explore whether the risk of burglary was proportionate to the degree to which builders followed this practice (whether or not they had agreed to participate in the experiment). This question was examined by sorting the 59 builders covered by the compliance checks–irrespective of whether they had committed to the experiment–into three groups: 20 builders with low percentages of houses (<17 percent) in which targeted appliances were present at the pre-completion stage; 20 builders with a medium percentages of houses (24-66 percent) with appliances present, and 19 builders with high percentages of houses with appliances present (>70 percent). The numbers of houses completed and appliance burglaries reported were obtained for the duration of the experiment for these groups of builders.

While numbers of burglaries are small,[6] the three groups differed according to expectation (see Table 1). For builders with low percentages of targeted appliances present, the burglary rate for these appliances (0.9 per 100 houses completed) was about one quarter of the rate for the high group (3.9 per 100 houses completed).

6 These small numbers account for the lack of statistical significance in the differences between groups.

Table 1
Appliance Burglary Rates for Three Groups of Builders with Varying Percentages of Targeted Appliances Present at the Pre-Completion Stage
Charlie One District, May to October 2000

Houses with targeted appliances present at pre-completion	**Number of builders**	**Houses completed***	**Burglaries of targeted appliances**		**Burglaries of all appliances**	
			No.	Rate per 100 houses	No.	Rate per 100 houses
Low percent with appliances	20	560	5	0.9	15	2.7
Medium percent with appliances	20	891	13	1.5	17	1.9
High percent with appliances	19	311	12	3.9	13	4.2

*Excluding 58 houses not covered by compliance checks

The high burglary rate (2.7) for all appliances for the group of builders who most frequently delayed installation of targeted appliances supports the conclusion that delayed installation does protect builders from burglaries, since this rate includes hardwired appliances–the installation of which was not delayed.

2. Differences in Burglary Rates Between Participating and Non-Participating Builders

Despite the disappointing rates of compliance for the participating builders, targeted appliances were found to be present in many fewer of their homes (about 22 percent) during compliance monitoring than for the other builders (appliances present in about 56 percent of checks). One might therefore expect that the participating builders would experience fewer burglaries. Contrary to expectation, however, the participating builders experienced virtually the same rates of burglaries of targeted appliances as the non-participating builders, and somewhat higher rates of burglary of all appliances (see Table 2).

Table 2
Appliance Burglary Rates for Participating and Non-Participating Builders
Charlie One District, May to October 2000

	Houses completed*	Burglaries of targeted appliances		Burglaries of all appliances	
		No.	Rate per 100 houses	No.	Rate per 100 houses
Participating builders (n=12)	631	10	1.6	22	3.5
Non-participating builders (N=47)	1,131	20	1.8	23	2.0
All builders (N=59)	1,762	30	1.7	45	2.6

*Excluding 58 houses not covered by compliance checks

One possible explanation for this anomalous result is that the participating builders might have been more vulnerable to burglary because of the location or size of their sites. Even after the experiment was introduced, cruising burglars could find appliances even though many of the houses were compliant.[7] Greater prior vulnerability of the participating builders could help explain why they were willing to take part in the experiment. It would also be consistent with the fact that the real difference in burglary rates between them and other builders involved hardwired appliances, which were given no protection by the preventive measures.[8]

To check whether the participating builders were at greater risk before the experiment, the analysis in Table 2 was repeated for the two years before the experiment, 1998 and 1999. Once again, data were analyzed only for May to October in both years. Not all the participating builders completed houses in these years and the mix of other builders in the two years was different from that in 2000. Nevertheless, the analysis did provide some support for the idea that the participating builders might previously have been at greater risk of burglary. As shown in Table 3, burglary rates for the participating builders were higher in 1998 and 1999 than for other builders. Of the four comparisons possible, the burglary rates were higher in all but theft of target appliances in 1999 (though the difference was very small).

7 The burglars' search for appliances might even have been narrowed by the decals telling them which houses had no appliances and thus which ones to avoid.

8 Another force might also have been at work. Burglars might have been returning to a familiar, favorite hole (as in fishing) - one in which they previously found in abundance what they were looking for - but now were faced with the need to search more intensively.

Table 3
Appliance Burglary Rates for Participating and Other Builders
Charlie One District, May-October 1998 and 1999

	Burglaries of targeted appliances		Burglaries of all appliances	
	Rate per 100		Rate per 100	
	1998	1999	1998	1999
Participating builders	5.8	4.0	6.3	5.7
Other builders	4.6	4.1	4.9	5.1

9 One-way Chi square tests found significant differences between observed and expected numbers of targeted and all appliance thefts across the three years.

3. Overall Impact of the Experiment on Burglary Rates in Charlie One

The last and perhaps most important question concerns the overall impact of the experiment on rates of burglary in the Charlie One district. This was assessed by comparing the rates of appliance burglary for May to October, 2000 (the period of the experiment) and those for the same time period in the two previous years. This analysis produced the most striking finding in the study. As can be seen in Table 4, the rate of appliance theft in the Charlie One district dropped more than 50 percent in 2000 compared with the previous two years.[9]

Table 4
Appliance Burglary Rates, Charlie One District
May to October, 1998-2000

	Houses completed	Numbers of burglaries		Rates of burglary (per 100 houses)	
		Targeted appliances	All appliances	Targeted appliances	All appliances
1998	1,072	54	58	5.0	5.4
1999	1,437	58	76	4.0	5.3
2000	1,820	30	45	1.6	2.5

To check that these declines in burglary in Charlie One were not simply part of a wider fall in these crimes, rates of appliance burglary were calculated for the entire area covered by the CMPD. Comparisons of the rates for Charlie One and the remainder of the CMPD show that the drop in these burglaries is much greater in Charlie One (see Table 5).

Table 5
Appliance Burglary for Charlie One and All Other Districts in CMPD
May to October 1998-2000

	Charlie One	Other CMPD Districts
Houses completed:		
1998	1,072	2,212
1999	1,437	2,892
2000	1,820	3,343
Appliance burglaries (target):		
1998	54	56
1999	58	39
2000	30	60
Appliance burglaries (all):		
1998	58	66
1999	76	51
2000	45	73
Burglary rate (target appliances):		
1998	5.0	2.5
1999	4.0	1.3
2000	1.6	1.8
Burglary rate (all appliances):		
1998	5.4	3.0
1999	5.3	1.8
2000	2.5	2.2

Table 5 also provides little evidence of geographic displacement of the problem from Charlie One to the other districts served by the CMPD. Rates of appliance burglary did not increase markedly in these districts during 2000.

A second possible form of displacement involves the targets of theft. Was there evidence that reductions in appliance thefts from construction sites in Charlie One were accompanied by increases in thefts of other items? An analysis conducted by the crime analyst attached to the project in its evaluation phase (Michael Humphrey) found that, for May to October 1999, 93 other thefts were recorded for Charlie One construction sites, while 87 were recorded for the same period in 2000. These figures translate into theft rates of 6.5 per 100 completed houses in 1999 and 4.8 per 100 in 2000. Far from suggesting displacement of the problem to other thefts, these figures suggest that, as anticipated at the outset, the reduction in appliance thefts might have brought wider benefits through a reduction in other thefts.

Before summarizing the results of the experiment, the possibility should be discussed that the reduction in appliance burglaries was the result not of delayed installation, but of the constant presence on the sites of Cunius and Rost when making the compliance checks. Each round of compliance checks took eight to ten days to complete involving one visit per construction site of about 30 minutes. This can hardly be described as a constant presence. Indeed, the officers believed that before the compliance checks, when they were on regular patrol duties, they spent more (not less) time in the construction sites. In addition, during the entire period of the experiment they never once saw another police patrol car in the construction sites. It therefore seems unlikely that police presence was the cause of the decline in appliance thefts.

Summary of the Results of the Experiment

Delaying installation of appliances until occupancy removes the opportunity for theft and the evaluation shows that builders who tend to follow this practice are likely to reduce their risks of appliance burglary. Rates of these offenses were considerably lower for builders who delayed installation for a high proportion of their houses.

The evaluation also showed that, in the period of the experiment, there was a substantial overall reduction in the rate of all appliance theft in the Charlie One District. This is a little difficult to explain given that the burglary rates for participating builders were not lower than those of the other builders in the period of the experiment. However, this could have been due to the greater prior vulnerability of the participating group, whose burglary rates before the experiment were higher than those of the other builders. The experiment succeeded in lowering their burglary rates as well, but not to the level of the non-participating group.

Also difficult to explain is why theft rates declined when there were still so many houses (40 percent) with appliances present at the pre-completion stage. This means that cruising burglars would still have been able to find appliances if they were prepared to search a bit longer. But they seemed unwilling to do so, which suggests that the preventive measures were perceived as more widespread than they were in reality–a phenomenon known as diffusion of benefits (Clarke and Weisburd, 1994). Thus, some of the burglars might have decided it was no longer worth the effort of driving out to Charlie One when they heard that the installation of appliances was being delayed, when they found it more difficult to locate appliances, or when they began to encounter houses with the warning decals. Furthermore, it seems that few of them displaced their attentions to building sites outside Charlie One. Burglary rates did not increase in these building sites that, in any case, had never been as tempting as the ones in Charlie One

The discussion below of the lessons to be drawn from this project concentrates on issues of wider significance, but we should not overlook the value that the new response has had for Charlie One and the CMPD. The district now has fewer thefts to which to respond, saving time, money, and resources. Moreover, the district is spared the frustration of being held accountable for the crime but not really being able to do anything about it. Cunius and Rost are more content in their work because of their pride in having brought a more intelligent, more effective, and ultimately timesaving response to this particular problem.

Follow-up Action

At the conclusion of the experiment, Cunius and Rost met with each of the twelve participating builders to obtain views on the experiment. All twelve were certain that delaying installation of appliances had been effective in reducing thefts. Some believed that other thefts had also declined. All twelve said they would continue to delay installation as a matter of policy. Some said that it should be a countywide policy.

Some problems of coordinating delivery of appliances with closing dates were reported[10] and several builders said that they had experienced difficulties in getting site supervisors to comply with the policy. Only a few reported objections from purchasers who mostly accepted the need for the measures once the reasons were explained to them. Providing coupons for the delivery of free pizza to meet the immediate need for food pending installation of appliances (a precautionary measure suggested by early discussions with builders about the experiment) mollified the more vociferous complainants.

10 The contractors split their deliveries, arranging for hard-wired appliances to be delivered at one time followed by immediate installation, and for the plug-ins to be delivered as homes were occupied. Apparently they incurred minimal costs in adopting this practice.

Three further rounds of compliance checks made by the two officers after the conclusion of the experiment (during January through March 2001) showed that the participating builders had maintained their levels of compliance. Indeed, the overall compliance rate for the group of 81.5 percent was slightly higher than during the experiment (78 percent). Other builders were also delaying installation in an increased proportion of houses (51 percent during January through March 2001 compared with a little under 43 percent during the experiment). The officers believed that this increase was the result of site supervisors moving from employer to employer. In some cases, those previously employed by participating builders converted their new employers to the policy of delayed installation.

As part of a broader effort to market the practice of delaying appliance installation, Cunius and Rost continued their efforts to persuade other builders to adopt it. They also made presentations of the results to CMPD command staff, to local builders associations and to the problem-oriented policing conference held by the Police Executive Research Forum in December 2000. They held briefing meetings for officials in nearby cities and for the press, the latter resulting in a favorable article in the Charlotte Observer (the local newspaper). They were invited to draft short articles for publication by the Police Executive Research Forum and for the house journal of the state builder's association.

In another effort to extend the practice of delayed installation, Captain Johnson asked Cunius and Rost to sell the idea to builders who were embarking on the construction of apartment complexes in Charlie One–at the time of writing, this was becoming a full-time responsibility for one of the officers. Johnson also asked the officers to explore the possibility of delaying installation of dishwashers, which had been excluded from the experiment because they are generally hardwired. The officers discovered that these units could be supplied as plug-ins, though they would still have to be connected to the water supply. When undertaking a further round of compliance checks in March 2001, they established that dishwashers were installed at the pre-completion stage in 64 percent of the 388 checks they made. However, only one dishwasher was stolen in March from the total of 279 houses completed, a risk of less than 0.4 per 100 houses. This was thought not to justify the effort that would have been required for both manufacturers and builders to change their practices to allow for delayed installation of dishwashers.

At the time of writing, Captain Johnson had recommended two further actions to his superior officers building on the work to date. The first involved instituting a departmentwide policy of not investigating reported thefts of appliances by builders who had refused to delay installation until occupancy, and informing such builders that proven means were available by which, through an adjustment in their own practices, they could substantially reduce such thefts. This did not gain the approval of the CMPD's executive staff. The second recommendation, still under consideration, involved the adoption of a countywide ordinance requiring all builders to delay installation of appliances.

Lessons of the Case Study

As noted earlier, the case study served three purposes:

1. It met its original goals by providing a comprehensive example, within the CMPD, of what is involved in a concentrated, careful application of the full dimensions of problem-oriented policing.
2. It enabled the CMPD to address the problem of theft of appliances from construction sites by learning as much as possible about the problem, testing the effectiveness of a new response, and ultimately achieving a substantial reduction in such thefts.
3. As a result of their involvement in the project, the authors gained new insights into the complexities of carrying out problem-oriented policing. The case study also enabled them to see more clearly what is needed to enable others to realize more expeditiously similar results. It is these lessons gleaned from the project that are summarized here.

As explained, the project began life as a conventional police operation –one in which, having decided to take a proactive stance, the two Charlie One officers, Cunius and Rost, planned to undertake an intensive patrol and investigative effort to identify, arrest, and prosecute the criminals responsible for the construction site thefts. In fact, this enforcement effort continued long after the project had become an exercise in problem-oriented policing because of the time taken to complete the analysis and identify alternative responses. As a result, the two officers spent every available hour in 1999 patrolling the sites and working with detectives to build cases against anyone suspected of, or arrested for, construction site theft.

By one measure, this was a successful operation because cases were made against 20 individuals in 1999 compared with only two individuals in 1998. But when related to the number of such crimes reported, the intensified effort aimed at detection, arrest, and prosecution was a failure. The number of appliance thefts in Charlie One actually increased in 1999 to 167 from 109 in 1998, and the rate of theft per 100 houses increased to 5.3 from 4.7. This early analysis led the police officers involved to conclude that despite their efforts conventional police work would not solve the problem. Not only had the officers' extraordinary efforts to identify, arrest, and prosecute offenders made little impact; they had been unable to acquire information about where the appliances were being sold, which could have led to new and potentially more fruitful investigative efforts.[11]

11 Cunius and Rost ended up being enthusiastic about the project and its potential and are now effective spokesmen in challenging the heavily ingrained commitment to always reverting to the use of the criminal process (i.e., investigation, arrest, prosecution, etc.). This was evident during a presentation they made on the project at the annual problem-oriented policing conference in San Diego in December 2000, where they strongly rebutted suggestions made by some in the audience that a more vigorous patrol and investigative effort would have brought results. It is also evident in a report made by the two officers in April 2000 to the COPS office. This opens with the following paragraph: "In May 1998, we thought we knew about problem solving. We worked third shift and we were concerned about the construction site thefts in our district. We approached our captain with a plan to reduce thefts. The plan was thought out over a shift and was comprehensive. The plan was not a band-aid method but was made to target the three elements which make up a crime (suspect, victim and opportunity). We were to work with the burglary detectives to help identify the suspects. Once the suspect was arrested, we were going to petition the courts to get them the maximum prison sentence. As for the victim builders, we wanted to get after hour contact numbers in case suspects were apprehended in their neighborhoods. We were also going to exchange crime prevention ideas with the builders in order to improve and increase the builder's use of crime prevention techniques. As for the opportunity element, we wanted to alter our methods of patrolling the neighborhoods under construction. We planned on staking-out neighborhoods, using marked and unmarked patrols as well as altering the days and times we patrolled. We thought this plan would reduce the construction site thefts. Within six months our plan was barely intact. The site managers we contacted were either reassigned or had left the company. This made the after hour contact list and distribution of crime prevention information worthless. We did not identify any suspects and our directed patrols did not reduce the reported crimes. We had thought through our plan, but left out one major aspect, analyzing the problem."

If the Charlie One team had accepted defeat at this point, the project would have been merely one more example of the limited capacity of conventional policing to reduce many ordinary crimes. In fact, the project demonstrates that where conventional policing has failed, problem-oriented methods can succeed. Some earlier examples of similar failures followed by successes involved the efforts to control slug use in the London Underground ticket machines (Clarke et al., 1994), graffiti in the New York City subway (Sloan-Howitt and Kelling, 1990) and pay phone fraud in the Manhattan Bus Terminal (Bichler and Clarke, 1996). In all three cases, the police had tried and failed to deal with the problem through stakeouts, intensified patrols, surveillance, and the prosecution of arrested offenders. Police officers arrested only a small proportion of the offenders, they found it difficult to prosecute successfully, and, even if successful, the sentences imposed by the courts seemed to have little deterrent effect. In New York, the newspapers regularly ran stories about police frustrations in dealing with the problems in the Manhattan Bus Terminal, sometimes including photographs of police standing by as alleged offenders continued to make fraudulent use of the phones.

In all three cases, the problems were solved only when the managers of the facilities stepped in with preventive measures of their own. In the case of the London Underground, the ticket machines were modified to block slug-use and in the Manhattan Bus Terminal conventional pay phones were replaced with more advanced models programmed to make fraud impossible. In the case of the New York subway, the solution consisted of an intensive and sustained program of graffiti cleaning.

In Charlie One, the builders had no intention of taking ownership of the problem and finding solutions as in the above examples. It was easier for them to trust to luck and swallow any losses. The Charlie One team, however, was unwilling to give up without having achieved any positive results. By the time it was clear that conventional policing was not going to work, the problem-oriented analysis had begun to point the way to the solution eventually adopted. Cunius and Rost were anxious to try this solution, and the district's captain, Johnson, who was convinced that further effort was justified, was enthusiastic in his support of them. Even though Johnson was working in a supportive management structure, this cannot have been an easy decision for him to make. After a disappointing period of failure in pursuing the first initiative, it required that he commit substantial resources, at a time of great competition for the limited personnel resources available to him, to a long and sustained effort with no guarantee of success. But this points to one of the strongest general lessons of the project. If, based on the positive results derived from

problem-oriented policing, it is to become a standard method of doing police business, the police (and those to whom they are accountable) will have to become accustomed to measuring the success of their efforts over a longer period of time, and will have to find ways to justify the use of the resources required to produce such positive results.

Furthermore, to obtain the maximum benefit from the project, police must not rest content with reductions in the local problem. With a commitment to improve the quality of policing more broadly, police, like the Charlie One team, must be prepared to invest additional effort in documenting and disseminating the results. In this way, local inquiry and action can have national benefits, and, reciprocally, studies conducted elsewhere can have local benefits. This is particularly important for a problem such as construction site theft, which by its very nature is likely to be troublesome in most places for only a relatively brief period of time. Once the volume of construction decreases, the problem will likely disappear. But somewhere else, where construction is just beginning, the problem will soon emerge. It is important to enable those in the new location affected to profit from the experience of dealing with the problem gained elsewhere.

This means that these wider benefits of local action should be included in any assessment of the costs and benefits of such action, which could radically affect any conclusions about the investment of resources. In Charlie One, the project, by conservative estimate, prevented over 100 thefts (i.e., about 6 per 100 houses completed) in 2000. The district commander characterized this, when compared to other allocations of resources, as a good return on the time invested by the two officers. However, if the practice of delaying appliance installation were adopted more widely–throughout the county, or in the entire region, the state and ultimately the nation–without the need for so heavy an initial investment of resources, but with similar benefits, the cost-effectiveness balance would be even more favorable.[12]

Seeking these wider policing benefits will require police administrators to act increasingly like the heads of local public health departments whose professional commitment extends beyond their communities to building knowledge for their profession. Thus, while the principal duty of police administrators will still be to safeguard the communities in their care, they will also increasingly have to meet the important responsibility of alerting other communities to new hazards, to evaluating measures taken in response to these hazards, and to disseminating the results achieved. This will require them to undertake a delicate political balancing act. They must act successfully to deal

12 The amount of time devoted to the project by Cunius and Rost should not be taken as an indication of what a similar effort would require in other circumstances and in working under a more restricted time frame. The officers were periodically involved in other police activities; they were involved in the investigation of crimes and the prosecution of offenders; they spent considerable time learning new techniques of analysis and presentation; and they had the luxury, in this first-time project, of engaging in some wide-ranging explorations that, while productive, would not be required in a replication.

with the problem locally, while at the same time justifying the additional expenditure needed to benefit communities elsewhere in the region, the state, and the country. The desirability of encouraging police agencies to engage in such studies and the benefits to be realized beyond the jurisdiction conducting the study constitute strong arguments for a program of federal financial assistance for such efforts.

Few police departments currently possess the technical capacity to evaluate and disseminate the results of their operations. If the required knowledge and skills exist in any degree, they are most likely to be found in departmental crime analysis units, and frequently not even there. This brings us to another important lesson of the project, which concerns the vital role of crime analysts in problem-oriented policing, and how their work relates to the role of police officers–on which much more attention has focused.

As originally conceived, problem-oriented policing anticipated the heavy involvement of individuals trained in analysis (Goldstein, 1979, 1990). But as problem-oriented policing has developed, most of the emphasis has been placed on the potential contribution of those who are depended on to carry out the daily, challenging work of policing–line police officers–but who also are at the lowest level in the police hierarchy. The Charlie One project leaned heavily on the contribution of the two officers, Cunius and Rost, and by any measure, their contribution–especially to the analysis–was far beyond what could normally be expected of line officers. They spent days sorting through and re-classifying theft reports relating to construction site theft. They repeatedly interviewed builders to collect data about their security practices and theft experiences. They constructed databases that made it possible to calculate the rates of theft for individual builders, initially by number of building permits issued and later by certificates of occupancy. They prepared graphs and tables setting out the results of these calculations so that relatively unsophisticated audiences could understand them. Above all they spent countless hours, in all kinds of weather, making and recording the results of thousands of compliance checks. Along the way, they absorbed many lessons about analyzing a problem, developed their own analytical skills, and grew in their capacity to present the findings in a coherent, persuasive manner.

However, even with the support and guidance they received, the officers would readily acknowledge that they could not have undertaken much of the work that was carried out by the crime analysts, who created computer maps of the construction site thefts,

obtained and processed data on building permits and certificates of occupancy, and designed the computerized data collection systems for the compliance checks.

The crime analysis unit in the CMPD–in its size, the abilities of its staff, and its highly developed use of computerized databases, including advanced mapping–is among the strongest such units to be found in a police agency. It was possible, through the involvement of Clarke and Goldstein in this project, to build on those strengths and to give the analysts the additional knowledge and skills needed to carry out problem-oriented policing. Drawing on their experience, Clarke and Goldstein provided the theoretical background needed for guiding the project. They elaborated on the action research methodology of problem-oriented policing, which is too often simplistically captured in the four stages of the SARA model. And they demonstrated how this would play out in dealing with the problem of construction site theft. Sensitive to the traditional perimeters of crime analysis and drawing on their experiences in other contexts, Clarke and Goldstein were in a unique position to contribute further by drawing attention to the importance of:

1. Having realistic expectations about the results of enforcement efforts
2. Focusing the project on a highly specific problem, or form of crime, i.e., appliance theft
3. Supplementing the most common form of hot spot mapping with carefully developed information about the environment being mapped (e.g. the stage of construction reached and the identity of the different builders operating in the various subdivisions)
4. Relating the absolute numbers of appliance thefts to the number of vulnerable homes, thereby producing suitable measures of risk before reaching conclusions about trends or patterns in these thefts
5. Using acquired data to compare security practices and risk of thefts among builders, and to engage builders in assuming some responsibility for solving the problem; expecting the builders to assume some responsibility for solving the problem and formally comparing security practices and risk of thefts among builders
6. Assuring that, in the language of routine activity theory, there are capable guardians of vulnerable targets
7. Being alert to the possibility of diffusion of benefits and not being deterred from preventive action by the threat of displacement
8. Monitoring closely the process of implementation and
9. Utilizing an evaluation design that would permit definitive conclusions about the value of the response

Police officers charged with undertaking a problem-oriented project and crime analysts who have limited themselves to the traditional forms of crime analysis cannot be expected to have an intuitive grasp of these points, and they will need to call upon others for advice. We believe that the repository of the research skills required in problem-oriented policing, at least for the larger police departments, should be the crime analysis unit. This does not diminish in any way the contribution that police officers–both line and management–can make in addressing problems. As Cunius and Rost demonstrated, in an exceptional example, their contribution is vital and they can be drawn more fully into the process. Police agencies should continue to encourage all of their personnel to think about their work in terms of the problems they handle and their effectiveness in dealing with them. But officer involvement by itself, absent some special analytical and research skills, will not be sufficient to realize the full potential in problem-oriented policing.

Judged by the CMPD, crime analysts have the necessary background to profit from the appropriate level of training in problem-oriented policing, which should also include components on environmental criminology and program evaluation. Unfortunately, training courses of this kind are not readily available, and providing them will be a considerable challenge for police leaders and others, such as municipal governments, federal agencies, and universities that support advances in policing.

More is needed than training, however, to turn crime analysts into effective resources for problem-oriented policing. Equally important is that they be brought more directly into the management of a police agency; that, to the extent they become involved in in-depth analysis of the effectiveness of their agency in dealing with specific problems, they be recognized as the equivalent of product researchers in the private sector. Chief executives in the business world lean heavily on those who are equipped to analyze the quality of the end product. Properly trained crime analysts, engaged in the systematic study of problems that the police handle, as contemplated in problem-oriented policing, should have direct access to the top police administrator, should be involved in management meetings, and should be routinely consulted for guidance on how to improve the effectiveness of police efforts. Fully developed, their unique contribution could go a long way toward increasing the effectiveness of the police and, as consequence, the professional status of the police in the community.

Conclusion

In reflecting on this project, a reader might be inclined to ask several basic questions. Why was so much attention given to such a discrete and, in relative terms, low volume crime? Why should it have taken more than two years and substantial resources to explore and address the problem? Was the involvement of the two authors and the backgrounds they were able to bring to the project warranted, and did their senior status distort the results of the experiment? Would the research methods utilized meet the tests of scientific inquiry? Didn't much of what was explored simply constitute common sense? Wasn't the solution implemented almost embarrassingly simple? Why make so much both of the experiment in addressing the theft of appliances and of the process by which it was carried out?

The answers to these questions are to be found in the current state of policing–in the United States and elsewhere. Despite the enormous investment made in policing, little is known about the problems police handle on a daily basis. The people affected–citizens, businesses, industries–also know little about them. And our knowledge about the most effective and economical ways in which to address these problems is very limited and often primitive. While some progress has been realized in recent years, we are only at the beginning in testing the value of specific strategies for dealing with specific problems. We have not developed, within policing, a protocol, a staff, a methodology, and, most importantly, a way of thinking that leads to the systematic study of problems and the relative merit of different strategies for dealing with them. The body of research that is available, usually conducted outside police agencies, is often inaccessible to the police. So, given the primitive state of affairs, getting going requires a great deal of trial and error. It is not a neat process. Indeed, it is a rather messy process. It requires getting one's hands dirty. It requires digging for data and often making do with less than what is want. It requires correcting and often supplementing existing data. It exposes difficulties that were unanticipated; phenomena that cannot easily be measured; findings and results that become blurred. It requires being ready to retreat or change course, and start all over again.

These are among the reasons the project took as much time, resources, and coaching as it did. And these are the reasons why we saw merit in recording all of the details of this relatively modest exploration. Through publication, others can build on these efforts–and thereby ultimately contribute to the critical need to build a strong commitment within policing to gain new insights into the problems the police are expected to handle, and to develop a sophisticated capacity within policing to conduct such inquiries.

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Appendix

Builder Compliance Rates and Burglaries Charlie One, May to October, 2000

BUILDER	Compliance Checks (1)	Target appliance present (2)	Appliance Compliance (3)	Homes completed (4)	Burglary of target appliance (5)	Burglary of any appliance (6)
1	23	0	100.0%	2	0	0
2	121	0	100.0%	0	0	0
3	1	0	100.0%	0	0	0
4	13	0	100.0%	3	0	0
5	6	0	100.0%	2	0	0
6	1	0	100.0%	0	0	0
7(H)	23	0	100.0%	10	0	0
8(H)	2	0	100.0%	2	0	0
9	27	1	96.3%	1	0	0
10	295	17	94.2%	56	0	0
11	377	25	93.4%	111	0	2
12	130	9	93.1%	14	0	0
13	21	2	90.5%	3	0	0
14	1122	131	88.3%	108	3	9
15	87	11	87.4%	58	0	0
16	123	16	87.0%	25	0	0
17	23	3	87.0%	20	0	0
18	668	102	84.7%	117	2	4
19(H)	6	1	83.3%	4	0	0
20	24	4	83.3%	24	0	0
21	487	118	75.8%	84	1	1
22	58	17	70.7%	8	0	0
23	137	48	65.0%	15	1	1
24	583	207	64.5%	218	1	1
25	120	51	57.5%	64	0	0
26	18	8	55.6%	2	0	0
27	17	8	52.9%	14	0	0
28	222	112	49.5%	57	1	5
29	100	51	49.0%	14	0	0
30	141	73	48.2%	41	5	5
31	43	26	39.5%	5	0	0
32	33	20	39.4%	17	0	0
33	319	196	38.6%	106	1	1
34	96	59	38.5%	49	0	0
35	186	116	37.6%	67	0	0
36	164	104	36.6%	40	2	2
37	118	75	36.4%	34	0	0
38	105	69	34.3%	33	0	0
39	62	41	33.9%	16	1	1
40(H)	3	2	33.3%	7	0	0
41	133	93	30.1%	16	0	0
42	68	48	29.4%	17	0	1
43	502	362	27.9%	108	2	2
44	59	44	25.4%	55	0	0
45	75	58	22.7%	11	2	2
46	72	57	20.8%	15	0	0
47	143	114	20.3%	28	2	2
48	45	37	17.8%	12	0	0
49	28	24	14.3%	6	0	0
50	15	13	13.3%	0	0	0
51	109	98	10.1%	6	0	0
52	30	27	10.0%	2	1	1
53	162	151	6.8%	13	3	3
54	244	230	5.7%	18	2	2
55	155	150	3.2%	2	0	0
56	62	62	0.0%	0	0	0
57	4	4	0.0%	0	0	0
58	1	1	0.0%	1	0	0
59	38	38	0.0%	1	0	0
	8,050	3,334	58.60%	1,762	30	45

Notes to ANNEX

(1) Number of checks made to determine if target appliances were present in a house. These are appliances that plug into an electrical outlet or any appliance that is scheduled to be hardwired, but has not yet been installed and is, therefore, like a plug-in appliance easily stolen.

(2) Number of times a target appliance was found present during a compliance check.

(3) The percentage of compliance checks when target appliances were not present within the home.

(4) A completed home is a home that has passed all inspections required by the building code and qualifies for a Certificate of Occupancy.

(5) Number of burglaries resulting in the theft of one or more targeted appliances.

(6) Number of burglaries resulting in the theft of one or more appliances, including hardwired appliances.

(H) indicates the builder uses hardwiring exclusively in installing all appliances.

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