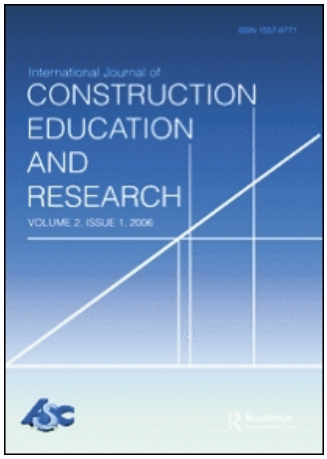

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Single-Family Home Construction Site Theft: A Crime Prevention Case Study

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The United States and other countries around the world, such as Canada, Australia, England, and Japan, have begun to address single-family home construction site crime through a variety of crime prevention methods. This article presents the results of a practical problem-oriented policing effort to reduce single-family home construction site theft in a suburban city in Florida. The Port St. Lucie, FL Police Department utilized a variety of data sources to understand the problem and tailored crime prevention responses to achieve a successful reduction in construction site theft over a 2-year period. Consequently, this article details the background of the project, the analysis, the crime prevention strategies implemented, and the impact results of the strategies.

Keywords construction management, construction site theft, crime prevention

Introduction

This article presents the results of a practical problem-oriented policing effort, spearheaded by the authors, to reduce construction site theft in a suburban city in Florida. Problem-oriented policing (POP) has been of substantial interest to police reformers for over 20 years. In his seminal 1979 article, ''Improving Policing: A Problem-Oriented Approach,'' Herman Goldstein argued that the police were too focused on means and not enough on the ends of their work (Goldstein, 1979, 1990). Goldstein argued that to be ''problem-oriented'' the police must take a new, more systematic approach that demanded that they collect new data, develop new methods of analysis, identify innovative solutions, and apply measures for assessing the success of their efforts. Furthermore, over the last two decades, a significant body of research suggests that problem-oriented policing can lead to more effective control and prevention of crime and disorder (Weisburd & Eck, 2004).

Eck and Spelman (1987) gave the approach a specific method, when they developed the SARA (scanning, analysis, response, and assess) model in their application of problem-oriented policing in Newport News, VA. They proposed that to address a problem using a problem-solving process must begin with scanning which is identifying a problem worth addressing important to the police and the community. Eck and Spelman suggested that scanning must be followed by careful *analysis* of the why the problem is occurring which demands that police look not only to official information, but also to new sources of data that might be drawn

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from the community and other sources (*e.g.*, businesses or other public agencies). Analysis is then followed by a *response* to the problem that is tailored to the specific problem based on the analysis results (Goldstein, 1990). Finally, once a response has been implemented, the police *assess* the effectiveness of their efforts in order to decide whether the problem has been solved and whether the response should be continued. The SARA process has been used successfully by police departments around the world and is recommended for police by the Center for Problem-Oriented Policing Service and U.S. Department of Justice among others.

The effort described in this article was initiated as part of a federal grant addressing problem-oriented policing (North Carolina State University, 2003) and was continued beyond the period of the grant. The Port St. Lucie, FL Police Department, led by the authors of this article, applied the SARA process to the local problem of single-family construction site theft. The project consisted of practically applied data analysis and tailored crime prevention responses to achieve reduction in construction site theft over a 2-year period. It has been recognized as a Finalist for the International Herman Goldstein Award for Excellence in Problem-Oriented Policing in October 2006 (POP Center, 2006). Accordingly, this article details the background of the project, the analysis, the crime prevention strategies implemented, and the impact results of the strategies on construction site crime. Because this was a practical effort, the analyses are not sophisticated, but the entire process undertaken, the innovative use of data, and the impact results provide not only successful results but a method by which other police agencies and construction companies can follow to address this problem and suggest ways to reduce incidents of single-family home construction site theft.

Single-Family Home Construction Site Theft: National and Local Picture

The United States as well as many other countries around the world—such as Canada, Australia, England, and Japan—have acknowledged that single-family home construction site crime has become a problem and have begun to address it through a variety of crime prevention methods (Berg & Hinze, 2005; Lambertson, 2005). Estimates from the United States indicate that between 1 and 4 billion dollars worth of materials, tools, as well as large and small equipment are stolen every year (Barrios, 2005; Berg & Hinze, 2005; Lambertson, 2005). The impact of these losses is often not borne by the construction companies themselves, but the costs are passed on to the home buyer with an average of a 1% to 2% increase in the cost of a new home (O'Malley, 2005; Patton & Oleck, 2005).

There are a number of reasons why single-family home construction sites are vulnerable to theft. Curiosity of passersby may lead them to trespass and possibility take property that may have been left unprotected on the site. A dramatic increase in the price of construction materials, such as plywood and aluminum, may also contribute to construction site theft (Scarcella, 2005) because it creates incentive for contractors as well as individuals to take materials from construction sites to save money.

Running an efficient business and everyday business decisions may also make individual construction sites vulnerable (Lambertson, 2005) in that practices that maximize efficiency may also maximize opportunities for crime. For example, a builder may decide not to erect a lockable fence that would protect the site from theft because it would hinder workers and delivery people from having easy access to the site.

Employee theft can also contribute to the overall problem. Individuals who work for builders and contractors or rival companies often have knowledge of a specific builder's construction practices and access to keys, tools, and materials. They may have more general knowledge of construction practices, such as how to disassemble an air conditioning unit and what stage of building that appliances are typically delivered. If security is lacking and management indifferent, the temptation to take items that are improperly secured or unaccountable may be too much to resist (Fennelly, 1996). Finally, many builders see theft as an inevitable cost of business and do nothing to address the issue (Clarke & Goldstein, 2002).

There have been numerous crime prevention strategies developed and employed to reduce construction site theft, including, but not limited to, tightening delivery and installation practices (Clarke & Goldstein, 2002), screening and training employees (Snyder, *et al.*, 1991), tool check out systems (O'Malley, 2005), hiring loss prevention personnel and security (Berg & Hinze, 2005; Crime Prevention Victoria and City of Casey, 2003), employee theft hotlines (Arizona Contractors Association, 2002; Construction Industry Crime Prevention Program, 2005; Construction Industry Advancement Program of New Jersey, 2005; Heselbarth, 1999), mobile closed circuit television units (Roberts, 2005), alarms (Bellett, 2004; Crime Prevention Victoria and City of Casey, 2003), and portable storage units (Construction Bulletin, 2003). Very few of these strategies, however, have been evaluated systematically through research or practical application (Boba & Santos, 2006). Thus, the purpose of this article is to contribute to the literature and to provide the evaluation results of a comprehensive practical strategy employed to address single-family home construction site theft in Port St. Lucie, FL.

The first step in the SARA process described above is scanning, which is identifying and selecting a problem to address. The Port St. Lucie, FL Police Department addressed single-family home construction theft for several reasons. In 2004, at the beginning of the effort, Port St. Lucie was approximately 100 square miles, the third largest in area in Florida, had a significant amount of undeveloped land, and was seeing unprecedented population growth. At that time, the city building department personnel estimated that between 450 and 600 new building permits were issued per month and that over 6,000 homes were under construction in the city. Preliminary analysis of crime data by the police department indicated that crime at construction sites constituted a relatively large proportion of property crime occurring in the city. Members of the department saw it as a problem worth addressing, not only because it was currently an issue but because it was likely to be one in the future as well. In 2004, the population was reported as 118,396 and estimates anticipate an increase to 214,997 by 2016 (City of Port St. Lucie, FL, 2006).

At the outset, a team composed of officers, crime analysts, sergeants, and the authors of this article was formed to conduct the data collection and analysis, as well as to recommend crime reduction and prevention strategies to the police department's command staff for implementation. These team members were also instrumental in implementing the responses later in the project. The problem was defined as the taking of property from a single-family building or construction site. The reason for this was that most of the reported construction crimes occurred at single-family locations, and Port St. Lucie, being a suburban community, has been zoned mostly for single-family homes, many of which had not been built yet. Consequently, thefts occurring at commercial sites or multifamily sites, thefts of large construction equipment (*e.g.*, backhoes, cranes), and vandalism of construction sites

(*e.g.*, holes in the drywall, graffiti, and general damage) were not addressed in this effort, as the offenders' motivations and opportunities for the crimes warrant different crime prevention strategies. The goal of the process was to focus crime prevention on a particular type of activity to achieve the maximum impact.

Research Question and Data

As part of the analysis phase of the SARA process, developing specific research questions allows the analysis to be focused on factors relevant in a particular community (POP Center, 2006). Our research was guided by the research question, "What type of offenders are primarily committing single-family home construction site thefts in Port St. Lucie?" We conducted a review of literature of construction site theft; however, as noted earlier, there were very few studies that had both implemented and evaluated crime prevention strategies for construction site crime. One notable study was conducted by Clarke and Goldstein (2002) in Charlotte, NC. We used this study, along with discussion with other agencies dealing with construction site theft problems and our experience, to develop potential answers to our research question. We focused on three possible types of offenders operating in Port St. Lucie:

- *Trollers*: Individuals drive around/walk around neighborhoods looking for the opportunity to take property from construction sites for resale or personal use. These can be anyone from people living in the neighborhood to people from out of town.
- *Insiders*: Builders and subcontractors steal from one another to use the stolen property in ongoing work and to sell. These individuals either work on the site that is victimized or have some inside knowledge of when property is being delivered, when it is vulnerable, and how well the sites are protected.
- *Professionals*: These are individuals who make a living at theft and selling stolen goods. They plan their crimes and tend to have intricate knowledge of the environment and areas where they commit their crimes.

The focus of our data collection and analysis was to develop evidence that indicated which type of offending was most prevalent in Port St. Lucie. Although all three types of offenders were probably part of the problem, determining which type of offending was most common provided us information to prioritize and tailor crime our prevention strategies accordingly.

The data that were collected and used for analysis included both primary (*i.e.*, data collected specifically for the project) and secondary data (*i.e.*, data obtained from official sources, such as the police department and city building department). The analysis began with examination of police reports of construction theft from January through December 2004. Aggregate data such as date, time, location, property taken, and victim information were analyzed, as were the report narratives.

Because the arrest rate for this type of crimes was very low, it was difficult to determine from arrest data the type of offenders that actually commit these crimes. Therefore, the police report narratives were used to code the level of difficulty of each crime. Examination of how the crimes were committed helped determine which type of offender might be responsible for the crimes and subsequently provided direction for crime prevention strategies. For example, if the crimes are fairly easy in that the property is unsecured, in plain view, and easy to move, offenders may

more likely be "trollers" and crime prevention strategies may focus on strengthening site security or removing property from the sites. Thus, all the reported crimes in 2004 were coded into three variables to measure the difficulty of the crime:

- *Skill*: The level of skill it took to remove the property (0 = No skill; 1 = Heavy, awkward, forcibly removed; 2 = Skills and/or tools necessary)
- *Transport*: What minimum mode of transport was necessary to move the property (0 = Walk away; 1 = Car or small truck; 2 = Large truck)
- *Access*: Where was the property located on/in the construction site (0 = Outside, visible, unattached; 1 = Outside/attached, inside visible attached and/or unattached; 2 = Secured).

Because the actual skill and mode of transport were not known (due to lack of offender information), the reports were coded to minimum requirements. For example, an air-conditioning unit could be transported in a large or small truck, but the minimum needed to do so would be the small truck. If the unit was taken along with a stove and refrigerator, the large truck would be necessary. One person was responsible for all of the coding to ensure consistency.

Initial examination of the police reports revealed that they did not contain much of the information needed to understand how and why these crimes were being conducted. Typically, crime reports are written to establish probable cause and to provide evidence for prosecution and do not include information about the environment in which the crime occurred or details of the method of the crime. Therefore, we developed a construction site theft check sheet for officers to complete in addition to every construction site crime report. The check sheet asked for the following information:

- *Builder information*: Because the victim of the crime listed in the report could also be a subcontractor, it was important to ask about the builder as well, since they are the owners of the site and oversee overall building practices.
- *Subcontractor information*: Information about the last subcontractor on site was included for two reasons: 1) they may have information about possible suspects, and 2) they may be suspects themselves.
- *Property delivered by*: Also, to determine "insider" activity, information about who and what company delivered the stolen property was asked. These individuals would have the knowledge and equipment to come back and take property they had delivered.
- *Stage of building*: The stage of building was asked to determine at which point the crime occurred: cleared lot, concrete slab poured, exterior walls in place, roof installed, exterior walls in place, house securable. Opportunities for this crime could change by the stage of building of the site. This information would not only help to determine which type of offender may be committing the majority of the crime but would also help to prioritize and determine when the crime prevention strategies should be employed on the sites.
- *Tools needed*: The officers were asked to speculate about what type of tools would be needed to take the property. This helped indicate the type of offender as well. For example, an experienced offender would take an air conditioning unit by unfastening the bolts from the concrete slab to which it is attached but might also know to cut the freon feed delicately in order not to ruin the unit.

For the initial analysis, 6 months of crime reports with check sheets (June through December 2004) were collected. In addition to quantitative data, qualitative

data were also collected through observation, focus groups, and interviews. Direct observation was used to glean qualitative information about construction generally in Port St. Lucie as well as the nature of the construction sites that were victimized. Several focus groups were held with builders in Port St. Lucie to discuss building practices, experiences with crime, and any strategies already being employed to prevent theft on the sites. Interviews with the city's building department personnel and individual builders' CEOs were conducted to determine building department practices as well as experiences and insight into the problem. Officers and detectives with expertise in construction site theft were also interviewed.

Analysis Results

The goal of the analysis phase was not to determine significant predictors of construction site theft, nor to generalize the findings to all construction site theft. The sole purpose was to develop support for which type of offender was most prevalent in Port St. Lucie in order to direct the crime prevention strategies. Thus, the analysis utilized basic frequencies and percentages displayed in tables, charts, and maps from which we drew conclusions about the nature of single-family home construction sites in Port St. Lucie.

Occurrence by Month

Overall, there were 266 single-family home construction site theft incidents in 2004. Figure 1 shows an increase in the second half of 2004. October was the highest month (with 42 incidents), which may be due to Hurricanes Frances and Jeanne, which that occurred in September. Closer examination of the data showed a large number of those cases to be theft of plywood, which is used both to protect homes during a hurricane and to help repair them in the aftermath (note: these data are categorized by report date, and some crimes occurring before the hurricanes were not reported until month after the storms).

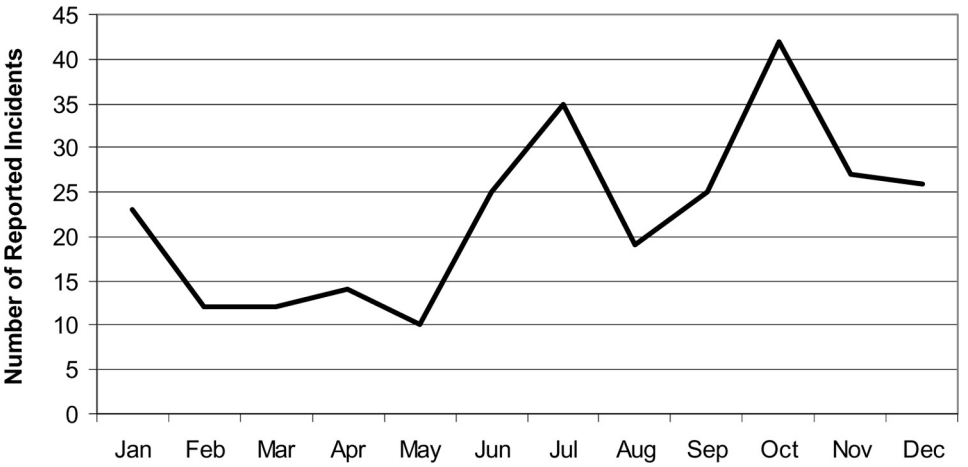

Figure 1. Single-family construction site thefts, 2004.

Repeat Victimization

A key way to direct crime prevention strategies is through the analysis of repeat victimization. Researchers have consistently found that a small number of victims often account for a larger proportion of the crime (Farrell & Pease, 1993). By identifying and focusing on these repeat victims, police and others can make a bigger impact than if strategies are applied equally across victims. Analysis of the data for repeat victimization by address showed that, of the 254 individual addresses victimized, only 12 (4.7%) were victimized twice within one year. Figure 2 shows all the incidents in 2004. Larger dots represent addresses that were victimized twice. Overall, the map shows that incidents happened predominantly on the west side of the city, where the majority of the construction was occurring.

It was apparent that repeat victimization by address was not noteworthy here, which may be because of the transitory nature of construction. That is, different types of materials are vulnerable at different times, and the construction site eventually becomes a residence, which, if victimized again, would be classified as a residential burglary. Because individual construction sites did not seem to be repeatedly victimized, an analysis of repeat victimization by builder (the company names of the builders have been removed from the paper) was conducted, and it showed that repeat victimization did exist. Table 1 shows that 20% of the builders accounted for 69.2% of the crime. The top builder, Builder A, was victimized more than twice as often as any other builder. Thus, we surmised that it was the practices of particular builders, not whether the particular construction site had already been victimized, that was a contributing factor to a site being victimized.

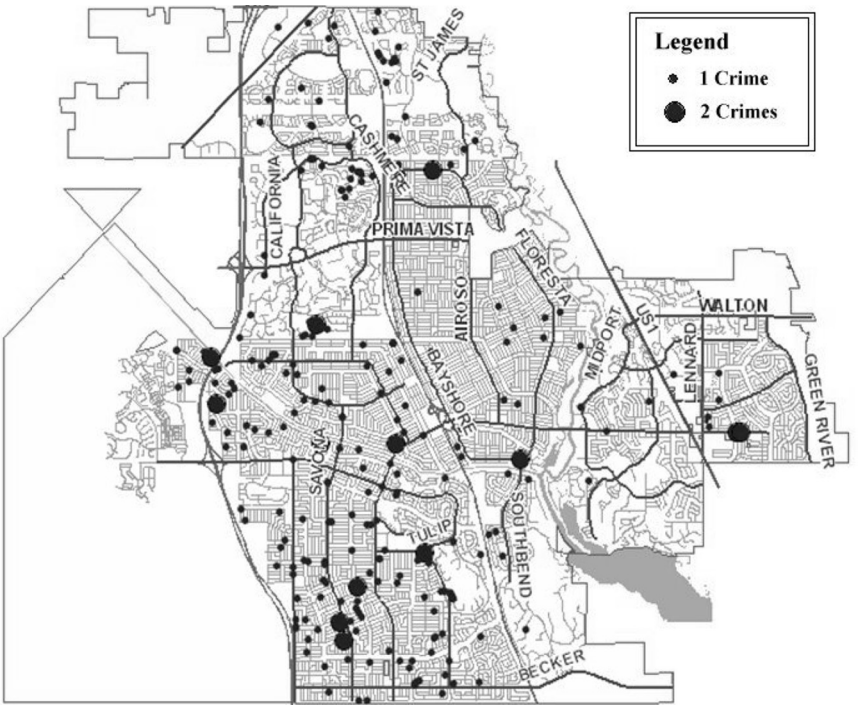

Figure 2. Single-family construction site thefts, Port St. Lucie, FL 2004.

Table 1. Frequency and percentage of builders' victimizations

Builder	Number of reported crimes	Total crimes (%)	Cumulative crimes (%)	Percent of total builders (%) (N = 70)	Cumulative builders (%)
Builder A	40	16.90	16.90	1.40	1.40
Builder B	15	6.30	23.20	1.40	2.90
Builder C	15	6.30	29.50	1.40	4.30
Builder D	14	5.90	35.40	1.40	5.70
Builder E	14	5.90	41.40	1.40	7.10
Builder F	11	4.60	46.00	1.40	8.60
Builder G	10	4.20	50.20	1.40	10.00
Builder H	10	4.20	54.40	1.40	11.40
Builder I	7	3.00	57.40	1.40	12.90
Builder J	7	3.00	60.30	1.40	14.30
Builder K	6	2.50	62.90	1.40	15.70
Builder L	5	2.10	65.00	1.40	17.10
Builder M	5	2.10	67.10	1.40	18.60
Builder N	5	2.10	69.20	1.40	20.00
All others	73	30.80	100.00	80.00	100.00
Total	237	100.00		100.00	

Crimes Resolved By Arrest

As noted earlier, arrests for these types of crime were even less frequent than other property crimes (Boba & Santos, 2006). From January to December 2004, five cases (1.9%) were resolved by arrest of either an adult (4 cases) or a juvenile (1 case). Thus, we were unable to conclude anything about the offenders based on arrest information.

Property Taken

The property taken listed in the crime reports was very specific, thus to examine them, we grouped specific property types into general categories. They included:

- *AC/Heat*: contains equipment related to air-conditioning and heating units, such as compressors, handlers, and heat pumps.
- *Appliances*: contains types of domestic appliances for use in the home, such as refrigerators, stoves, microwaves, washers, dryers, and dishwashers.
- *Building Supplies*: contains general building supplies that can be used in almost any construction project, such as plywood, lumber, copper wiring, steel, and concrete masonry.
- *Construction equipment*: contains equipment used to carry out construction projects, such as generators, cement mixers, and saws.
- *Doors/windows*: contains doors and windows.
- *Internal cosmetic*: contains materials installed inside the home and may be specific in color and type to a particular home or builder, such as ceramic tile, bathtub, sink, faucets, cabinetry, house paint, and carpet.
- *Pool*: contains equipment and supplies related to building pools, such as pool pumps, heaters, and filters.

Table 2. Frequency and percentage of property taken

Type of property	Number of reported crimes	Percentage of total
Building Supplies	52	19.5
Appliances	45	16.9
Internal cosmetic	24	9.0
Construction equipment	24	9.0
AC related	23	8.6
Doors/Windows	20	7.5
Pool related	11	4.1
Rebar	8	3.0
Ladder	6	2.3
Hurricane Shutters	3	1.1
Well pump	3	1.1
Other	13	4.9
Unknown/Not applicable*	34	12.8
Total	266	100.0

*Criminal damage/attempted theft incidents.

- *Rebar, ladder, hurricane shutters, tools, well pump*: these categories represent only these types of property. They have not been categorized either because they are particularly unique (*e.g.*, hurricane shutters) or have arisen as an issue in the analysis (*e.g.*, ladders).
- *Other*: contains an assortment of property not fitting into any of the other categories.

Table 2 tallies of incidents by the type of property taken in the crimes. In most cases in which multiple pieces of property were taken, they fell into the same category (*e.g.*, several appliances taken in one incident). The table shows that building supplies (19.5%) and appliances (16.9%) were most frequently stolen. However, if the categories pertaining to general construction supplies and equipment (*e.g.*, building supplies, construction equipment, rebar, and ladders) are combined, they represent 33.8% of the property taken.

Difficulty of the Crime

The difficulty variables revealed that more crimes required the highest amount of skill, more required a car or small truck, and there was a fairly equal distribution of accessibility of the property. Figures 3, 4, and 5 represent the percentages for each of the variables.

Although these findings are not definitive, we concluded that offenders in Port St. Lucie may have more a high degree of knowledge about construction materials and equipment, since the highest level of skill was required in nearly half of the crimes.

Stage of Building

As noted earlier, we asked officers to indicate on a supplemental check sheet at what stage of building the crime occurred in order to determine when the homes were most

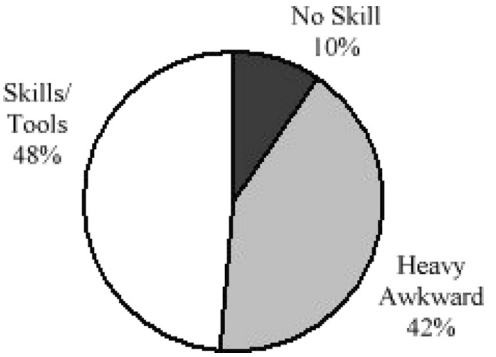

Figure 3. Percentage–skill: The level of skill it took to remove the property.

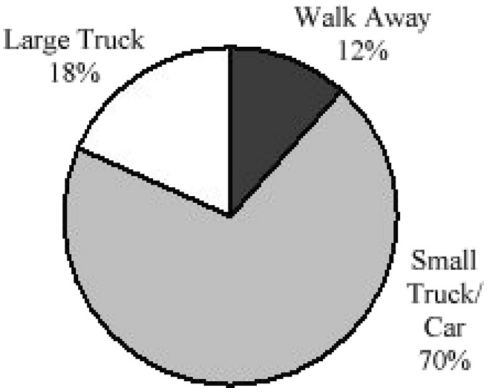

Figure 4. Percentage–transport: What minimum mode of transport was necessary to move the property.

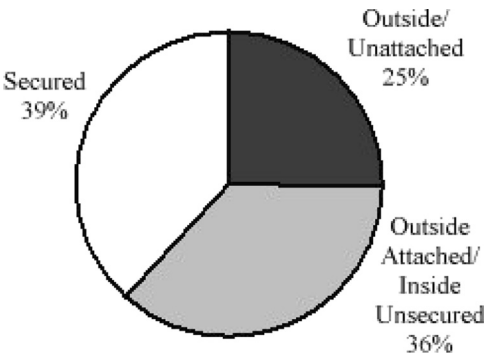

Figure 5. Percentage–access: Where was the property located on/in the construction site.

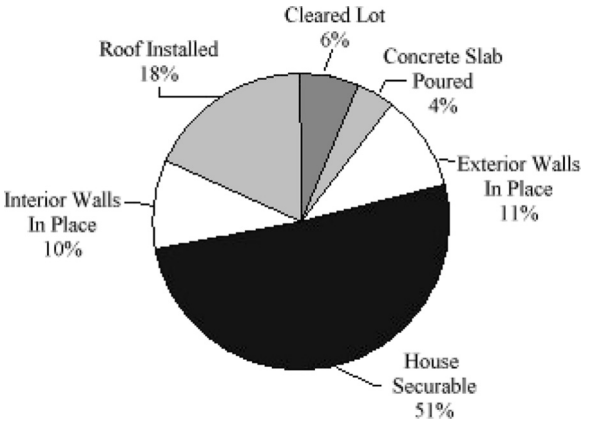

Figure 6. Frequency and percentage of theft for each stage of building.

vulnerable. Figure 6 shows that just over half of the single-family home construction site theft occurred when the house was securable (N = 145, July through December 2004 data only). Even though it was not known from the reports whether the building was actually secured, this finding indicated that the crimes were happening when entry was most difficult. We concluded that individuals with knowledge or access to the site were the likely offenders in these cases.

Builder and Building Department Focus Groups

We held a meeting for builders to share their experiences and to provide information for our analysis. The information gleaned from the meeting was invaluable, as there were many things we did not know about the nature of home building generally as well as about the nature of the construction business in Port St. Lucie. Several themes arose from our discussions including 1) the builders indicated that in some cases they hired subcontractors who provided their own materials; 2) they did not typically report crimes of less than $300 because it was not worth their time; 3) they believed that subcontractors were the majority of the offenders; and 4) they believed that the homes were most vulnerable in the final stages of building because of the amount of property contained in the building at that time.

We also held a separate meeting with the city building department to gain additional insight into the problem. They too felt that insiders were the predominant offenders. Also, they had observed a change in building culture during recent years, in which workers could be seen on jobsites working on weekends, nights, and holidays, making it difficult to identify potential offenders. Other information we obtained included the fact that nearly 6,300 homes were under construction at the time; appliance installation was not required for closing by the builder, but may have been required for bank inspection; and on average, it took about 10.5 months to build a house. A particularly interesting finding related to determining when each site was in its final stage of building and was securable. In Port St. Lucie, about 3 weeks before the house closing, an electricity meter inspection occurred when the house was securable and safe. The addresses that requested or passed the inspection were faxed to the electric company on a daily basis. These addresses provided a real-time indicator of those homes that could be most vulnerable to theft, based on the stage of building analysis.

Conclusions

At the end of the analysis phase, we concluded, based on the results of the primary and secondary data analysis, that "insiders" were primarily responsible for these crimes. The support for this conclusion rested in the results that indicated that general construction supplies and equipment and appliances were primarily stolen; over half of the crimes required the highest level of skill; most of the property taken could be transported with a car or small truck; the property taken typically was not easily accessible; in half of the incidents, the property was taken when the house was securable; and police, builders, and the building department thought, based on their experience, that "insiders" were primarily committing these crimes.

However, we also decided that this problem did not warrant an intensive, all-encompassing response because of the fact that over 6,000 homes were at risk on any given day but only 266 thefts occurred in 2004. These figures indicated that this crime was not as prevalent as we first believed. Therefore, we took a more conservative approach when developing crime prevention strategies that focused on targeting 1) particular areas where the crimes were occurring more often, 2) builders that were victimized more, 3) particular types of property and 4) the time when the sites were most vulnerable—the final stage of building.

Crime Prevention Responses

In the response phase, we developed a multifaceted response plan that included both a general and a targeted approach toward crime prevention. The analysis phase revealed that the single-family construction site theft problem in Port St. Lucie was focused in particular areas of the city, on particular builders, on particular types of property, and in later stages of building. The crime prevention strategies necessary to address these particular aspects of this problem were techniques that the police alone could not implement. Therefore, the responses centered on shifting and sharing the responsibility of implementation with builders as recommended by problem-oriented policing scholars and practitioners (Scott & Goldstein, 2005). General strategies were developed and implemented in the high-risk areas that were identified through analysis and included 1) improving pattern identification and responses to patterns; 2) educating potential victims and potential guardians (*i.e.*, those who can help see and report crimes) through media, meetings, and training; and 3) increasing police guardianship through construction site checks.

In addition, the analysis revealed that there were particular builders that were at higher risk for victimization than others. We worked closely with several builders, and responses were developed based on more specific analyses of individual builders' victimizations and the types of property taken. The following is a more detailed description of each of the crime prevention strategies implemented.

Pattern Analysis

Pattern analysis was implemented through the hiring and training of experienced crime analysts and improvement of data collection. Crime analysts are civilian personnel a police agency whose responsibility it is to conduct a variety of analyses (Boba, 2005). Patterns are crimes that are linked together through a combination of attributes that distinguish that collection of activity from other activity (Boba,

2005). Once identified, the patterns were used to direct more traditional responses geared toward apprehending offenders. The patterns allowed the detectives and patrol officers to prioritize their work and focus on repeat offending (multiple crimes in one pattern). For example, in March 2005, a pattern was identified of nine cement mixers stolen from construction sites. The incidents were mapped which showed that they were particularly close to Interstate 95. Working with one of the previous victims, the detectives were able to borrow a cement mixer and attached a GPS locator to it and placed it at a site, clearly marked "No Trespassing," in an area indicated at risk by the map of the nine incidents. After only 2 days, the mixer was stolen, and three men were arrested for theft and criminal trespass on a construction site.

Media Campaign

For several months in the summer and fall of 2005, we worked with various media to provide information about the crime, strategies being implemented, and general crime prevention advice for builders and community members. The campaign included five television news spots, three radio interviews, and ten newspaper articles. The information provided came from the analysis phase of the study and encouraged individuals in particular areas of the city to be on the look out for suspicious activity in their residential neighborhoods. It also was a warning to offenders that the police department was taking this crime very seriously and was making attempts to address the problem.

Meetings with Builders

Throughout 2005 and continuing, members of the police department's crime prevention unit attended monthly meetings of individual builders/contractors as well as the Treasure Coast Builders Association. Police personnel provided general crime prevention advice, results of the problem analysis, as well as current ongoing patterns developed as a result of the first general strategy. The relationships forged through these meetings made communication with specific builders easier and the builders more responsive to the police (see specific responses discussed below).

Crime Prevention Checks

Interviews with the city building department revealed that electric meter inspections took place in the final stages of construction and that addresses were faxed to the electric company when individual sites passed inspection. Since the analysis showed that a large number of construction site burglaries occurred in the final stages of building, we utilized these meter checks to provide a real-time notification of an increase in a construction site's risk. The crime prevention unit obtained the addresses of the meter checks on a weekly basis from the building department, entered them into a database, and produced a report that was distributed to patrol officers.

Addresses located in the riskiest areas (*i.e.*, in the southwest part of the city), were prioritized, and patrol officers, especially those on midnight shift, conducted daily checks of the sites. If the sites were found to be unlocked or property left unsecured, "crime opportunity forms" were left for the builders to warn them about the vulnerability of the site. Also, we confirmed at the builder forum that builders

require supervisors to check individual sites each day, so the forms were effective in reaching them in a timely manner. Feedback from builders' supervisors in regular meetings indicated they were receiving the forms and making necessary changes to the site to reduce theft.

Working with Specific Builders

The analysis phase showed that 20% of the builders victimized accounted for nearly 70% of the reported crime. We also found that many of the crimes occurred because of poor management practices by the builders, such as lack of oversight, long delivery and installation periods, and carelessness in protecting property. Thus, the targeted approach focused on working with the most victimized builders encouraging them to increase guardianship through site management, to tighten delivery practices, and to strengthen the security of their property and their sites.

At the beginning of the targeted response, we conducted further analysis of the selected builders' crimes and began working with Builder A in February 2005. This builder had the most crimes in 2004 but was not building the most homes. Analysis of the difficulty level of Builder A's victimizations indicated that the averages were significantly "easier" than other builders' victimizations. That is, the builder was more likely to leave property unsecured than the other builders. We also found they had a relatively high number of appliances taken.

During a meeting in February 2005 with Builder A, we discovered that their supervisors were managing between 25 to 30 homes each, which, in comparison to other builders in the area, was very high. Other builders' supervisors were managing between 10 and 20 homes each. After discussion of the analysis results and their building practices, we convinced Builder A to reduce the number of homes assigned to site supervisors to 15 for better oversight; to focus on protecting the property left on site; and to delay installation of appliances until the very final stages of building.

It took a month for Builder A to begin implementing these changes, but from March 2005 to June 2005, there was a significant decrease in crimes (see assessment below). In light of this preliminary success, we scheduled a larger meeting with several more of the most victimized builders. We invited both builders who were the most victimized and a select few that had little to no crime. We thought that many of the crimes were due to opportunities related to builders' practices, and those builders with few crimes could discuss their own building practices and show that better building practices were practical. For example, practices that were discussed in the meeting included providing waivers for banks to sign for responsibility for appliances if they insist on installation too early; requiring homeowners to take out builder risk insurance; working only with certain subcontractors; and delivering appliances the day before closing. Moreover, in its planned communities, one company shared that they took back the master key after the appliances were installed and only the supervisor had the key. Subsequent subcontractors had to contact that person for entry.

The builders who were present at this meeting were very cooperative, as many of them attended the initial analysis meeting and had been at the association meetings where police crime prevention personnel shared information. Although many of the builders agreed to review suggestions and potentially implement changes, three of the builders made firm commitments to change their building practices. They also agreed, in the future, to receive updated analysis from the police department and adjust their practices accordingly. In addition to general efforts to strengthen

security and improve delivery practices, each of these three builders agreed to implement particular strategies tailored to their victimizations.

For Builder B, appliances were the top theft concern so they focused on reducing the time the appliances were installed before closing and assigned a person to check on a daily basis that homes in the final stages of construction were secured. For Builder E, pool equipment was being stolen, so they installed video surveillance cameras at particular construction sites and removed the pool equipment and re-installed it just before the closing. Finally, for Builder G, air-conditioning units were being stolen, so they delayed installation of air-conditioning units and placed stickers in Spanish and English on the air-conditioning units. The stickers included both the builder's and police department's logo and indicated that the property was being tracked. In reality it was not, but the goal was to increase the offenders' perception of risk for being caught to deter them from taking the equipment.

Impact Results

Because there were two distinct approaches used to address this problem, the assessment phase consists of two areas of examination. The first is of the overall impact of the responses, and the second is of the impact to the particular builders who implemented particular responses. The results of the assessment indicate that overall single-family home construction site thefts went down substantially and that each of the builders was victimized less than they had been before the responses were implemented. The charts below show the monthly counts of crime and indicate when response implementation began. Linear trend lines are added to each chart to show the general linear differences between the pre- and post-response periods.

Overall Impact

Figure 7 shows the monthly count of single-family home construction site thefts in Port St. Lucie for 2.5 years and indicates the beginning of the response period.

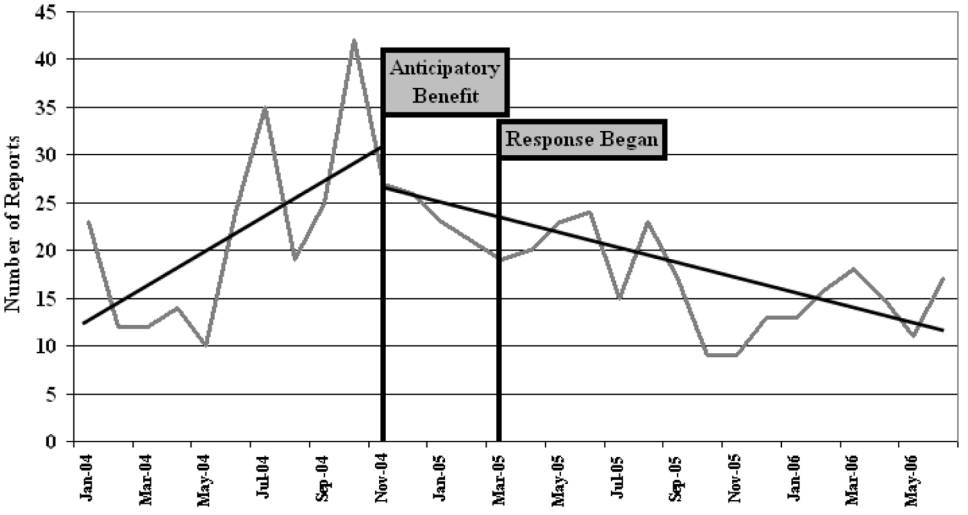

Figure 7. Single-family construction site theft per month, Port St. Lucie, FL.

A period of "anticipatory benefit" is also indicated on the table. It is notable that the number of crimes declined before the response period began. There is some theoretical evidence that this may be due to an "anticipatory benefit." As Smith and colleagues (2002) argue, crime reduction may occur before a strategy is implemented because the work being done before implementation may actually change offenders' perceptions of risk and victims' awareness. Although other responses may also create this benefit, Johnson and Bowers (2003) found that crime prevention publicity did have a preliminary anticipatory benefit. Notably, in this study, we had been analyzing, talking to builders, and observing sites, nearly 6 months before the response period began. Although it is difficult to confirm, it appears as though, from November 2004 to March 2005, there may have been anticipatory benefits. Thus, the linear trend lines indicate the upward trend before the response and the downward trend during the anticipatory benefit period and after the response. Note that building levels were slightly higher during this time (6,621 in 2004 to 6,829 in 2005).

As part of any assessment phase within a problem solving project, an analysis of displacement is recommended (Clarke & Eck, 2005). For example, did the reduction in crime at construction sites displace to another type of location, did the crime move to another part of the city, or did construction site begin to suffer more of a different type of crime (such as vandalism)?

Anecdotally, some members of the police department began to see some displacement to homes that were completed but vacant. As the home buying market slowed, many homes that were built by short-term investors in Port St. Lucie were not being sold quickly and were left vacant. Unfortunately, examination of this displacement would have been very difficult since these homes were labeled "residences," and there was no systematic way to determine they were vacant at the time of theft (*i.e.*, the officers were not required and were not asked to document this at the time of the theft).

In addition to the anticipatory benefits noted above, it could also be that the crime prevention strategies geared toward theft at construction sites of single-family homes may have had a diffusion of benefits (Clarke & Weisburd, 1994). Diffusion of benefits occurs when the crime prevention strategy has a positive impact beyond the intended crime or area. For example, the strategies may have indirectly impacted the rate of vandalism at single-family home construction sites or burglary and theft at other locations, like residences and commercial construction sites. However, the practical nature of this project did not allow a formal analysis of diffusion of benefits.

Builder A

Of the four builders that participated in the specific responses, the most dramatic effect was seen for Builder A in Figure 8. As in the overall impact, the number of crimes appears to be decreasing before the response was implemented, which may also reflect an anticipatory benefit. Importantly, overall the number of crimes reduced dramatically after the response was implemented, even though building volume stayed essentially the same during this time. Note that the spike of four crimes in July 2005 was the result of one offender targeting four houses over one weekend.

Builder B

Figure 9 shows that Builder B's crimes were actually increasing before the responses were implemented, but similar to Builder A, they experienced a decrease and have had only a handful of crimes since they began implementing responses. In fact, their building

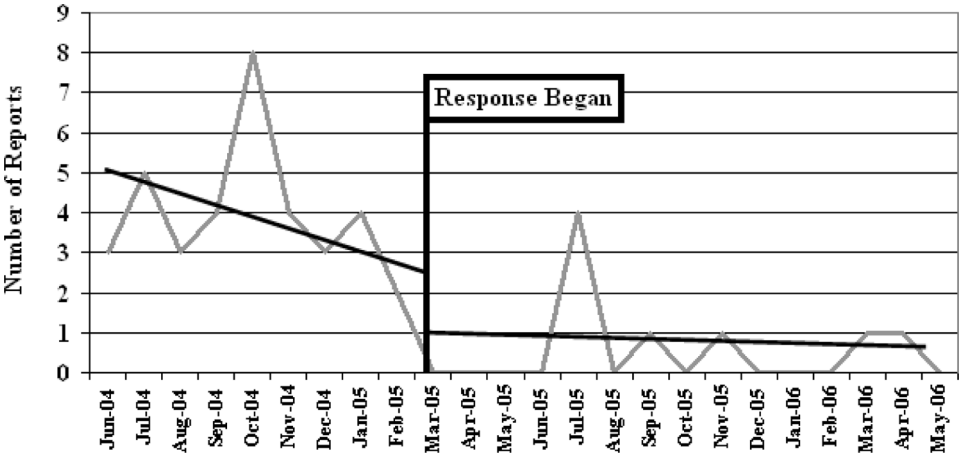

Figure 8. Single-family home construction site theft per month, Builder A.

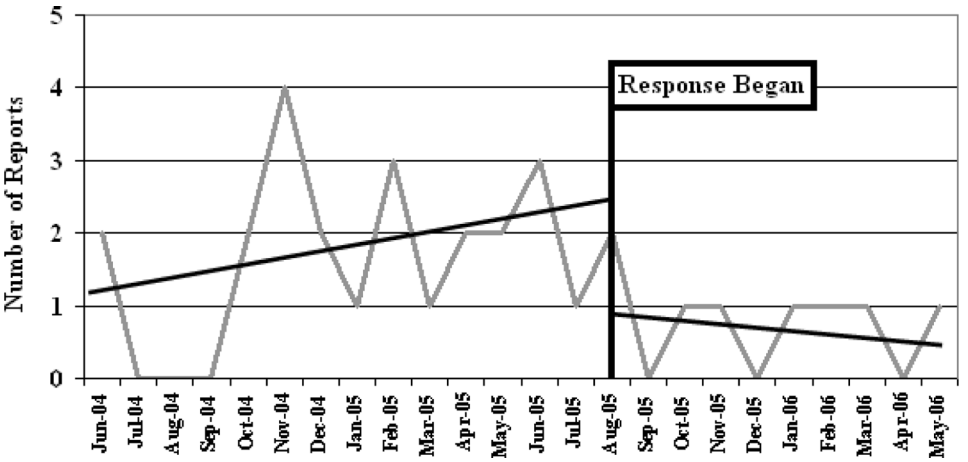

Figure 9. Single-family home construction site theft per month, Builder B.

volume slightly increased during the response period. They continued to improve their practices based on information and patterns provided by the police department.

Builder E

Although Builder E had suffered fewer crimes as the other builders, since implementing their responses in September 2005, they have no reported crimes (see Figure 10). Feedback from the builder revealed that during this time it had a consistent volume of home building and changed practices of overseeing and delivering building materials as well as the installation of pool equipment.

Builder G

Similar to Builder B, Builder G's crime incidents (see Figure 11) were increasing before the responses were implemented, and they saw a decrease that remained fairly

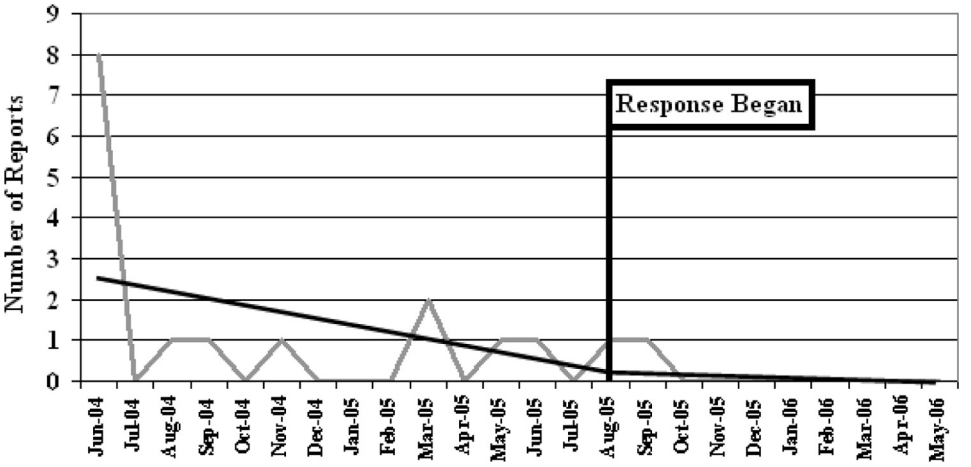

Figure 10. Single-family home construction site theft per month, Builder E.

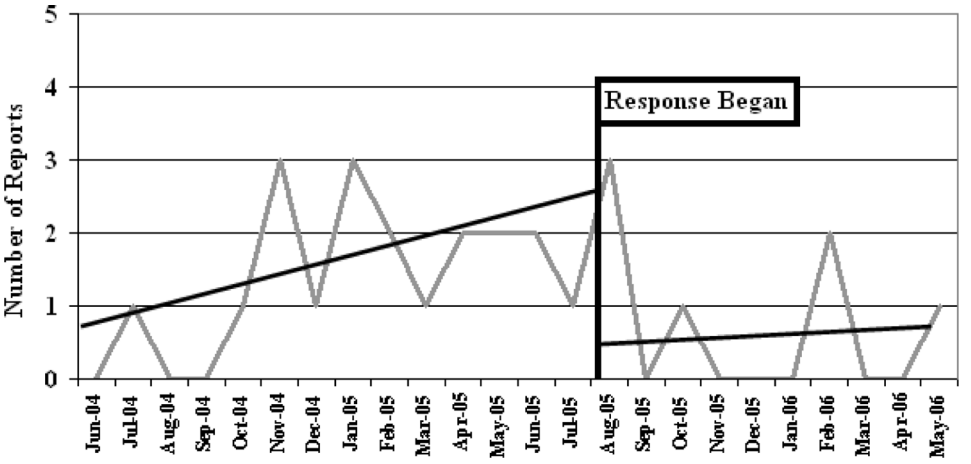

Figure 11. Single-family home construction site theft per month, Builder G.

stable after the responses were implemented, even though their building volume slightly increased.

Conclusion

We have deemed this endeavor as a success for the individual builders as well as for the city of Port St. Lucie. In fact, the problem-oriented policing community also agrees, evidenced by the project earning the award of Finalist in the International Herman Goldstein Award for Excellence in Problem-Oriented Policing (POP Center, 2006). The notable achievements of this effort are the application of the SARA process, the examination of a wide range of data, the cooperation of the policing and the building community, and the tailored responses implemented by both the police department and the builders.

Most importantly, the results led to working with specific builders because nearly 70% of the crime occurred only at 20% of builder locations. Although we served as the impetus for this effort and provided guidance to the builders, the partnerships that were created to accomplish both the general and specific responses were key to the success of this effort because impacting this crime was primarily at the hands of the builders making adjustments to their building practices. Importantly, there is some indication from anticipatory benefits that the partnership itself may have impacted the problem since the number of crimes began to decrease during the analysis phase and while partnerships were being formed, even before the responses were formally introduced.

Acknowledgements

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