SELECTING THE BEST ANALYST FOR THE JOB

A Model Crime Analyst Assessment Process for Law Enforcement Agencies

APPENDIX E
Problem Analysis Exercise Components

APPENDIX E: PROBLEM ANALYSIS EXERCISE COMPONENTS

E.1 Candidate Materials
Problem Analysis Exercise
Instructions to Candidate

The following exercise was taken from the Advanced Problem Analysis, Crime Analysis, and Crime Mapping Training developed by the Police Foundation. It describes a commercial burglary problem in the fictitious city "Los Analysis." You have 90 minutes to develop a summary of the problem and potential solutions using your knowledge about GIS mapping, data analysis, crime analysis, offenders, criminological theory, understanding of crime patterns and trends, etc.

The following pages present detailed information regarding the problem, its frequency, changes over time, geographical trends, victimization, and modus operandi (method of operation). Review the information presented and write a two to three page summary of the problem that includes the following:

1. Summary of the problem.
2. Summary of the relevant data.
3. Outline potential solutions based on existing information and include possible shortcomings, if any.
4. Additional information that you would seek in order to further analyze the problem or generate additional solutions.

Commercial Burglary in Los Analysis
Introduction

The Los Analysis Police Department is a midsize agency with 420 sworn and 185 civilian personnel serving approximately 164,000 citizens in 48 square miles. Los Analysis is a suburb of a major metropolitan city; however, Los Analysis has its own downtown area in addition to several commercial and industrial areas. Generally, the industrial areas are located on the west side and the commercial areas are in the northwest section of the city. The northeast, east, and south sides of the city are predominantly residential. The downtown area is in the center of the city. Since Los Analysis is landlocked, population growth has leveled off in recent years.

During the past 5 years, Part I crime has declined in Los Analysis; however, in the past 2 years, the city has experienced a dramatic increase in burglary activity in its commercial and industrial areas. In addition, recent media attention has been drawn to this problem because the downtown business association has brought it to their attention. Thus, it has become a high priority for the mayor and, consequently, the police chief.

The Problem

The increase in commercial burglary activity during the past 2 years has prompted the police department to partner with local business owners to better understand and respond to the problem. The Crime Analysis Unit was recently asked to attend the partnership meetings and provide data on the city's commercial burglary problem. Figure E1 depicts the annual frequency of commercial burglary in Los Analysis during the past 5 years. Note that the increase in activity has primarily occurred during the past 2 years.

The increase in activity is further illustrated in Figure E2 (shown on page E–3), which depicts the rate of commercial burglary by population. The increase in population has been relatively small and consistent (161,000 in Year 1, with an increase to 164,000 in Year 5, a 1.9 percent increase during 5 years).

Note how the rate jumped from 933.13 in Year 3 to 1147.56 in Year 4 and remained steady at 1138.41 in Year 5. The commercial burglary rate in Los Analysis is much higher than the statewide rate of 714.45 per 100,000 persons and the national burglary rate of 740.85 per 100,000.

The clearance rate for commercial burglary in Los Analysis is 7.69 percent, lower than the national burglary clearance rate of 12.7 percent. In addition, it appears that a small number of repeat offenders are responsible for multiple crimes, as approximately 20 percent of the offenders account for 45 percent of the arrests. However, these numbers should be interpreted with caution since less than 8 percent of commercial burglaries are cleared by arrest.

Figure E1. Commercial Burglary Frequency in Los Analysis: Last 5 Years
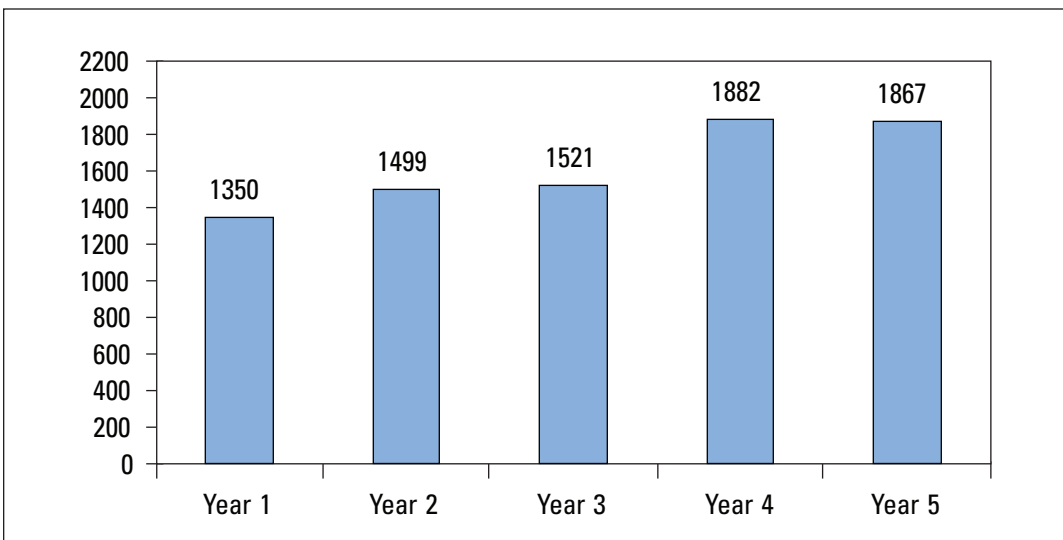
Figure E2. Commercial Burglary Rate per 100,000 Persons in Los Analysis: Last 5 Years
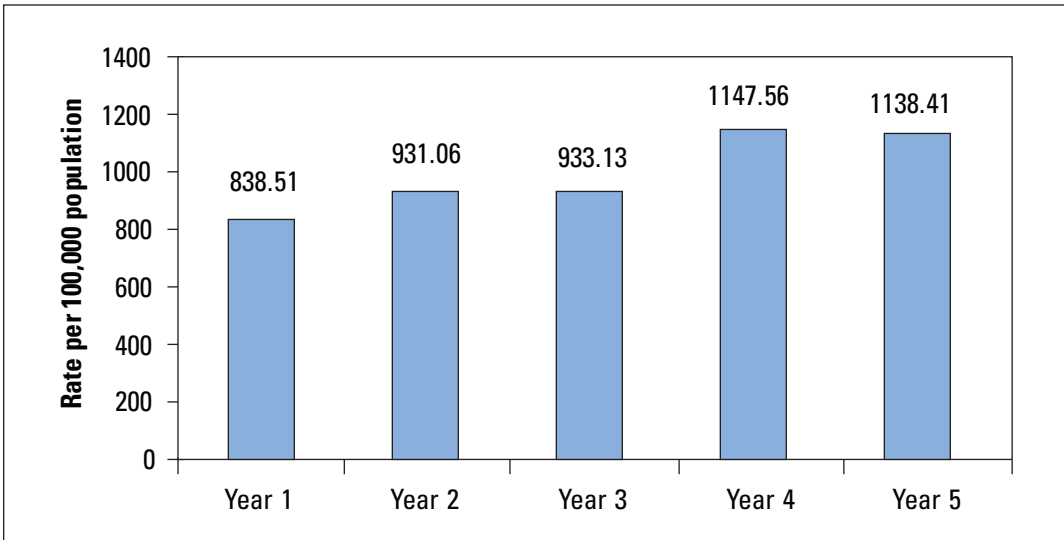
Temporal Analysis

A temporal analysis was conducted to determine if any recent, seasonal, monthly, day-of-week, or time-of-day patterns emerged. Figure E3 (shown on page E–4) illustrates the frequency of commercial burglary in the most recent full year.

This chart shows that commercial burglary activity tends to be greater in the last 6 months of the year with 54 percent of the reports occurring between July and December. Last year, the number of reports reached a low of 99 in April and peaked at 210 in October. The high number of incidents occurring during the month of October can partly be attributed to ongoing office and industrial/construction site crime trends discussed in the following sections.

To determine seasonal variation in the crime, Figure E4 (shown on page E–4) depicts 2 years of commercial burglary data by month.

Figure E3. Commercial Burglary Frequency in Los Analysis: Year 5
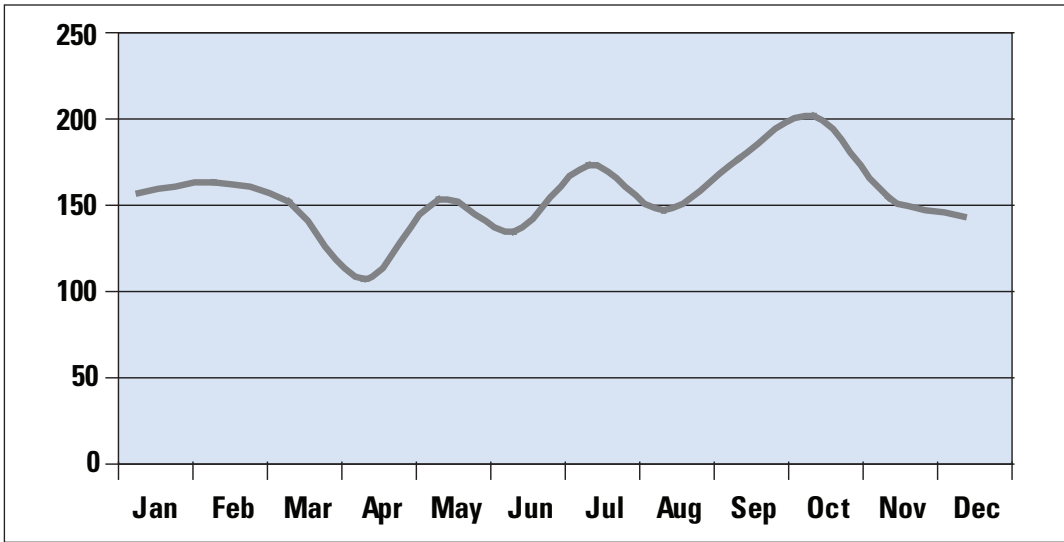
Figure E4. Commercial Burglary Frequency in Los Analysis: Years 4 and 5
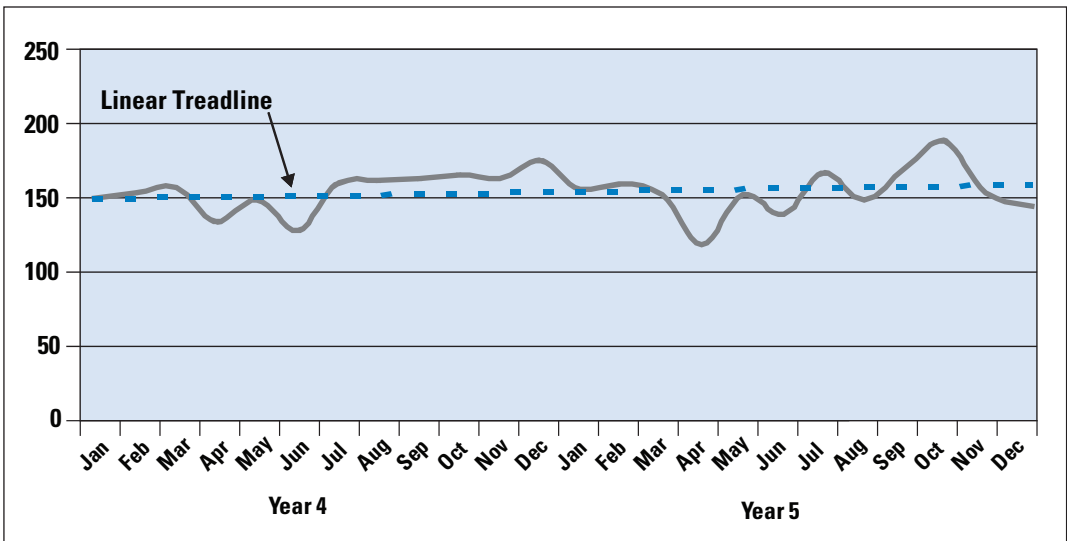
Figure E5. Weighted Method, Time-of-day Pattern of Incident Reports

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
6.42	6.52	6.97	7.05	6.83	6.53	6.32	5.03	4.56	3.32	3.23	2.69	2.60	2.66	2.24	2.12	1.52	2.41	2.93	3.25	3.13	3.57	4.11	3.86

Interestingly, commercial burglary trends for the past 2 years have been similar between the months of January and July. Overall, crime tends to increase in the early part of the year, decrease in April and June, and increase in May and July. However, trends in the latter part of last year were different from the preceding year. For example, commercial burglary activity spiked in October of last year, with 210 crimes reported, an increase of 36 from the previous October. The month of December is also different from the preceding year. Last December, only 142 commercial 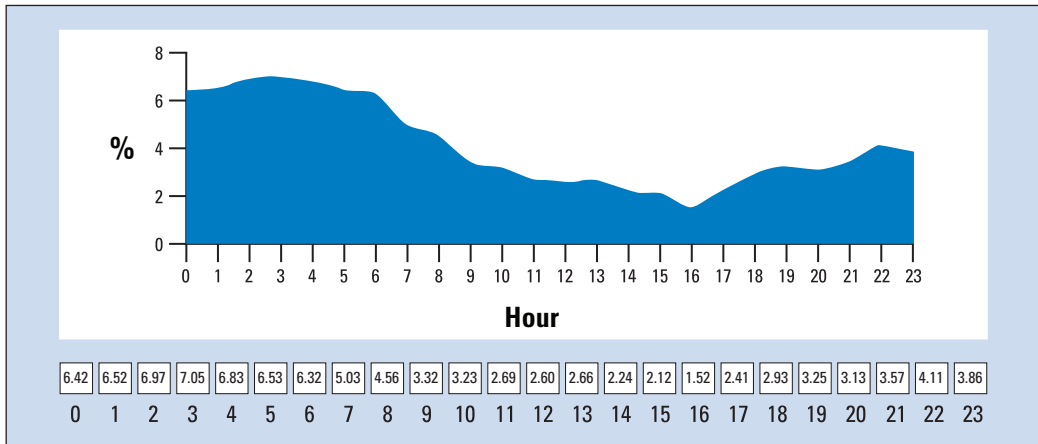burglaries were reported, down from 189 the previous December. Generally, this chart indicates that commercial burglary activity is greater in the last 6 months of the year and is substantially lower during the months of April and June. Also, the trendline shows that, despite monthly variation, commercial burglary has gradually increased during the last 2 years.

A temporal analysis was conducted to determine if any time-of-day patterns emerge. Figure E5 depicts the time of day based on the time span recorded on incident reports taken in the last year. The chart depicts temporal analysis using the weighted method. For example, if a commercial burglary occurred sometime between the hours of 0100 and 0500, each hour in the 4-hour time span is given a weight of 0.25. Rather than relying on the time the crime was reported or the first time in the time span, every hour is accounted for by using the weighted method of analysis. This method of temporal analysis can be hand calculated or automatically generated using the Automated Tactical Analysis of Crime© (ATAC) software from Bair Software Inc.

As one might expect, this chart reveals that most commercial burglary activity takes place overnight when businesses are unoccupied. Activity declines during the daytime hours and then begins to increase again at 1700 when many businesses close for the day. The numbers at the bottom of the chart, automatically generated by the ATAC© software, indicate the percentage of activity that occurs during each hour. Thus, we can see that a large percentage (46.6 percent) of the time spans overlap the hours of midnight and 0600.

Figure E6. Daily Variations In Pattern of Incident Reports
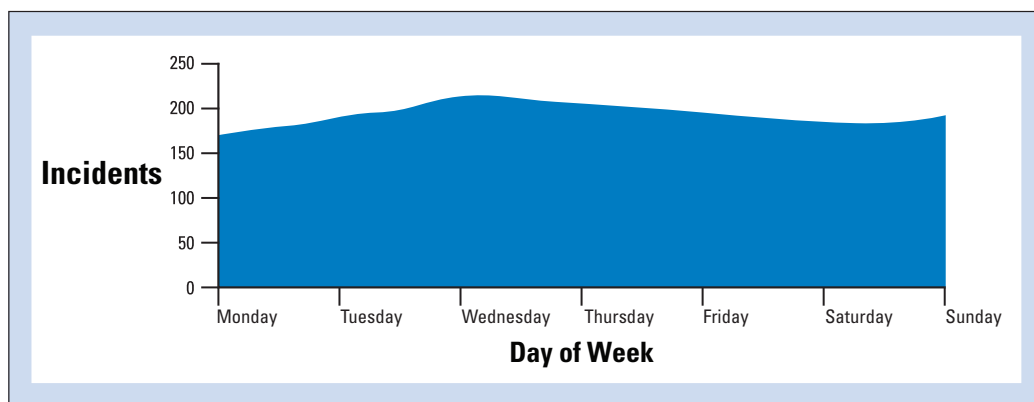
To determine variation in commercial burglary by day of week, Figure E6 depicts the day of week based on the first possible date the crime could have occurred from reports taken in the last year. Ideally, since commercial burglary tends to occur over a time span, a day of week analysis should take every day in the time span into account, weighting each day in the time span equally. However, a majority of the cases occur within 1 or 2 days.

The chart in Figure E6 was created using ATAC© software and illustrates that a slightly higher number of commercial burglaries occur or have a time span beginning on Wednesday. For the most part, however, the crime seems to be fairly evenly spread over each day of the week. However, this chart should be interpreted carefully since it accounts for only the first day of the time span.

Spatial Analysis

The maps in Figures E7, E8, and E9 reveal that much of the commercial burglary activity is concentrated in the west/northwest sections of Los Analysis, which is where the city's industrial and commercial areas are located. The density map in Figure E7 (shown on page E–7) illustrates commercial burglary hot spots for the last year.

The densest concentration of activity is in the northwest section of the city. This area includes commercial locations, such as office buildings, strip malls, and gas stations. In the latter part of the year, burglary of office buildings substantially increased as the result of an ongoing crime pattern. Seven of the 22 incidents in this crime pattern occurred in the red area on the density map, and the remaining incidents occurred in the surrounding area. The hot spot in the center of the density map represents the downtown area, where commercial burglary tends to occur at restaurants, retail stores, and office buildings. The smaller hot spot on the lower west side of the map is in the city's industrial area. Burglaries in this area tend to occur at commercial yards, storage facilities, and construction sites. During the past 6 months, 18 incidents have occurred as part of an ongoing crime pattern in this area. Note that the east side of Los Analysis, which is primarily residential, experiences very little commercial burglary activity.

Figure E7. Commercial Burglary Hot Spots in Los Analysis – Last Year
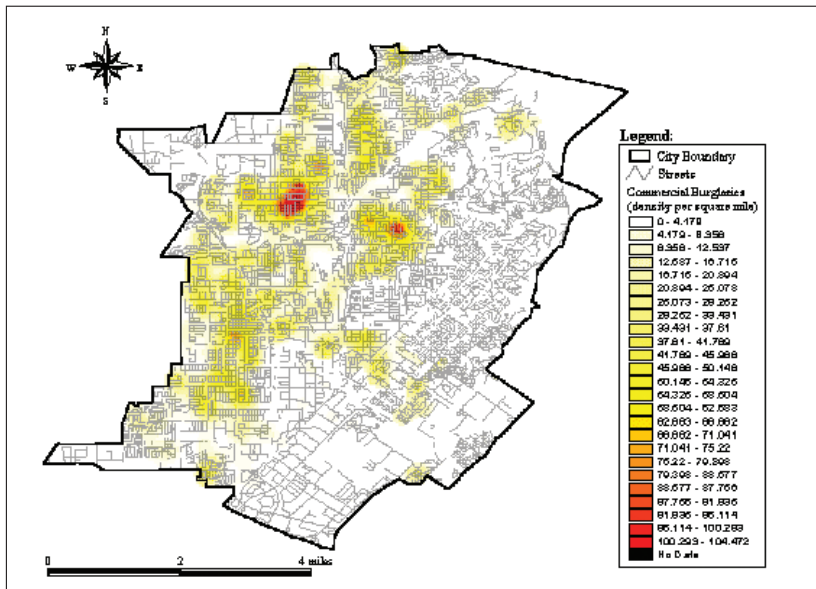
Figure E8. Commercial Burglary Hot Spots in Los Analysis – Last Year

Figure E9. Top 10 Adresses for Commercial Burglary in Los Analysis – Last Year
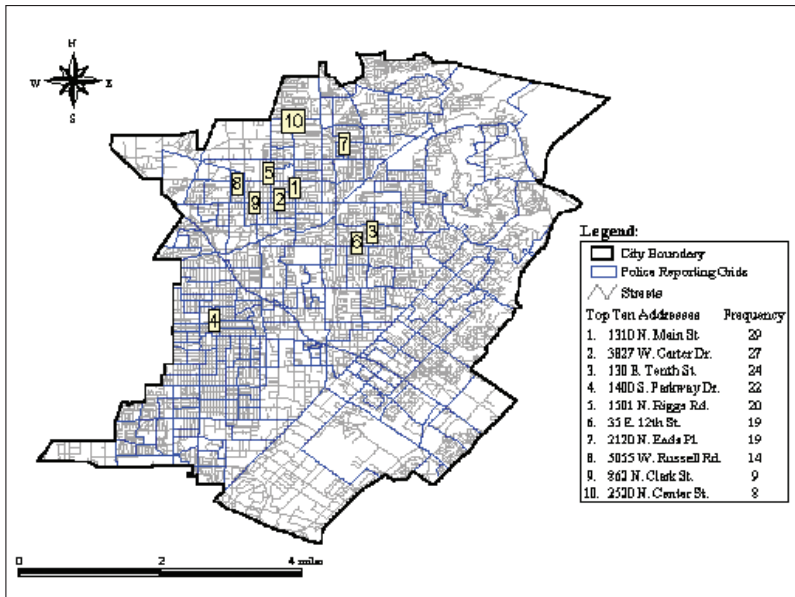
To further illustrate commercial burglary hot spots, the graduated color map in Figure E8 (shown on page E–7) depicts the last year of commercial burglary data by police grid; the standard deviation classification is used to illustrate outliers, that is, those grids that have more or fewer commercial burglaries than average.

In this map, the blue areas signify areas with fewer commercial burglaries than the mean, or the average number of burglaries per grid. The red areas represent grids that have a higher than average number of commercial burglaries. The areas that are shaded dark red are three or more standard deviations from the mean, meaning that they have a substantially higher number of commercial burglaries than the grids in the rest of the city. Note that the dark red grids are concentrated downtown and in the commercial area in the northwest section of the city.

The final map in Figure E9 depicts the top 10 addresses for commercial burglary in Los Analysis. The map is also based on the last year of commercial burglary data.

The top address for commercial burglary in Los Analysis is the Parkside Office Complex at 1310 N. Main St. Last year, 29 commercial burglaries were reported from office suites at this location. The remaining top addresses consist of office buildings, commercial yards, storage facilities, and strip malls. Many of the top addresses are along main thoroughfares and 8 of the top 10 locations do not have an alarm or security guard.

Victims

The map in Figure E9 (shown on page E–8) which depicts the top 10 commercial burglary locations for the last year, illustrates that certain types of locations are repeatedly victimized. Figure E10 depicts the most frequently victimized location types in Los Analysis.

Figure E10. Most Frequently Victimized Location Types in Los Analysis

| LOCATION TYPE	FREQUENCY	PERCENT
Office Building	352	18.9%
Storage Fenced	205	11.0%
Commercial Yard	160	8.6%
Construction Site	127	6.8%
Restaurant	83	4.4%
School	69	3.7%
Apartment	65	3.5%
Clothing/Retail/Thrift	59	3.2%
Medical/Dental/Hospital	59	3.2%
Auto Parts/Repair	49	2.6%
Electronics/Appliance	47	2.5%
Warehouse	45	2.4%
Church	43	2.3%
Hotel/Motel	43	2.3%
Bar	41	2.2%
Beauty Salon	34	1.7%
Other	386	20.7%
Total	**1867**	**100.0%**

Figure E11 (shown on page E–10) illustrates the top five types of locations. Almost 20 percent of commercial burglaries occur at office buildings, most of which are concentrated in the northwest and downtown areas of the city. Office buildings are likely targeted because they tend to be unoccupied between the hours of 1700 and 0800 and because, in many instances, several office suites can be burglarized once entry is made to the exterior building. Offices are a reliable source of valuable property, such as computer equipment, office supplies, and cash. The next three types of locations—storage facilities, commercial yards, and construction sites—tend to be concentrated on the west side of the city. All of these sites contain similar types of property, such as construction equipment, hardware/tools, auto parts, and industrial machinery. The last type of location, which accounted for 4 percent of commercial burglaries last year, is restaurants. While restaurants are located throughout Los Analysis, those in the downtown area are burglarized most often. The most common property taken from restaurants is cash.

The location types collapsed into the "other" category include schools (3.7 percent), apartment buildings (3.5 percent), retail stores (3.2 percent), and medical offices (3.2 percent), among others.

Repeat Victimization

Repeat victimization refers to the recurrence of crime against the same people and/or places. The maps in the spatial analysis section illustrate that commercial burglary in Los Analysis does tend to concentrate at specific locations and in certain areas. For example, 5 of the city's 20 reporting grids (those encompassing the commercial area in the northwest section of the city) accounted for 790, or 42.3 percent, of last year's commercial burglaries.

Figure E11. Types of Locations Victimized By Commercial Burglary in Los Analysis
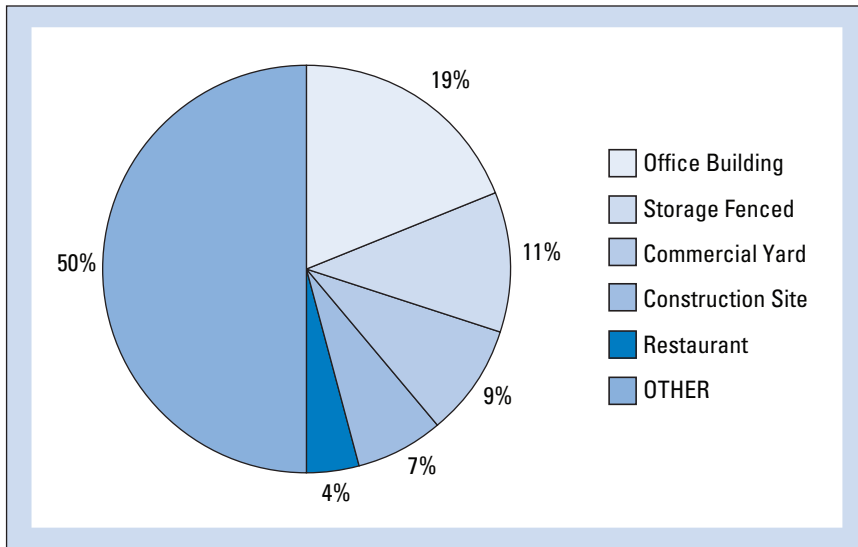
In addition, the top 10 addresses accounted for 191, or 10.2 percent of last year's crimes. By focusing prevention strategies at repeatedly victimized areas and/or places, the police department can likely bring about a dramatic reduction in the commercial burglary problem.

Modus Operandi

While the modus operandi largely depends on the unique opportunities available at each crime scene, some commonalities do emerge. Figures E12, E13, and E14 (shown on pages E–11 and E–12) depict the point and method of entry as well as the property taken for commercial burglaries occurring in the last year.

Generally, the front door is the most common point of entry (18.2 percent) in Los Analysis commercial burglaries. The "other" category also accounts for 18.2 percent of last year's burglaries. This category is used to refer to entry points such as garage doors, air vents, or roofs. Because this category is collapsed at the time data are entered, the original incident reports would have to be read to learn more about the point of entry in these 340 incidents. The remaining top five points of entry include windows (14.4 percent), storage doors (11.2 percent), and fences/walls (11.1 percent).

The top method of entry is a window break (19.9 percent), commonly perpetrated with an item, such as landscaping rocks, that offenders find at the scene. Interestingly, entry with no sign of force is the next most common category, accounting for 16.3 percent of last year's incidents. Although this finding indicates that some businesses are left

Figure E12. Commercial Burglary – Points of Entry

Window	268	**14.4%**
Fence/Wall	207	**11.1%**
Door: Window	118	**6.3%**
Other	340	**18.2%**
Total	**1867**	**100%**

Figure E13. Commercial Burglary – Methods of Entry

Method of Entry	Frequency	Percent
Break	372	**19.9%**
Pry Tool	280	**15.0%**
Remove/Cut Lock	152	**8.1%**
Forced	109	**5.8%**
Cut	84	**4.5%**
Rock	76	**4.1%**
Remove	36	**1.9%**
Foot Impact/Impact Tool	33	**1.8%**
Bolt Cutters	17	**0.9%**
Channel Locks/Vice Grips	2	**0.1%**
Lift off Track	2	**0.1%**
Other	244	**13.1%**
Unknown	156	**8.4%**
No Sign Forced	304	**16.3%**
Total	**1867**	**100%**

unsecured, it should be noted that no sign of force is often found at construction sites and commercial yards where gaps in perimeter fencing make it easy for offenders to enter the property. The remaining top methods of entry are door or window pries (15 percent), remove/cut lock (8.1 percent), forced but undetermined (5.8 percent), and cut (4.5 percent). Once again, the "other" category represents a limitation in the modus operandi data.

As one would expect, cash is the most common type of property taken because it can be readily used and is nearly impossible to trace. The "unknown" category refers to burglaries where property is taken, but the owner or responsible party cannot identify every item that is missing. Other hot products include hardware/tools (11.2 percent), computer equipment (11.1 percent), and construction equipment (5.1 percent). These are the primary types of property that are being taken in the two ongoing commercial burglary patterns described below.

The problem-solving partnership between the police department and the business community was formed 2 months ago as the result of the notable increase in activity. During the past 6 months, two separate crime patterns have occurred in the west and northwest sections of the city. The pattern occurring in the commercial area on the city's northwest side involves overnight entries into office buildings where office and computer equipment are taken. In two separate incidents, offenders burglarized multiple suites in the same office building. The primary methods of entry in these incidents have been through prying open the front door or breaking a window.

Figure E14. Commercial Burglaries – Types of Property Taken In The Last Year

Property Taken	Frequency	Percent
Cash/Notes	258	13.8%
Hardware/Tools	210	11.2%
Computer Equipment	207	11.1%
Construction Equipment	95	5.1%
Stereo Equipment	62	3.3%
TV	62	3.3%
Office Equipment	57	3.1%
Clothes	53	2.8%
Bike	44	2.4%
Auto Parts	43	2.3%
Consumable	42	2.2%
Appliances	30	1.6%
Sporting Goods	23	1.2%
Alcohol	21	1.1%
Phone	20	1.1%
Furniture	17	0.9%
Jewelry/Precious Metal	16	0.9%
VCR	16	0.9%
Credit Cards/Checks	15	0.8%
Purse/Wallet	15	0.8%
Yard Equipment	14	0.7%
Coins/Collections	13	0.7%
Cell Phone	12	0.6%
Firearms	11	0.6%
Other	264	14.1%
Unknown	242	13.0%
No Property Taken	5	0.3%
Total	**1867**	**100.0%**

Overall, approximately $32,000 in property has been stolen from offices in this area during the last 6 months. In one incident, a suspicious white Honda Accord was seen in the area immediately after the burglary, but no license plate number was obtained. The pattern occurring on the west side of town involves overnight burglaries at unguarded commercial yards and construction sites. In 4 of the 18 total cases, offenders cut through or drove a vehicle over

a perimeter fence; however, in most of the remaining incidents, there was no sign of forced entry to the property. Property taken in these incidents includes approximately $23,000 worth of hardware/tools, construction equipment, and auto parts. Property taken in these incidents includes approximately $23,000 worth of hardware/tools, construction equipment, and auto parts. In one incident, a surveillance camera recorded two white males loading property into a dark blue or black pickup truck; however, since the recording quality is poor, no additional information was obtained from the tape.

Two weeks ago, the police special enforcement team used a bulletin prepared by the Crime Analysis Unit to set up an overnight surveillance in an area with a high amount of activity; however, the surveillance effort failed to generate any leads.

E.2 Evaluator Materials

Problem Analysis Response Template

The candidate's overall response should include each of the following points:

- ✦ During the past two years, there has been an increase in commercial burglary in the city of Los Analysis. The city consists of three primary focus areas: downtown area, commercial areas mainly in the northwest section, and industrial areas located on the west side. Based on the analysis of the last five years, there is some evidence of repeat offending, as 20 percent of the offenders account for 45 percent of the arrests.

- ✦ The temporal analysis of this commercial burglary problem reveals that commercial burglary activity tends to be greater in the last six months of the year, with a large percentage occurring at nighttime.

- ✦ The spatial analysis of this commercial burglary problem reveals that most of the activity is concentrated in the west and northwest sections of Los Analysis. In addition, the large hotspot represents the downtown area, where commercial burglary tends to occur at specific places. Finally, a mention of the top addresses being targeted and what systems they do or do not have in place are given.

- ✦ The section on victims indicates that certain types of locations are repeatedly victimized. Specifically, office buildings and fenced storage areas. Various types of items taken are mentioned, such as, cash, hardware, and construction equipment.

- ✦ The brief section on repeat victimization proposes that by concentrating on the repeat locations, the Los Analysis police departments can bring about the biggest reduction to this commercial burglary problem.

- ✦ The final section on modus operandi discusses the common points of entry as well as the common methods of entry.

In conclusion, there are two separate crime patterns occurring in the northwest and west sections of Los Analysis. Both patterns have occurred overnight; however, they involve different MO's and stolen property.

Model Candidate Response

The following response is an example of a well-written response incorporating all of the points described above.

During the past two years, Los Analysis has experienced a dramatic increase in burglary activity in its commercial and industrial areas that has become the focus of Los Analysis' mayor and police chief. The activity peaked in October of last year, which was largely driven by two ongoing crime trends—the first is a pattern of burglaries occurring overnight at office buildings in the northwest section of the city and the second involves overnight burglaries at commercial yards and construction sites on the west side of town. The commercial burglary rate in Los Analysis is higher than both state and national levels, and while the clearance rate is very low, it too, is much lower than the national level.

More specifically, the commercial burglary problem is generally during evening and night hours when businesses are closed but there does not appear to be any patterns of occurrence by day of the week. Much of the commercial burglary activity is concentrated in the west/northwest sections of Los Analysis, which is where the city's industrial and commercial areas are located. In fact, almost 20 percent of commercial burglaries occur at office buildings, which are primarily located in the northwest and downtown areas of the city. Also, 20 percent of the city's reporting grids (those encompassing the commercial area in the northwest section of the city) account for 42.3 percent of last year's commercial burglaries, and the 10 most frequently victimized addresses account for 10.2 percent of last year's commercial burglaries. Finally, the front door is the most common point of entry (18.2 percent) in Los Analysis commercial burglaries, while breaking a window is the most common method of entry. Interestingly, entry with no sign of force is also frequent, accounting for 16.3 percent of last year's incidents. Although this finding indicates that some businesses are left unsecured, it should be noted that no sign of force is often found at construction sites and commercial yards where gaps in perimeter fencing make it easy for offender(s) to enter the property. As one would expect, cash is the most common type of property taken because it can be readily used and is nearly impossible to trace.

In sum, this report has provided preliminary information about the commercial burglary problem in Los Analysis over the last several years, focusing on the most recent year's activity. Additional analysis is recommended before developing a response to this problem.

Evaluator Guide for Problem Analysis Exercise

Each section lists discussion points to assist in the evaluation of the candidate's response to the problem analysis exercise.

The Problem

1. Commercial burglary has increased dramatically in the commercial and industrial districts of Los Analysis over the past 2 years.

2. Population has remained fairly consistent.

3. The commercial burglary rate increased most dramatically from Years 3 to 4 and has since remained steady.

4. A small number of repeat offenders appear to be responsible, as approximately 20 percent of those arrested for burglary account for 45 percent of the burglary arrests. However, this must be interpreted cautiously as only 8 percent of commercial burglaries are cleared by arrest.

Temporal Analysis

1. The greatest increase occurs in the last 6 months of the year (July–December) and peaks around October.

2. This trend has been the same between months of January and February for each of the last 2 years.

3. Despite monthly variation, commercial burglary has gradually increased during the last 2 years.

4. Most of the commercial burglaries take place overnight (between midnight and 0600).

5. The burglaries are fairly evenly spread throughout the week.

Spatial Analysis

1. Much of the commercial burglary is concentrated in the northwest (commercial) and west (industrial) sections of the city.

2. The largest hot spot in the downtown area has been experiencing commercial burglary mainly at restaurants, retail stores, and office buildings.

3. Top address for commercial burglary in L.A. is the Parkside Office Complex at 1310 N. Main Street.

4. Several top addresses are along main thoroughfares and 8 of the top 10 do not have an alarm or security guard.

Locations and Repeat Offenses

1. Approximately 20 percent of commercial burglaries in Year 5 occurred at office buildings.

2. Office buildings are targeted because they are usually unoccupied at night.

3. The top five types of locations victimized in Year 5 were office buildings, fenced storage areas, commercial yards, constructions sites, and restaurants.

4. Fenced storage, commercial yards, and construction sites accounted for approximately 27 percent of all commercial burglaries. Restaurants accounted for approximately 4 percent.

5. Five of the city's 20 reporting grids account for 42.3 percent of last year's burglaries.

6. The top 10 addresses accounted for 10.2 percent of last year's crime.

Modus Operandi

1. The front door is the most common point of entry.

2. Window break is the most common method of entry.

3. Most commonly taken is cash, followed by hardware/tools and computer equipment.

4. Northwest (commercial) area has had a number of overnight entries into office buildings where office and computer equipment were taken. Prying open the front door or breaking a window were the common methods of entry.

5. A white Honda Accord was seen in the area immediately following one of the burglaries.

6. West (industrial) area has had a number of overnight burglaries of unguarded commercial yards and construction sites. In 4 of the 18 cases, a vehicle was used to break down a perimeter fence; the majority of the remaining cases showed no sign of force.

7. Hardware/tools, construction equipment, and auto parts were most commonly taken.

8. In one case, a surveillance camera (poor quality) captured two white males loading property into a dark blue or black pickup truck.

E.3 Problem Analysis Exercise Score Sheet

	Possible	Earned
A. Summary of the Problem		
1. Thoroughly identifies problem.	10	_____
2. Thoroughly discusses temporal analysis issues.	5	_____
3. Thoroughly discusses spatial analysis issues.	5	_____
4. Thoroughly discusses crime locations and repeat offenses.	5	_____
5. Identifies the various modus operandi patterns.	5	_____
Comments:		
Total Possible = 30 points or 15% of total score	**Total Earned**	_____
B. Relevant Data		
Evaluator should be looking for descriptive detail about each component, including related statistics and key points.		
1. Key temporal issues.	10	_____
2. Key spatial Issues.	10	_____
3. Key victim and repeat victimization issues.	20	_____
4. Key modus operandi issues.	20	_____
Comments:		
Total Possible = 60 points or 30% of total score	**Total Earned**	_____
C. Potential Solutions		
The outline process is the primary piece of this section and should indicate a step-by-step description of potential solutions.		
Does the solution take into account all the relevant data that they selected?	20	_____
Is there a systematic process delineated in the solution?	30	_____
Does the applicant indicate that additional information is needed in order to develop a viable solution?	20	_____
Comments:		
Total Possible = 70 points or 35% of total score	**Total Earned**	_____

D. Additional Information

This section is open ended but the following questions should be considered when examining the candidate's response.

Does the candidate discuss valid sources or information that may help solve this problem?

Does the candidate indicate how to obtain the additional information and whether or not it will be difficult to obtain?

Does the candidate indicate how the additional sources or information will help in solving the problem?

Does the candidate mention involving specific people, agencies, and businesses in the solution process?

Comments:

Total Possible = 40 points or 20% of total score   **Total Earned**

Total Score = _____ out of 200
Percentage Score = _____
By: (initial here) _____