Operations Analysis Report
Fire and Emergency Medical Services
Hermosa Beach, California
October 2013

Final Report

FIRE/EMS OPERATIONS

CENTER FOR PUBLIC SAFETY MANAGEMENT

Submitted by and reply to:
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ICMA

Leaders at the Core of Better Communities

General Information

About ICMA

The International City/County Management Association (ICMA) is a 100-year-old nonprofit professional association of local government administrators and managers, with approximately 9,000 members located in 28 countries.

Since its inception in 1914, ICMA has been dedicated to assisting local governments in providing services to their citizens in an efficient and effective manner. Our work spans all of the activities of local government: parks, libraries, recreation, public works, economic development, code enforcement, brownfields, public safety, and a host of other critical areas.

ICMA advances the knowledge of local government best practices across a wide range of platforms, including publications, research, training, and technical assistance. Our work includes both domestic and international activities in partnership with local, state, and federal governments, as well as private foundations. For example, we are involved in a major library research project funded by the Bill & Melinda Gates Foundation and are providing community policing training in El Salvador, Mexico, and Panama with funding from the United States Agency for International Development. We have personnel in Afghanistan helping to build wastewater treatment plants and have teams working with the United States Southern Command (SOUTHCOM) in Central America on conducting assessments and developing training programs for disaster preparedness.

ICMA Center for Public Safety Management

The ICMA Center for Public Safety Management (ICMA/CPSM), one of four centers within ICMA's U.S. Programs Division, provides support to local governments in the areas of police, fire, emergency medical services (EMS), emergency management, and homeland security. In addition to providing technical assistance in these areas, we also represent local governments at the federal level and are involved in numerous projects with the U.S. Department of Justice and the U.S. Department of Homeland Security.

ICMA/CPSM is also involved in police and fire chief selection, assisting local governments in identifying these critical managers through original research, the identification of core competencies of police and fire managers, and assessment center resources.

Our local government technical assistance includes workload and deployment analysis, using operations research techniques and credentialed experts to identify workload and staffing needs and best practices. We have conducted approximately 140 such studies in 90 communities ranging in size from 8,000 population (Boone, Iowa) to 800,000 population (Indianapolis, Indiana).

Thomas Wieczorek is the Director of the Center for Public Safety Management. Leonard Matarese is the Director of Research & Project Development.

Methodology

The ICMA Center for Public Safety Management team follows a standardized approach to conducting analyses of fire, police, and other departments involved in providing services to the public. We have developed this approach by combining the experience sets of dozens of subject matter experts in the areas of police, fire, and EMS. Our collective team has several hundred years of experience leading and managing public safety agencies, and conducting research in these areas for cities in and beyond the United States.

The reports generated by the operations and data analysis team are based upon key performance indicators that have been identified in standards and safety regulations and by special interest groups such as the International Association of Fire Chiefs (IAFC), the International Association of Fire Fighters (IAFF), and the Association of Public-Safety Communication Officials International, and through ICMA's Center for Performance Measurement. These performance measures have been developed following decades of research and are applicable in all communities. For this reason, the data yield similar reporting formats, but each community's data are analyzed on an individual basis by the ICMA specialists and represent the unique information for that community.

The ICMA team begins most projects by extracting calls for service and raw data from a public safety agency's computer-aided dispatch system. The data are sorted and analyzed for comparison with nationally developed performance indicators. These performance indicators (e.g., response times, workload by time, multiple-unit dispatching) are valuable measures of agency performance regardless of departmental size. The findings are shown in tables and graphs organized in a logical format. Despite the size and complexity of the documents, a consistent approach to structuring the findings allows for simple, clean reporting. The categories for the performance indicators and the overall structure of the data and documents follow a standard format, but the data and recommendations are unique to the organization under scrutiny.

The team conducts an operational review in conjunction with the data analysis. The performance indicators serve as the basis for the operational review. The review process follows a standardized approach comparable to that of national accreditation agencies. Before the arrival of an on-site team, agencies are asked to provide the team with key operational documents (policies and procedures, asset lists, etc.). The team visits each city to interview fire agency management and supervisory personnel, rank-and-file officers, and local government staff.

The information collected during the site visits and through data analysis results in a set of observations and recommendations that highlight the strengths, weaknesses, and opportunities of—and threats to—the organizations and operations under review. To generate recommendations, the team reviews operational documents; interviews key stakeholders; observes physical facilities; and reviews relevant literature, statutes and regulations, industry standards, and other information and/or materials specifically included in a project's scope of work.

The standardized approach ensures that the ICMA Center for Public Safety Management measures and observes all of the critical components of an agency, which in turn provides substance to benchmark against localities with similar profiles. Although agencies may vary in size, priorities, and challenges, there are basic commonalities that enable comparison. The approach also enables the team to identify best practices and innovative approaches.

In general, the standardized approach includes: ICMA will ask questions and request documentation upon project start-up; confirm accuracy of information received; deploy operations and data analysis teams to research each unique environment; perform data modeling; share preliminary findings with the jurisdiction; assess inconsistencies reported by client jurisdictions; follow up on areas of concern; and communicate our results in a formal written report.

ICMA/CPSM Project Contributors

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Executive Summary

ICMA was retained by the city of Hermosa Beach, California, to complete an operational analysis of the city's fire department to include staffing and workload. The analysis is intended to provide the town with an unbiased review of fire services provided by the Hermosa Beach Fire Department (hereinafter, HBFD). This report is the result of this analysis and is accompanied by recommendations for ways to improve efficiencies and effectiveness in the delivery of services. The report also provides some benchmarking of the town's existing service delivery performance.

To begin the review, the ICMA project staff asked the city for a variety of documents, data, and information. The staff used this information to learn about the fire department's structure, assets, and operations. The data also was used in conjunction with performance data collected by ICMA to assess the existing performance of the fire department.

The ICMA project management staff conducted a site visit for the purpose of observing fire department and agency-connected supportive operations, interviewing key city and fire department staff, and reviewing preliminary data and operations. Follow-up telephone calls with city staff allowed ICMA staff to affirm the project information and elicit further discussion regarding this operational analysis.

In reviewing information and discussing operations with department members, the ICMA team always seeks first to understand the operations, then to identify ways the department can improve efficiency, effectiveness, and safety for both its members as well as the community it serves. ICMA found that the city of Hermosa Beach is not unique, in that it seeks to create a more efficient fire department within existing financial resources.

ICMA found the HBFD to be a capable department in the delivery of first response emergency medical (EMS) and fire services, but there is always room for improvement. Critical areas the ICMA team has identified that need improvement and that resulted in our recommendations are: the department has not, however plans to complete a comprehensive community risk analysis, which will significantly assist with the objective planning for staffing and deployment of resources; there is a need to work with the regional communications center to fully implement emergency medical dispatch for the HBFD and further screen fire calls for service so that only the most appropriate unit (s)are dispatched to EMS calls for service-this review should also include the current deployment of the basic life support ambulance; the need to review how senior and captain level staff spend their time during the work day to insure all critical elements of the organization are given the proper attention such as training and staff development-included in this is the need to fund the administrative division chief position on a full time basis; the need to continue to implement a comprehensive performance measurement system; the need to continue to address relocating the current fire station; the need to undertake a comprehensive effort to study the options available for a fire department consolidation. These needs are addressed further in the report and recommendations.

Twenty-six recommendations are listed below and in the report. The recommendations are based on best practices derived from the National Fire Protection Association (NFPA), the Center for Public Safety Excellence (CPSE), ICMA, the U.S. Fire Administration, the International Association of Emergency Managers (IAEM), and the Federal Emergency Management Agency (FEMA), to name a few, as well as the knowledge of ICMA reviewers. All recommendations are listed in the order they appear in the report.

Recommendations

1. Merge the HBFD Organizational Chart, to include the proposed division chief position with the proposed functional organizational matrix.

2. Examine the option of operating the basic life support (BLS) ambulance in a capacity that it is more independent and can be dispatched to minor EMS calls and patient assists without the accompaniment of other HBFD units.

3. Consider the operation of the BLS Ambulance on the busiest days of the week (Friday, Saturday and Sunday) and only during peak hours of operations (11:00 a.m. to 10:00 p.m.) ICMA further recommends that should the EMS demand increase to include duplicate calls, the HBFD should consider, as funding permits and as a maximum service level increase, transitioning from peak load staffing to full-time staffing of the BLS ambulance (addition of six full time employees).

4. Closely evaluate overtime expenditures for fire personnel and consider changes to the Firefighters Association memorandum of understanding with regard to its overtime/time-worked provision.

5. Use the funds currently spent on overtime to pay captain for collateral duties to fund a division chief position that would be responsible for training and operations program areas.

6. Consider as a minimum service level increase, a civilian fire marshal position to implement new and maintain more effectively and efficiently the department's community wide risk reduction efforts.

7. Adopt a time allocation model; implement and monitor time allocation to ensure effective use of fire officer and staff time as it relates to achieving the organizational mission.

8. Follow current strategic plan and develop and implement a succession planning process that identifies and develops future leaders.

9. Follow current strategic plan and develop and implement a career path training and development program for career advancement that focuses on personal and professional development for promotion.

10. Continue implementing current strategic planning process goal statements to ensure the management and delivery of a comprehensive training program is a priority and includes both cognitive learning and hands-on practical training, as well as annual assessments of all personnel in both EMS and fire suppression skills.

11. Continue with the development and implementation of a performance measure reporting system that expands the type of measurement it employs, including a program logic model. This system should incorporate the HBFD vision statement "*Achieving national standards and industry best practices as they relate to meeting established performance measures and positive outcomes.*"
12. Continue with the development and implementation of performance measures for each department activity as indicated above; link these measures to the strategic and comprehensive planning documents and fiscal/budget documents.
13. Expand the use of MDCs to store and retrieve critical information regarding building occupancy files, pre-plan information, and contact information. Evaluate options for fully automating the pre-planning process so that critical occupancy information is retrievable from the mobile data computers (MDCs) and certain hazardous components are identified by the system in order to give responding personnel critical information regarding an occupancy's status or specific hazard.
14. Continue to develop and enhance, as funding allows, annual medical screenings, respiratory protection plan/program, and an ongoing fitness assessment process for operational personnel; consider a partnering effort with neighboring jurisdictions in providing medical screening and fitness assessments to personnel.
15. Work with the community development and public works departments to ensure that the second-floor addition remains sound, is to code, and is safe for occupancy.
16. Continue to seek an appropriate parcel (size and location) for the construction of a new fire station.
17. Adjust the vehicle replacement program to reflect current industry cost standards for each fire department vehicle. Further, apparatus replacement should be adjusted and based on industry best practices such as age, performance, maintenance costs, safety features, and reliability.
18. Continue to develop performance measures for critical tasks that can be implemented on low and moderate risks, regularly train on these measures for continuous improvement, and evaluate each member in the department annually against established benchmarks for the purpose of continuous process improvement.
19. Continue to evaluate options for deploying fewer vehicles on the initial response to emergency incidents; conduct a comprehensive review of all current medical priority dispatch system call typing in the regional communications center and a comprehensive review of fire-related responses and run-card assignments.
20. Continue with the comprehensive review of current fire reporting to ensure that the proper information is being entered, with particular focus on estimated fire loss, and implement a quality assurance program for incident reporting that links to continuous training and improvement.

21. Continue to discuss the dispatch handling times with the regional communications center (RCC) management and pursue efforts to improve these times, particularly on fire calls.
22. Continue developing and monitoring performance measures specific to fire services that are benchmarked against demand and response time and that measure elements such as percent of fires contained to room of origin (in place now), percent of fires contained to building of origin, and target goals for call processing, turnout, access, set-up, travel, and total response times. The results of these performance measures should be reported with explanation in an annual report.
23. Continue use of the South Bay Regional Public Communication Authority for fire and EMS dispatching. The services received, the quality of operation, and technical support balances the annual fee.
24. Continue discussions with RCC regarding expanding the use of emergency medical dispatch (EMD) through the South Bay Regional Public Communication Authority in order to further define the severity of EMS call and adjust response assignment to incidents with a focus on efficiency and effectiveness of service delivery.
25. Request changes in operations with the South Bay Regional Public Communication Authority with regard to the quality assurance process for call screening and pre-arrival instructions. Emphasis should focus on ensuring that these functions are being carried out in accordance with the recommended guidelines.
26. Preserve the options available for fire department consolidation.

Operational Analysis

Governance and Administration

City of Hermosa Beach

Located on the southern end of the Santa Monica Bay region and 17miles Southwest of Los Angeles in Los Angeles County, Hermosa Beach is comprised of 1.43 square miles of land area and is approximately 40 blocks long, with the Pacific Coast Highway running through the middle of the City. The 2011 population was 19,773.

The main area of attraction in Hermosa Beach is the Hermosa Pier, which offers shopping, entertainment, and year round fishing.[1] The top employers include a fitness club, the city of Hermosa Beach, a grocer, and a realty.[1] Hermosa Beach is known for its picturesque beaches, which offer numerous recreational outlets and its ideal climate.

Hermosa Beach has a council/manager form of government. This form of government combines the political leadership of elected officials in a city council with the managerial experience of an appointed city administrator.[2] Pursuant to Title 9, California Government Code, the city council is comprised of a mayor and four councilmembers who are elected at large to serve four-year terms.

Section 2.12.070 of the code provides that the city manager is the chief administrative officer of the city and is appointed by the council to administer all affairs of the city except those identified in the code.[3]

Hermosa Beach is typical of many cities and towns across the United States in that it has its own police and fire departments; public works, community development, and community agencies; and full finance and human resources internal functions. Figure 1 illustrates the organizational chart for the city of Hermosa Beach, California.

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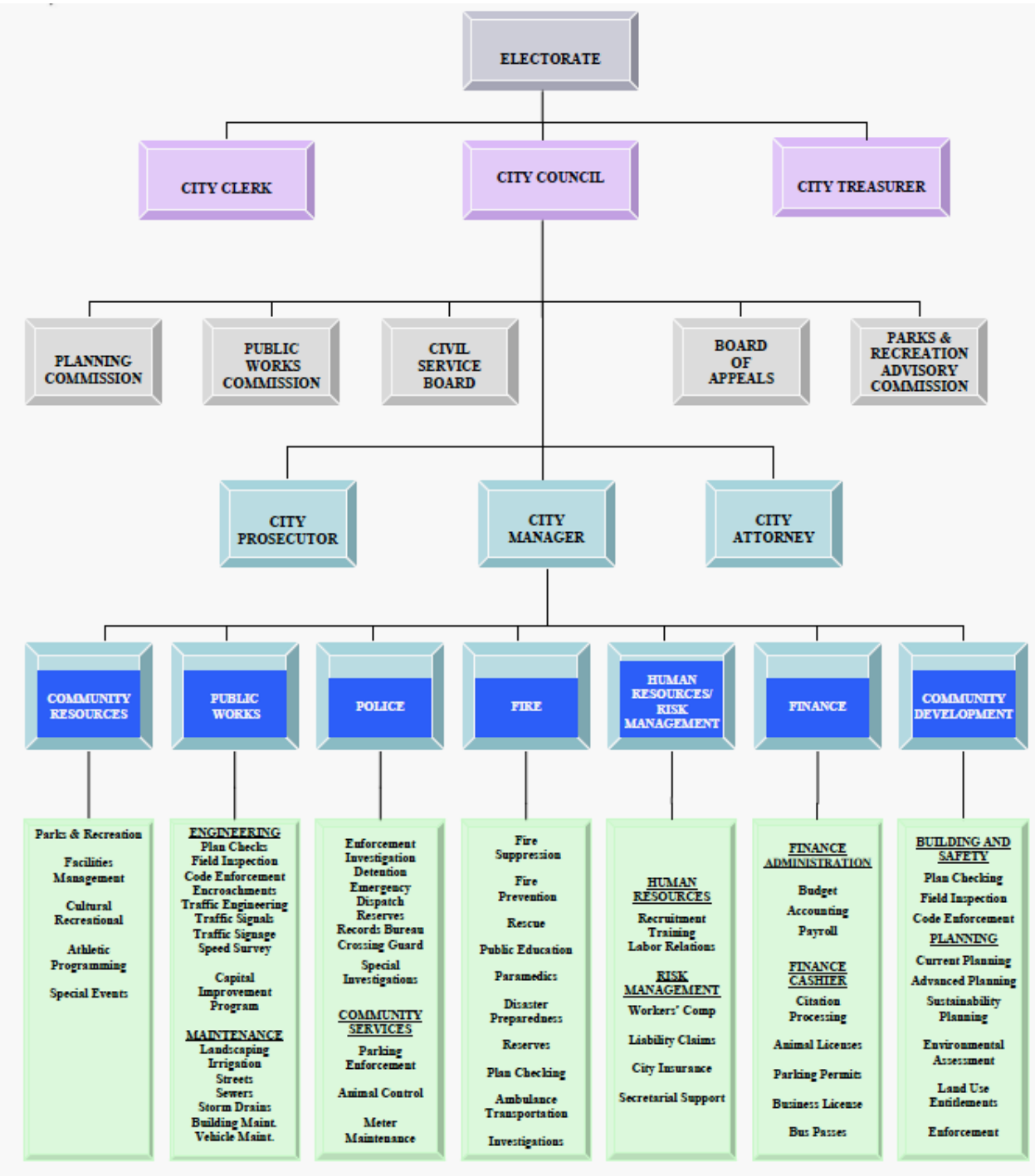
[1] Annual Report Statistical Section, http://www.hermosabch.org/Modules/ShowDocument.aspx?documentID=1011.

[2] Official Code of Hermosa Beach, California.

Figure 1: City of Hermosa Beach Organizational Chart



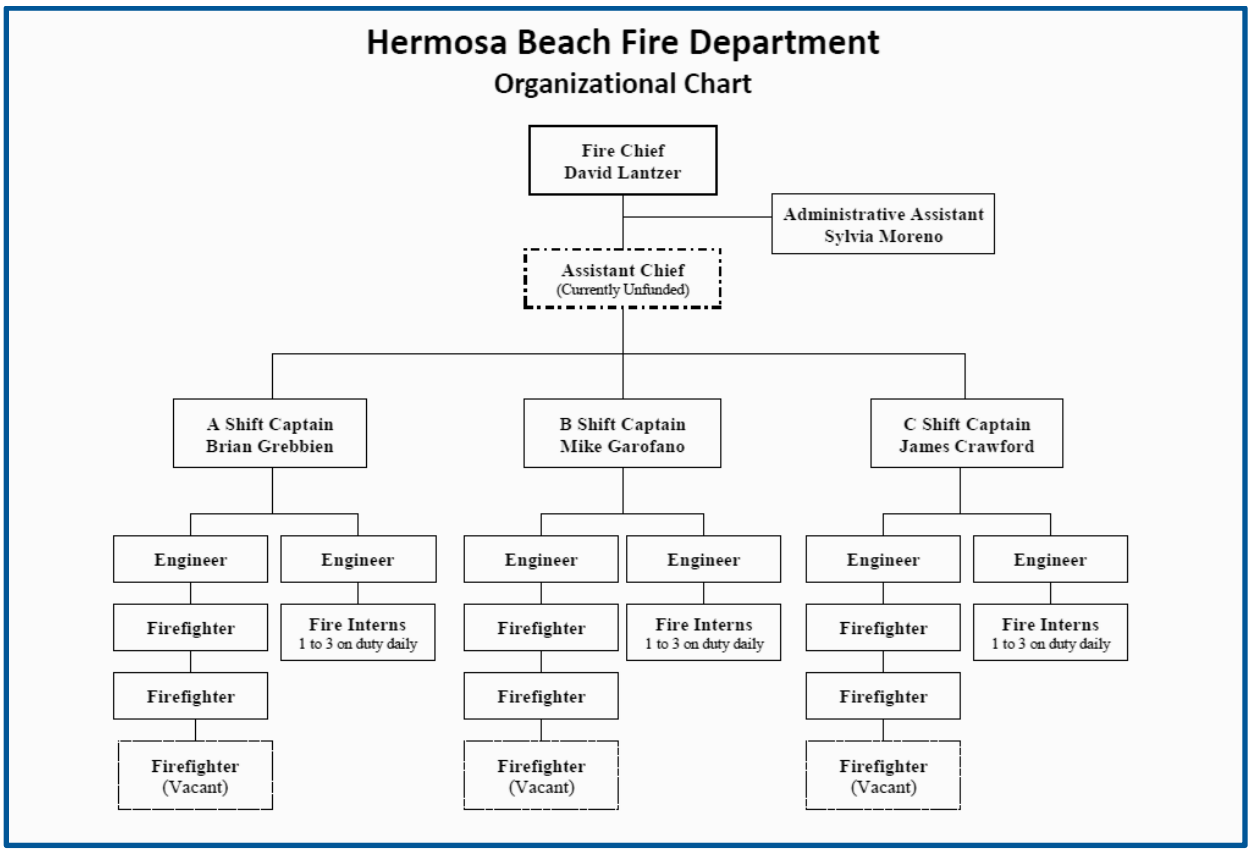
Hermosa Beach Fire Department

The Hermosa Beach Fire Department is a career fire and emergency medical services (EMS) department. The HBFD responds to calls for service from one fire station, which is south-centrally located on Pier Avenue near Ardmore Avenue. There are 17 positions currently approved and staffed in the fire department budget. These include 15 suppression shift personnel, a fire chief, and a civilian administrative assistant. The organization chart also includes one assistant fire chief, but this position is currently unfunded. The suppression shift personnel operate on a 48/96 hour rotational schedule with three platoons.[4]

In addition to full-time firefighters, the city of Hermosa Beach also has an ambulance fire intern (AO/FI) program with part-time interns. The program is a mutually beneficial relationship: the community benefits from having a certified responder that can provide EMS to residents and visitors at a reduced cost, while the AO/FI garners the on-the-job experience, education, and training to prepare for a full-time career in the fire service. The program has some limitations, however, which are discussed later in this report.

The department provides traditional services, including fire suppression, EMS and emergency rescue; enforcement of regulations essential to the fire protection and safety of life and property; fire prevention and investigation; community support functions; and other duties prescribed by the council. Figure 2 illustrates the HBFD organization chart.

Figure 2: Hermosa Beach Fire Department Organization Chart

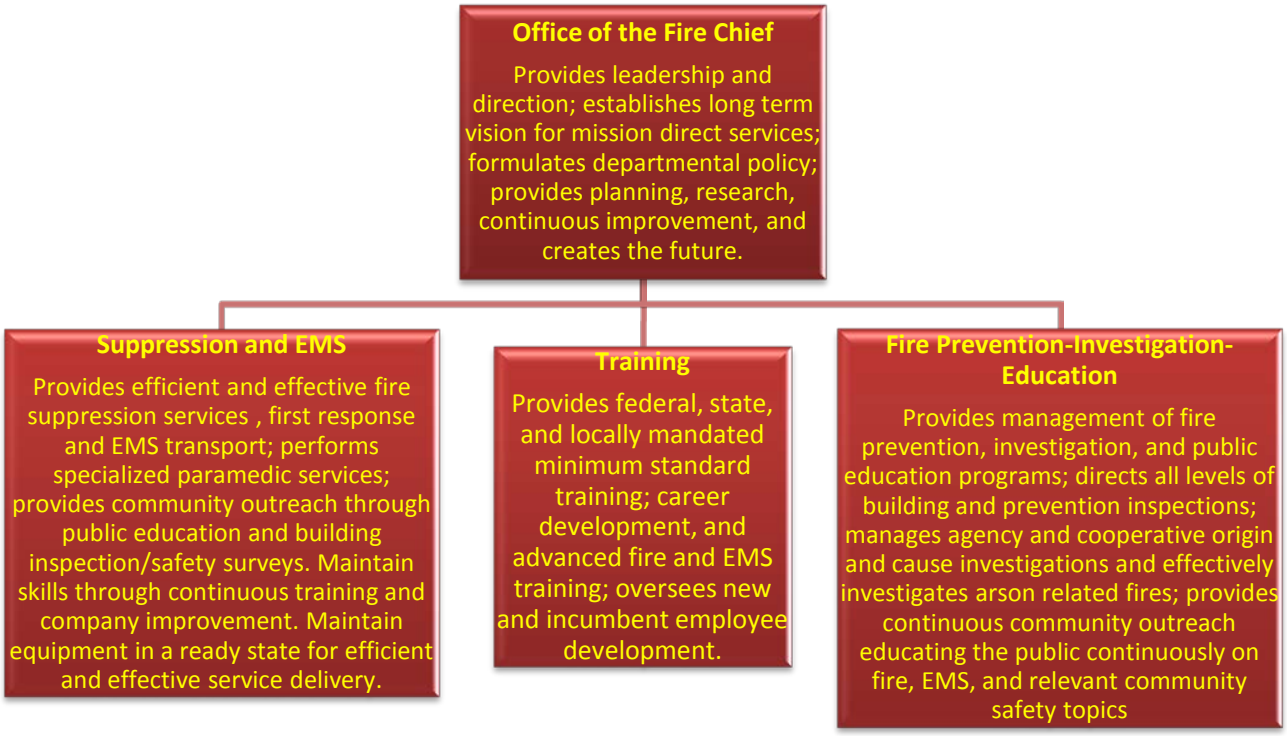


A functional table of the organization illustrates to the community a clear picture of what and where key services of the organization are located within an organization. The HBFD has implemented a functional organization matrix table that clearly defines a collateral duty for which each member of the organization is responsible. In this organizational matrix, each task or functional area becomes a focal point. Specialization is centralized and employees that are doing these specialized jobs or tasks are identified. This functional matrix enables the HBFD to better visualize the division of responsibilities and offers a high level of transparency to both internal and external stakeholders. The functional matrix is supported by in-depth definitions of each collateral duty, clearly laying out the responsibility and accountability level of each.

The functional table also provides to the agency a clear picture of the leadership functions at each organizational level and illustrates the work that must be performed at these organizational levels. Integrating the functional table with the traditional organizational model helps leaders move from a specific focus of an individual to an organizational perspective that breaks down organizational silos and creates leadership teams within each organizational component. This promotes lateral team building between organizational divisions.

Figure 3 is a functional chart of the organization that further defines organizational components and leadership responsibilities. Both citizens and organizational members can see the impacts each organizational component has not only on the department, but also the community. Figure 3 illustrates a defined functional organizational chart.

Figure 3: Proposed Functional Organization Chart



Staffing and Deployment

During the period covered by this study (May 1st, 2012 to April 30th, 2013), the HBFD operated three frontline response apparatus: one engine, one advanced life support (ALS) ambulance, and one basic life support (BLS) ambulance. In addition, the fire department operated one reserve engine/quint and one reserve utility vehicle. The department operational minimum daily staffing is five personnel, all of whom are certified as paramedics. The engine is staffed with three personnel (one captain, one engineer and one fire fighter). The ALS ambulance is staffed with two personnel (two firefighter/paramedics), and the BLS ambulance is staffed with two ambulance operators/fire interns (AO/FI).

As discussed earlier, the HBFD is currently comprised of sixteen sworn fire personnel and one civilian administrative assistant. In addition, the department employs up to twenty-six ambulance operator/fire intern (AO/FI) staff, who are part-time, temporary emergency medical technicians. All three HBFD units respond on most responses. For many incidents HBFD units operate as a joint response/mutual aid contingent, primarily with the Redondo Beach or Manhattan Beach Fire Department. The BLS ambulance *never* responds without being accompanied by another HBFD unit. but if a full-time HBFD employee determines a patient to have a non-life-threatening condition, the BLS ambulance provides patient transport to the appropriate medical facility (usually in Torrance) independently of other HBFD units.

Our evaluation indicates that the AO/FI program operates as a training ground for new employees who seek employment elsewhere once they obtain enough field experience. Subsequently, the turnover rate among the AO/FI personnel is extremely high, with very few employees staying longer than six months. The high turnover rate makes supervising, scheduling, and training these personnel a time-consuming process, which is compounded by the limited administrative staff within the fire department. HBFD has initiated discussions with the Manhattan Beach Fire Department regarding a pool of hourly employees to expand capacity of this program. These discussions remain ongoing.

HBFD provides both ALS and BLS transports. In the 12-month period evaluated in 2012-13, a total of 911 transports were carried out by HBFD units. EMS in Hermosa Beach is regulated by the Emergency Medical Services Agency of Los Angeles County (LA County EMS). This agency provides licensing guidelines, treatment protocols, medical supervision, and a pharmacy for drug replacements. LA County EMS also stipulates pricing for transport activities. Currently HBFD is authorized to charge $1,412.25 for an ALS transport and $1,010.25 for a BLS transport. The city utilizes a third-party billing service for EMS transports (Wittman Enterprises) that is paid on a percentage basis (6.1 percent) for collections. In the 12-month period between March 2012 and February 2013, HBFD billed approximately one million dollars for its transports activities and had total receipts of just over $550,000. This is an estimated collection rate of approximately 56 percent.

The current utilization of the BLS ambulance is a viable concept, but we believe greater efficiency can be achieved if its work schedule and utilization are altered. The AO/FI staff has limited role that should be expanded. Currently the AO/FIs are scheduled for a 24-hour period for which they are paid a $100 stipend. In FY 2012-13, the city of Hermosa Beach budgeted $127,500 for AO/FI

stipends. Because AO/FIs are considered part-time, they are not eligible for pensions, health care, sick and vacation time, and other benefits.

ICMA believes that the AO/FI concept is viable on a part-time basis but should be restructured and expanded to further complement services provided by HBFD. As discussed in the workload analysis later in this report, call activity in the non-peak hours (typically 10:00 p.m. to 9:00 a.m.) is low, and rarely do simultaneously incidents occur during these hours. ICMA believes that HBFD should consider reallocating the current AO/FI funding ($127,500) to implement a peak-period BLS ambulance that would be staffed with better-trained part-time staff who are paid a commensurate rate of pay. This would help improve the longevity and productivity of these workers. In addition, the BLS ambulance should be equipped with an automatic external defibrillator (AED), and personnel should be allowed to manage basic EMS and public-assist calls without support from other HBFD units. Further, should the EMS demand increase to include duplicate calls, the HBFD should consider, as funding permits, transitioning from peak load staffing to full-time staffing of the BLS ambulance.

The fire chief oversees the daily operations of the agency and reports directly to the city manager. The fire chief is assisted by an administrative assistant (a 40-hour-per-week clerical position) and three fire captains. The fire captains are assigned to a 56-hour shift assignment (48/96) and fulfill key departmental functions in addition to their emergency response and supervisory duties. One captain serves as the fire marshal and is responsible for plan review and code enforcement. Another captain oversees the fire department's facilities/safety/communications programs, and the third oversees equipment purchasing. Because the city frequently holds special events and activities (such as beach festivals, volleyball tournaments, or film productions), a fire engineer works as the fire department's special events coordinator in permitting and oversight of special events.

These collateral duties and activities are time consuming and entail significant responsibility. Many of the related tasks are done in the employee's time off, and the employee is compensated by either overtime pay or compensatory time, in compliance with the terms of the city's labor memorandum of understanding (MOU). Prevention, training, EMS, and special events account for up to 15 to 20 hours for each program, each week. The department has attempted to address the workload by using outside contract services. For instance, a private contractor, Hayer Consultants, assists in the review of building plans and construction permits. In addition, the city employs a nurse educator to deliver in-service EMS training. Changing the current approach offers potential for considerable cost savings: the city's expenditures for these support functions and the overtime and compensatory time costs that result from them are staggering for a city and department of this size. The employees responsible for these functions receive several thousand dollars annually in additional pay beyond their salaries. The overtime costs for the fire department exceeded $500,000 in 2012. On a per capita basis, this amounted to an average of $35,778 in overtime pay per employee. According to the HBFD fire chief, this is a decrease from overtime expenditures that occurred 2007-2008 of $707,735.

Article 28, Section D, of the MOU between the city and the firefighters association (July 1, 2012-June 30, 2015) specifies that "paid leaves of absences for vacation, sick, comp. time, and holiday compensatory time shall be counted as hours worked." The Fair Labor Standards Act (FLSA)

provides oversight and guidance to employers regarding the payment of overtime and stipulations regarding these criteria. FLSA does not require payment for time not worked, such as vacations, sick leave, or holidays (federal or otherwise). These benefits are matters of agreement between an employer and an employee (or the employee's representative). ICMA believes that the city should re-evaluate its definition of and determination for "time worked" to align them closer to with FLSA guidelines. We believe this would result in a significant reduction in overtime costs.

ICMA was asked to evaluate a proposal in the FY 2013-14 fire department budget that provides funding for an administrative division chief position to oversee training and operations. In light of the administrative functions currently assigned to 56-hour captains and the fire chief, and the amount of overtime pay spent to support these activities, we believe that the administrative division chief position should use overtime funds in lieu of funding the current unfunded assistant chief position.

We believe there is a significant workload available for an administrative division chief. In addition to providing better continuity for the oversight of some critical programs currently overseen by fire captains, the administrative division chief would provide both administrative and command support for the fire chief during absences. We also believe that the assignment of duties for this new position has the potential to offset overtime costs currently resulting from paying line officers for these services. HBFD should look strategically at the assignment of duties for the proposed administrative division chief with a keen eye toward reducing overtime costs associated with the programs identified above.

The city also asked ICMA to further review alternatives for staffing and deployment of resources. Current capacity is addressed in this study through the ICMA workload analysis presented in Appendix A and further discussed in the body of this report. Information for this analysis was first validated utilizing the data recorded in HBFD fire incident reporting (NFIRS) using computer-aided dispatch (CAD) data, which was provided by the regional communications center. In cases where the timestamps were not recorded in NFIRS and were recorded in CAD, we used the CAD data. In all other cases we used the NFIRS data.

The HBFD fire chief also provided ICMA information presented to the Hermosa Beach city council (November 2012) regarding the HBFD response capacity. This presentation included data compiled by the fire chief regarding HBFD incidents and trends, Hermosa Beach population trends, mutual aid with surrounding jurisdictions and the importance of time in emergency response.

The HBFD fire chief utilized as an evaluation of unit capacity, a model as prescribed by the Center for Public Safety Excellence fire accreditation program that benchmarks response time as a measure of capacity as it relates to the availability of units. ICMA while utilizing response time as a benchmark also analyzes workload of individual units as a bench mark of capacity. Ultimately ICMA is asked here by the city to discuss an operational maximum service level increase and a pro-active risk reduction minimal service level increase in order to meet city council's adopted mission intent of first class service as it relates to fire and EMS services.

<u>Minimally</u> the HBFD can increase service level in a pro-active manner through community wide risk reduction efforts. As discussed above each employee in the department is assigned a collateral duty

that at times takes them away from their respective operational shift assignment. In addition to this some department members, due to their assigned collateral duties, must return to work on their day (s) off to perform critical tasks associated with their assignment. One of these areas is fire prevention and education and associated program activities such as managing certain aspects of special event planning and permitting. One full time position that may be considered in this area is a city fire marshal, which is recommended to be a civilian position assigned to the fire department. Program task areas this position would be responsible for include:

- California Fire Code maintenance, revision, and enforcement.
- Manage engine company fire inspection program
- Manage community risk reduction programs:
    - Public Access Defibrillation
    - Fire Prevention Week
    - Public Education
    - Injury/Fall Prevention
- Track inspection and permit billing to ensure all applicable are invoiced and paid.
- Manage fire permit pre-incident planning.
- Manage/enforce occupant load enforcement issues, with an emphasis on entertainment/nightlife occupancies.
- Manage/perform special event plan review, inspection, and permitting.
- Manage community risk and vulnerability analysis in accordance with the HBFD strategic plan.

A maximal increase in service delivery alternatives includes the increase in the delivery of EMS services, which makes additional personnel available also to assist with fire services critical tasking as discussed further in this report. As noted in the ICMA workload analysis included in this report, and the fire chief's November 2012 city council statistical analysis presentation, EMS responses represent the greatest number of overall calls for service in Hermosa Beach.

As discussed above the HBFD has in place a BLS ambulance staffed by part-time employees. ICMA provides an incremental approach in this discussion regarding the staffing of the BLS ambulance, which includes peak load staffing at certain times of the day and on certain days of the week. Additionally ICMA recommends as a policy consideration, that if demand increases, this potentially may increase the capacity of current HBFD units as indicated by the fire chief in his November 2012 city council presentation. Six full time positions would be needed (two per operational shift) to reach this maximum operational service level increase. These personnel would be assigned to the BLS ambulance with a primary operational assignment of responding to EMS calls and transporting BLS patients to local hospital emergency departments as indicated through protocol. Additionally these positions add capacity to fire ground operations (when this unit, or when both ambulances are available) to perform fireground critical tasks as discussed later in this report.

Recommendations:

- Merge the HBFD Organizational Chart, to include the proposed division chief position with the proposed functional organizational matrix.
- Examine the option of operating the BLS ambulance in a capacity that it is more independent and can be dispatched to minor EMS calls and patient assists without the accompaniment of other HBFD units.

- Consider the operation of the BLS Ambulance on the busiest days of the week (Friday, Saturday and Sunday) and only during peak hours of operations (11:00 a.m. to 10:00 p.m.) ICMA further recommends that should the EMS demand increase to include duplicate calls, the HBFD should consider, as funding permits and as a maximum service level increase, transitioning from peak load staffing to full-time staffing of the BLS ambulance (addition of six full time employees).
- Closely evaluate overtime expenditures for fire personnel and consider changes to the Firefighters Association MOU with regard to its overtime/time-worked provision.
- Use the funds currently spent on overtime to pay captain for collateral duties to fund a division chief position that would be responsible for training and operations program areas.
- Consider as a minimum service level increase, a civilian fire marshal position to implement new and maintain more effectively and efficiently the department's community wide risk reduction efforts.

Organizational Processes

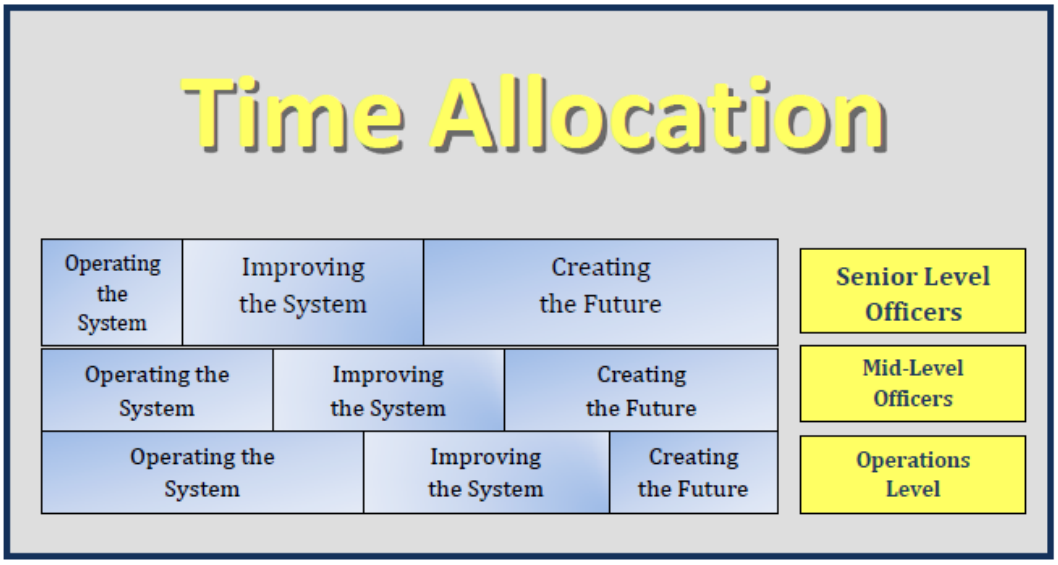
Time Allocation

To effectively operate in an organization, an employee must understand his or her role and, as important, where he/she should allocate his/her time to be most effective. Understanding this concept is essential in an organization such as the HBFD, which has a compact organizational chart. Managers and firefighters have a responsibility to understand their organizational roles and responsibilities and to perform the tasks related to these roles and responsibilities. One would not expect senior-level officers to spend as much time operating the system as a frontline service provider does. Conversely, one would not expect a first-line or mid-level officer to spend as much time as a senior-level officer planning for the future of the organization. In this way, each level of the organization has a different set of priorities, and the employees at each level should allocate their time accordingly. In the HBFD, however, this is not possible because mid-level officers (captains) spend a majority of their workday tending to administrative duties tied to collateral duty assignments.

Figure 4 illustrates the components of efficient time allocation in the public sector. As shown in this illustration, three segments of organizational time allocation are central to achieving the goals and objectives of any organization and, more important, to enabling the organization to fulfill its mission and realize its vision: (1) operating the system; (2) improving the system; and (3) creating the future.

Operating the system is the time during the workday that an organizational member is implementing service deliverables, touching those components of the organization that make it go. *Improving the system* is the time an organizational member spends seeking ways to make service deliverables and organizational components more efficient or, simply, better. *Creating the future* is a critical piece of time allocation when an organizational member develops goals and objectives that link to strategic planning and considers the vision of the organization in a way that focuses on successful, effective outcomes.

Figure 4: Time Allocation Model



Time allocation is discussed in this report in large part because the HBFD currently has an unfunded vacancy at the assistant chief level. As illustrated in Figure 2, the assistant fire chief position is allocated responsibility for the day-to-day organizational program and operational functions. HBFD's vacancy in this position leaves the current organizational structure centralized to the fire chief's office. Ideally, even in a compact organization like the HBFD, it is critical that the appropriate time be spent at the appropriate level in the organization to continuously make improvements and create the future.

In the HBFD, captains are allocating much of their workday to administrative functions that are not tied to company- or shift-level responsibilities. In fact some of these administrative functions take the captain away from the station, leaving the duty crew supervised either by the fire chief, whose office is in the same building, or by a senior-level engineer or firefighter. Day-to-day activities (operating the system) and training in some cases are going unsupervised by the assigned officer, as he has to allocate more time to improving the system through the administrative tasks tied to collateral duties. To be an effective public organization, the proper time allocation of officers and subordinate personnel is essential to ensure the efficient delivery of services. ICMA suggests (as recommended above) the funding of an officer-level position between fire chief and captain to correct the time allocation imbalance of the staff at the captain level.

Recommendation:

- Adopt a time allocation model; implement and monitor time allocation to ensure effective use of fire officer and staff time as it relates to achieving the organizational mission.

Succession Planning

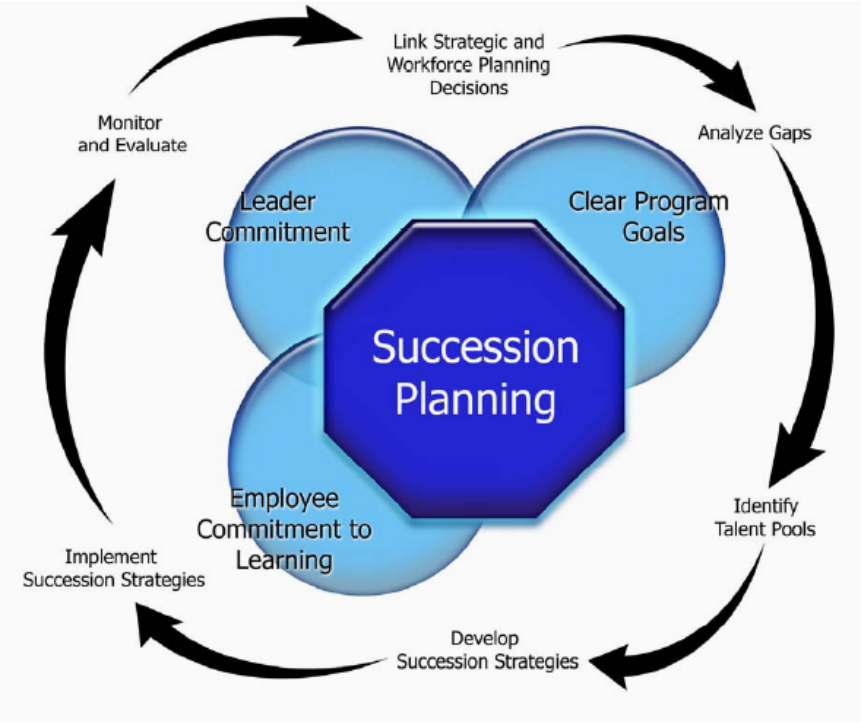
The analysis of the HBFD did not reveal a clear organizational succession plan. Additionally, there is no career-path training program that outlines expectations to help prepare staff for advancement at

various levels in the organization. For example, there is no certification or advanced training requirement for an engineer, an important position in the department. However, the extensive collateral duty program currently in place that extends to all employees does serve as an informal succession planning/career development program.

It is important for the HBFD to implement programs that will help to identify and prepare future leaders of the organization; that is, that will go beyond the technical courses for career advancement. Key to this strategy is the development and implementation of a formal succession plan. Succession planning is a systematic approach to developing potential successors to ensure organizational leadership stability. Successful succession planning identifies, develops, and nurtures potential future leaders. It is critical for the long-term success of any organization that such a process is in place. As such the HBFD has included succession planning in their organizational strategic planning process.

Critical to the success of succession planning is the engagement and commitment of the senior leaders to the program, as well as a commitment of other members of the organization to their own personal and professional development. To be a part of the succession plan, one must commit to one's own professional development process to be able to compete for and fill critical organizational leadership roles. Figure 5 illustrates one example of a succession plan.

Figure 5: Six-Step Succession Planning Model



From United States Office of Personnel Management, HCAAF Systems, 2005.

According to Kramer, "education and training in the fire service are complimented by an equally important third factor: experience. A healthy mix of all three is required for an effective fire officer,

but as he or she moves through a career, the mix and the proportion of each tend to vary, with education becoming more and more important over time."[3]

The HBFD does not have a career-path training program that identifies technical and organizational development courses and/or formal education programs that must be completed as one prepares to increase the level of responsibility or advance one's position in the organization. For the officer (captain) level, California state fire officer certification is required. Ideally, a candidate for any officer level in the department is experienced and has the foundational technical and formal education and training to be successful with each new level. A formal program that identifies the foundational technical and organizational courses germane to each level in the organization should be implemented. As such the HBFD has included this in their strategic planning process. ICMA realizes this may have to be discussed and agreed upon with the bargaining unit, but strongly supports the utility of this approach.

Recommendations:

- Follow current strategic plan and develop and implement a succession planning process that identifies and develops future leaders.
- Follow current strategic plan and develop and implement a career path training and development program for career advancement that focuses on personal and professional development for promotion.

Education and Training Programs

An operational shift captain serves as the training officer for the HBFD. The captain is responsible to the fire chief to ensure that training is conducted across all operational shifts. In addition to this responsibility and his primary duty as a shift officer, this captain is also assigned the collateral duties to serve as facilities manager, fleet manager, radio communications officer, hazard communications officer, public information officer, and coordinator of hydrant inspections. Other operational members are responsible for coordinating and administering specific types of training. For instance, an engineer has the responsibility to coordinate rapid intervention crew training, a firefighter coordinates paramedic continuing education, and a firefighter coordinates training for the ambulance operator/fire intern program.

Current requirements for probationary firefighters (new hires) are certifications for Firefighter I (in accordance with the California Fire Marshal Office) and paramedic (in accordance with the California Emergency Medical Services Authority and local requirements). At HBFD a new hire is a fire academy graduate and a licensed paramedic, and receives two weeks of HBFD orientation training and then is assigned to an operational shift. Continuing education requirements for paramedic level certification are delivered on a monthly basis to all operational personnel maintaining this certification by a part-time contracted employee.

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[3] Joseph R. Bachtler and Thomas F. Brennan, eds. *The Fire Chief's Handbook,* Fifth Edition. (Saddle Brook, NJ: Fire Engineering Books, 1995), 328.

The department considers training a priority, and strives to complete one to two hours of training a day. Shift captains expressed concern that training is not being completed properly due to the collateral duties, and often competing priorities of those responsible for this training. The training officer's collateral duties suggest that this position may be challenged to provide the critical overarching management of a comprehensive training program. This is evident in the training completed and recorded at Target Solutions, the online training and training records management system used by the HBFD. Although the training is important and often is mandated by the department and state agencies, the online delivery platform and the subject matter content fail to meet the fire risk potential and critical tasks that need to be completed by first- and second-arriving engine and ladder company crews on fire suppression calls for service in general or specific to Hermosa Beach risks.

Recommendation:

- Continue implementing current strategic planning process goal statements to ensure the management and delivery of a comprehensive training program is a priority and includes both cognitive learning and hands-on practical training, as well as annual assessments of all personnel in both EMS and fire suppression skills.

Assessment and Planning

Strategic Planning/Goals and Objectives

The development of a long-range fire protection and prevention comprehensive strategic plan involves three key steps. The first step is to generate an assumption of what the community will look like at the end of the planning process. Second, the department needs to assess realistically the strengths and weaknesses of the existing fire protection system to include codes, standards, and ordinances relating to fire prevention efforts, public safety education programs, and emergency response capability. The third and final step is to project the needed capabilities and capacity of the fire protection system and its fire department component as the community changes.[4] This process helps to ensure that an adequate level of resources, including staffing and equipment, is allocated to meet the community's needs for the services delivered by the fire department as efficiently as possible. A strategic plan also assists the department in matching resources with available revenues.

Defining clear goals and objectives for any organization through a formal strategic planning document establishes a resource that any member of the organization, as well as external stakeholders, can see the goals toward which the organization is heading and how the organization is planning to get there.

The HBFD has a five-year strategic plan for 2012 to 2016, a best practice. The organization has developed a strategic plan and identified specific goals and objectives and an action agenda to measure completion of these goals and objectives.

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[4] *Fire Protection Handbook,* Twentieth Edition, Volume II (National Fire Protection Association, 2008): 12-5.

As the HBFD has developed a strategic plan, ICMA recommends the following steps be completed during the next update of the startegic plan for a contiuned successful approach to this critical process:[5]

- **Develop a vision of the community**: Work with the community development department to develop a comprehensive vision of what Hermosa Beach will look like in the short term and several years out.
- **Monitor and update the plan:** Regularly reflect on the extent to which goals are being met and action plans are being implemented. Perhaps the most important feedback is positive feedback from customers, both internal and external to the organization.

Performance Measurement

Fire suppression, prevention programs, and EMS service delivery need to be planned and managed to achieve specific, agreed-upon results. This requires establishing intended results and developing a set of goals and activities to achieve these results. Determining how well an organization or program is doing requires that these goals be measurable and that they are measured against desired results. This is the purpose of performance measurement.

Simply defined, performance measurement is the ongoing monitoring and reporting of progress toward pre-established goals. It captures data about programs, activities, and processes and displays data in standardized ways that help communicate to service providers, customers, and other stakeholders how well the agency is performing in key areas. Performance measurement provides organizations with tools to assess performance and identify areas in need of improvement. In short, what gets measured gets done.

The need to continually assess performance requires adding new words and definitions to the fire service lexicon. Fire administrators need to be familiar with the different tools available and the consequences of their use. In *Managing the Public Sector*, business professor Grover Starling applies the principles of performance measurement to the public sector. He writes that the consequences to be considered for any given program include:

- **Administrative feasibility:** How difficult will it be to set up and operate the program?
- **Effectiveness:** Does the program produce the intended effect in the specified time? Does it reach the intended target group?
- **Efficiency:** How do the benefits compare with the costs?
- **Equity:** Are the benefits distributed equitably with respect to region, income, gender, ethnicity, age, and so forth?
- **Political feasibility:** Will the program attract and maintain key actors with a stake in the program area?[6]

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[5] McNamara, C. (1996-2007) *Basic Overview of Various Strategic Planning Models.* Adapted from the Field Guide to Nonprofit Strategic Planning and Facilitation. Minneapolis, MN: Authenticity Consulting, LLC.

Performance measurement systems vary significantly among different types of public agencies and programs. Some systems focus primarily on efficiency and productivity within work units, whereas others are designed to monitor outcomes produced by major public programs. Still others track the quality of services provided by an agency and the extent to which citizens are satisfied with these services.

Within the fire service, performance measures tend to focus on inputs (the amount of money and resources spent on a given program or activity) and short-term outputs (the number of fires in the community, for instance). One of the goals of any performance measurement system should be also to include efficiency and cost-effectiveness indicators, as well as explanatory information on how these measures should be interpreted. The types of performance measures are shown in Table 1.

The HBFD measures some aspects of performance through published department goals. For instance, it collects and reports typical fire department data on response times and nonemergency services, fire loss, training, and department communication. These are typical workload measures seen among fire service organizations today, but if they are to be used to justify program budgets and service delivery levels, they need to link department goals to specific target rates or percentages. To accomplish this linkage, other forms of performance measures, particularly service-quality and customer-satisfaction measures, should be incorporated into the system.

Table 1: The Five GASB Performance Indicators

Category	Definition
Input indicators	These are designed to report the amount of resources, either financial or other (especially personnel), that have been used for a specific service or program.
Output indicators	These report the number of units produced or the services provided by a service or program.
Outcome indicators	These are designed to report the results (including quality) of the service.
Efficiency (and cost-effectiveness) indicators	These are defined as indicators that measure the cost (whether in dollars or employee hours) per unit of output or outcome.
Explanatory information	This includes a variety of information about the environment and other factors that might affect an organization's performance.

From Harry P. Hatry et al., eds. *Service Efforts and Accomplishments Reporting: Its Time Has Come* (Norwalk, CT: GASB, 1990).

One of the most important elements of performance measurement within the fire service is to describe service delivery performance in a way so that both citizens and those providing the service have the same understanding. The customer will ask, "Did I get what I expected?" the service provider will ask, "Did I provide what was expected?"

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[6] Starling, *Managing the Public Sector,* 396.

Ensuring that the answer to both questions is "yes" requires alignment of these expectations and the use of understandable terms. The author of the "Leadership" chapter of the 2012 edition of ICMA's *Managing Fire and Emergency Services* "Green Book" explains how jargon can get in the way:

> Too often, fire service performance measures are created by internal customers and laden with jargon that external customers do not understand. For example, the traditional fire service has a difficult time getting the public to understand the implications of the "time temperature curve" or the value of particular levels of staffing in the suppression of fires. Fire and emergency service providers need to be able to describe performance in a way that is clear to customers, both internal and external. In the end, simpler descriptions are usually better.[7]

The HBFD *Vision Statement* includes language centered on "a*chieving national standards and industry best practices as they relate to meeting established performance measures and positive outcomes*."[8] As such the HBFD has included in its strategic planning process goals to include digitizing fire, EMS, and fire prevention reporting so that performance measurement data is easily accessible. Additionally the fire chief has advised ICMA he is evaluating dashboard performance measurement systems as a means of automating performance measurement.

Staff throughout the organization should and will according to the fire chief participate in developing performance measures. In addition to helping facilitate department wide buy-in, enlisting the participation of personnel at all levels provides a valuable opportunity for upper management to better understand what the line staff believes to be critical goals—and vice versa. For the same reason, the process of developing performance measures should include citizen input regarding service level preferences. Translating community input into performance measures will help to link the preferences of citizens and business community to the goals of the department and will help identify areas where community expectations are and are not being met.

Establishing a performance management system within the framework of an overall strategic plan will also help city management and elected officials gain a better understanding of what the HBFD is trying to achieve. Building any successful performance management system that measures more than outputs requires a consistent model. Figure 6 illustrates a successful program logic model[9] designed to build consistent performance measures and should be linked to the performance measure indicators shown in Table 1 to build a successful performance measurement system.

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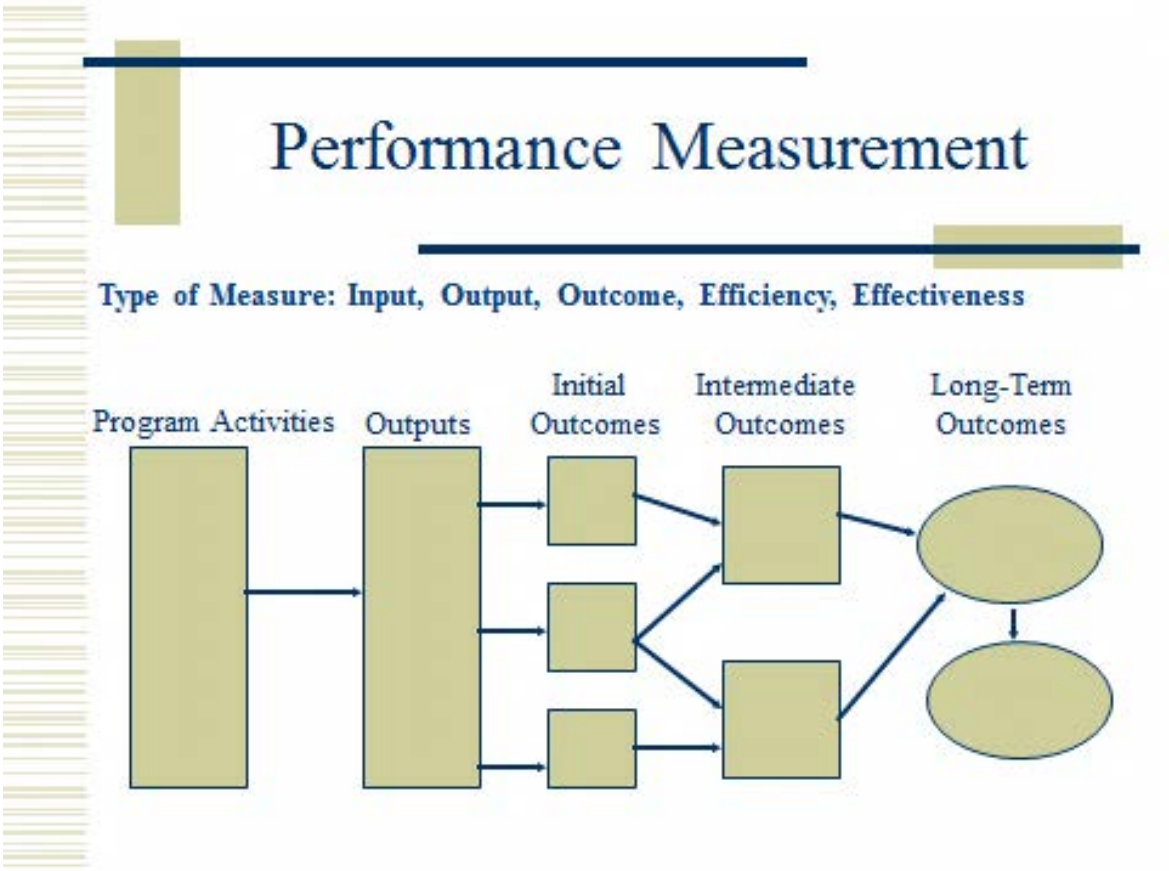
[7] I. David Daniels, "Leading and Managing," in *Managing Fire and Emergency Services* (Washington, DC: 2012), 202.

[8] Hermosa Beach Fire Department Strategic Plan, 2012-2016.

[9] A logic model shows the logic by which program activities are expected to lead to targeted outcomes.

Figure 6: Performance Measure Program Logic Model[10]



Program logic components are defined as follows:

- **Type of measure:** the type of indicator to be measured.
- **Program activities:** the provision of services provided by this program area.
- **Outputs:** the results of or how much is produced from the program activities.
- **Initial/intermediate outcomes:** substantive changes/improvements/benefits of the program as measured against the program goal.
- **Long-term outcomes:** satisfy the stated *goal*—links to the budget and strategic plan.

Recommendations:

- Continue with the development and implementation of a performance measure reporting system that expands the type of measurement it employs, including a program logic model. This system should incorporate the HBFD vision statement "*Achieving national standards*

[10] Theodore Poister, *Measuring Performance in Public and Nonprofit Organizations* (San Francisco, CA: 2003), 44.

and industry best practices as they relate to meeting established performance measures and positive outcomes."

- Continue with the development and implementation of performance measures for each department activity as indicated above; link these measures to the strategic and comprehensive planning documents and fiscal/budget documents.

Community Risk Assessment and Risk Management Planning

The city of Hermosa Beach and the entire LA County metroplex are adept in emergency planning and community risk assessment. ICMA has found the caliber of emergency planning and its level of specificity in the Hermosa Beach area to be comprehensive and extremely sophisticated. The city's emergency operations plan (EOP) and utilization of the National Incident Management System (NIMS) are far reaching and widely utilized by all sections of city government.

The city operates within the Los Angeles County's Operational Area Response and Recovery System (OARRS) network. All systems are closely aligned with the state of California Standardized Emergency Management System (SEMS), and this effort is in accordance with the FEMA National Response Framework. The local, county, and state response plans rely heavily on regional and statewide mutual aid networks.

Community risk and vulnerability assessments are essential elements in a fire department's planning process. According to an NFPA paper on assessing community vulnerability, fire department operational performance is a function of three considerations: resource availability/reliability, department capability, and operational effectiveness.[11] These elements can be further defined as:

- **Resource availability/reliability:** The degree to which the resources are ready and available to respond.
- **Department capability:** The ability of the resources deployed to manage an incident.
- **Operational effectiveness:** The product of availability and capability. It is the outcome achieved by the deployed resources or a measure of the ability to match resources deployed to the risk level to which they are responding.

The community risk and vulnerability assessment evaluates the community as a whole, as well as with regard to property types. It is used to measure all property and the risk associated with that property and then segregates the property as either a high, medium, or low hazard. According to the NFPA *Fire Protection Handbook*, these hazards are defined as:

- **High-hazard occupancies:** Schools, hospitals, nursing homes, explosives plants, refineries, high-rise buildings, and other high life-hazard or large fire-potential occupancies.
- **Medium-hazard occupancies:** Apartments, offices, and mercantile and industrial occupancies not normally requiring extensive rescue by firefighting forces.

[11] Fire Service Deployment, Assessing Community Vulnerability. http://www.nfpa.org/assets/files/pdf/urbanfirevulnerability.pdf.

- **Low-hazard occupancies:** One-, two-, or three-family dwellings and scattered small business and industrial occupancies.[12]

The city of Hermosa planning efforts places great emphasis in identifying the potential hazards that can affect the community as a whole. Through a vulnerability analysis for the community they have identified those events that would have the highest potential for occurrence and the greatest devastation. These include:

- Earthquake, at the Newport Inglewood fault
- Transportation accident
- Flood, coastal and Urban
- Severe weather
- Terrorism/ workplace & school violence
- Energy shortage/ disruption
- Hazardous materials incident
- Water emergency/ drought

The city's planning efforts also focus on the support and organizational systems that would be necessary to respond and sustain ongoing relief efforts during times of disaster. Included in these efforts are:

- Continuity of operations planning (COOP)
- Public awareness and public information
- Succession planning (continuity of government)
- Utilization of volunteers and management of donations
- Interoperable communications
- Mutual aid
- Alternate facilities / record preservation.

Linking a fire department's operational functionality to the community risk and its vulnerability assessment is intended to assist fire personnel in refining their preparedness efforts. According to the HBFD strategic planning process this assessment will begin in October 2014.

Fire Pre-Planning

In addition to examining communitywide risk and vulnerability, the HBFD should continue to examine specific risk and vulnerability on the basis of the community's critical occupancies. Risk assessment and vulnerability analysis are not new to the fire service: the NFPA 1620 Standard,

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[12] National Fire Service Data Summit Proceedings, U.S. Department of Commerce, NIST Tech Note 1698, May 2011.

Recommended Practice for Pre-Incident Planning, identifies the need to utilize both written narrative and diagrams to depict the physical features of a building, its contents, and any built-in fire protection systems. The occupancies that are typically specified for pre-incident plans, or "pre-plans," are as follows:

- Large assembly
- Educational
- Health care
- Detention and correction
- High-rise residential
- Residential board and care (assisted living)
- Mercantile
- Business
- Industrial
- Warehouse and storage.

Risk Management/Firefighter Health and Fitness:

In addition to examining community risk and vulnerability, HBFD should examine the internal risk and vulnerability of its personnel. NFPA 1500, Standard for a Fire Department Occupational Safety and Health Program (2007 ed.), recommends the development of a separate risk management plan for fire department personnel in response to their work environment. In order for this process to be effective, the following components must be included in the risk management plan:

- **Risk identification:** Actual or potential hazards.
- **Risk evaluation:** The potential for occurrence of a given hazard and the severity of its consequences.
- **Prioritizing risk:** The degree of hazard based upon the frequency and severity of occurrence.
- **Risk control:** Solutions for eliminating or reducing real or potential hazards by implementing an effective control measure.
- **Risk monitoring:** Evaluation of effectiveness of risk control measures.

NFPA 1582, Standard on Comprehensive Occupational Medical Program for Fire Departments (2013 ed.), and NFPA 1583, Standard on Health-Related Fitness Programs for Fire Department Members (2008 ed.), provide guidance to fire departments regarding medical screening and annual fitness requirements for their members. ICMA found that HBFD does not currently conduct annual medical screenings for its employees, but does conduct annual fitness evaluations based on performance however these are voluntary. Additional compensation for those who participate is available and is based on certain performance criteria. According to the HBFD fire chief, a

respiratory protection plan/program is in the final stages of development and will serve as the foundation of the medical/fitness program.

The NFPA 1582 standard of safety establishes the parameters within which the HBFD should conduct all activities during emergency and nonemergency operations. The intent is for all members to operate within this standard or plan of safety and not deviate from this process. Through this effort accidents can be minimized and employee lost time reduced.

Recommendations:

- Expand the use of MDCs to store and retrieve critical information regarding building occupancy files, pre-plan information, and contact information. Evaluate options for fully automating the pre-planning process so that critical occupancy information is retrievable from the mobile data computers (MDCs) and certain hazardous components are identified by the system in order to give responding personnel critical information regarding an occupancy's status or specific hazard.
- Continue to develop and enhance, as funding allows, annual medical screenings, respiratory protection plan/program, and an ongoing fitness assessment process for its operational personnel. Further, HBFD should consider a partnering effort with neighboring jurisdictions in providing medical screening and fitness assessments to it personnel.

Infrastructure

Fixed Facilities/Capital Vehicles

The HBFD operates out of a single station located in the south-central part of Hermosa Beach. The facility was constructed in 1959 as a single-story, two-bay fire station and is in poor condition. In the early 1980s, fire staff, with assistance from the city building department, constructed and completed second-story dormitory and bathroom facilities. The second floor facilities are still in use today. A training/hose-tower rising from the roof of the original building has been condemned and is no longer in full use. Staff expressed concerns about the construction of the second-floor addition and wondered whether it was built in accordance with proper building codes.

The HBFD facility houses both the administrative offices and the operational component of the department. Two ambulances, the quint, and the primary engine apparatus operate out of the facility with a crew of five career and, at times, two additional AO/FI personnel. The administrative function currently consists of two people: the fire chief and civilian administrative assistant. The facility is cramped, as there is insufficient space for both the administrative and operational functions. The fire chief advised a new fire station is under consideration, but the city has not been successful in finding an available parcel in an optimal location for a new station. The city does not have a viable or exercised option for relocating the fire/police functions in the event that the current structures become inoperable.

As noted above, the HBFD operates an array of vehicles that includes heavy fire apparatus, ambulances, and staff vehicles. In the FY 2012-2013 budget, there is a replacement schedule for these vehicles, a best practice. This schedule benchmarks the year the vehicle was placed in service, the projected life of the vehicle, projected cost to replace the vehicle, and funds available to

replace the vehicle (through the most recent fiscal year). In review of this schedule, ICMA found that the 1990 engine, which was due for replacement in 2012, has not been replaced. ICMA also found that the projected costs to replace the heavy fire apparatus and ambulances are not within current industry standards.

Recommendations:

- Work with the community development and public works departments to ensure that the second-floor addition remains sound, is to code, and is safe for occupancy.
- Continue to seek an appropriate parcel (size and location), and continue with its consideration for the construction of a new fire station.
- Adjust the vehicle replacement program to reflect current industry cost standards for each fire department vehicle in the program. Further, apparatus replacement should be adjusted and based on industry best practices such as age, performance, maintenance costs, safety features, and reliability.

Programs

Operational Response and Workload

The Hermosa Beach Fire Department provides fire and EMS services from its sole fire station located in the south-central area of town at 540 Pier Avenue. The city, which is approximately 1.43 square miles, is an oceanfront, densely populated suburb in the Southern California metroplex. There are approximately 20,000 year-round residents, but Hermosa Beach has frequent surges in population due to tourism and beach-related special events. Hermosa Beach itself is predominantly residential, but there are concentrations of commercial and strip development along the major thoroughfares, and various freeway and rail lines transect the larger regional area.

The South Bay Regional Public Communication Authority serves as the city's 911 public safety answering point (PSAP). During the twelve-month study period from which data was derived (May 1, 2012, to April 30, 2013), HBFD units responded to 1,660 calls that originated from within city limits. Of these calls, 23 were structure fire calls and 22 were classified as other or outside fire calls (grass, trash, dumpster, vehicle, etc.). There were also 78 incidents classified as "Hazardous Conditions" and 1,152 (69.4 percent) emergency medical incidents (including motor vehicle accidents). The remaining 199 calls (12 percent) were classified as public assist, good intent, or false alarms. In addition, HBFD responded to 755 incidents that originated in mutual aid or automatic response jurisdictions, raising the total incident count to 2415. On approximately 186 of the calls, HBFD units were cancelled en route to the call, prior to arrival.

Operational Category Call Type

Nationwide, fire departments are responding to more EMS calls and fewer fire calls, particularly fire calls that result in active firefighting operations by responders. Improved building construction, code enforcement, automatic sprinkler systems, and aggressive public education programs have contributed to a decrease in serious fires and, more importantly, fire deaths among civilians. In addition, the incidence of fires is greatly influenced by demographics: on a national basis, lower income earners and rental properties have a higher occurrence of fire on a national basis.[13] Another interesting trend is the frequency of true emergencies versus non-emergency or public assist calls. ICMA's findings nationally indicate that in some jurisdictions more than 50 percent of all responses (fire, EMS, and other) are non-emergency calls. This factor is critical when calculating response time data, determining staffing levels, and identifying appropriate deployment strategies.

The key to improved efficiency with regard to deploying resources to emergency incidents is best achieved through a more robust call prioritization process at the 911 dispatch center. The ability for 911 call takers to accurately screen calls and then assign the most appropriate unit(s) and personnel to a call can pay substantial dividends in the following ways:

[13] *Socioeconomic Factors and the Incidence of Fire,* the Federal Emergency Management Agency, United States Fire Administration, and National Fire Data Center**,** June, 1997.

- increased unit availability
- reduced wear and tear on vehicles
- lower fuel costs
- reduced vehicle maintenance needs
- fewer vehicle accidents and reduced risk of accidents.

In addition to having fewer units respond to minor incidents and public assistance calls, cities also can respond at slower speeds, without using lights and sirens, and obeying all traffic signals. ICMA believes that HBFD, in conjunction with the regional communications center (RCC), should adjust its response patterns and reduce the frequency of multiple-unit responses in lights-and-siren mode. To this end, the HBFD should expand the use of medical priority dispatch system (MPDS) and call prioritization though the RCC to further define the severity of EMS calls and adjust the response to incidents accordingly. This is further discussed in the emergency communications section of this report. Table 2 depicts the specific call types and the number of calls in each category to which the HBFD responded.

Table 2: Call Types

Call Type	Number of Calls	Calls per Day	Call Percentage
Cardiac and stroke	57	0.2	2.4
Seizure and unconsciousness	118	0.3	4.9
Breathing difficulty	43	0.1	1.8
Overdose and psychiatric	176	0.5	7.3
MVA	52	0.1	2.2
Fall and injury	318	0.9	13.2
Illness and other	388	1.1	16.1
EMS Total	**1,152**	**3.2**	**47.7**
Structure fire	23	0.1	1.0
Outside fire	22	0.1	0.9
Hazard	78	0.2	3.2
False alarm	76	0.2	3.1
Good intent	28	0.1	1.2
Public service	95	0.3	3.9
Fire Total	**322**	**0.9**	**13.3**
Mutual aid	755	2.1	31.3
Canceled	186	0.5	7.7
Total	**2,415**	**6.6**	**100**

Observations from this table include:

- The department received 6.6 calls, including 0.5 canceled calls and 2.1 mutual aid calls, per day.
- EMS calls for the year totaled 1,152 (48 percent of all calls), averaging 3.2 per day.
- Fire calls for the year totaled 322 (13 percent of all calls), averaging 0.9 per day.
- Structure and outside fires combined for a total of 45 calls during the year, averaging one call every 8.1 days.
- Of the 755 mutual aid calls, 314 calls (42 percent) were canceled.

As there are a significant number of mutual aid calls, ICMA analyzed these calls separately. Table 3 depicts this analysis.

Table 3: Mutual Aid Call Analysis

Call Type	Manhattan Beach	Redondo Beach	Other
EMS	308	68	3
MVA	15	2	0
Structure fire	13	14	0
Outside fire	0	0	1
Hazard	2	1	0
False alarm	2	2	0
Public service	1	1	1
Good intent	4	3	0
Canceled	231	83	0
Total	**576**	**174**	**5**
Percentage	**76.3**	**23.0**	**0.7**
Calls per Day	**1.6**	**0.5**	**0.0**

Observations from this table include:

- 76 percent of mutual aid calls occurred in Manhattan Beach, averaging 1.6 calls per day.
- 23 percent of mutual aid calls occurred in Redondo Beach, averaging 0.5 calls per day.
- A total of 314 (42 percent) mutual aid calls were canceled.
- HBFD responded to 27 mutual-aid structure fire calls and 1 mutual-aid outside fire call.

EMS alarm activity clearly dominates the HBFD workload and accounts for nearly 70 percent of all responses. This call distribution is also evident in responses into mutual-aid jurisdictions. Fire responses and actual fire incidents were very limited, accounting for less than 2 percent of the

alarm activity. The nature of EMS responses is characteristic of a relatively younger service population that is fairly affluent. The volume of the workloads and the nature of call activity are consistent with the call activity ICMA has observed in similar jurisdictions and do not present any significant anomalies.

Operational Unit Deployment Time

The time a unit is deployed on a single call, referred to as *deployed time,* indicates the workload of that particular unit. This can be measured as productive emergency response time over a shift. In the case of the HBFD, the shift is twenty-four hours. An analysis of the HBFD response data shows that on average EMS calls lasted 30.0 minutes and fire calls lasted 16.4 minutes. It is interesting to note that mutual/automatic-aid calls lasted longer, on average they were 35.4 minutes.

HBFD responded with only one unit to only 7.8 percent of EMS incidents and 44.1 percent of fire calls. We feel this outcome is indicative of a response pattern that exceeds the requisite level. Table 4 presents incident categories that are typically non-emergency or minor in nature and should be considered for a reduced response assignment in the HBFD system.

Table 4: Recommended Single Unit Call Types

Public/Patient Assists	**Rescue Minor**
Trash Fires	**Minor vehicle accidents**
Smoke Investigations	**Overcrowding investigations**
Vehicle Fires	**Police Assists**
Dumpster Fires	**All automatic fire alarm soundings/notifications (without smoke or fire showing)**
Natural Gas Leaks	**Wires Down/Sparking Wires**

The following tables (Tables 5, 6, and 7) further break down unit deployment time, workload, and unit utilization.

Table 5: Annual Deployed Time by Call Type

Call Type	Average Deployed Minutes per Run	Annual Hours	Percent of Total Hours	Deployed Minutes per Day	Annual Number of Runs	Runs per Day
Cardiac and stroke	36.6	89	4.3	14.6	146	0.4
Seizure and unconsciousness	35.0	174	8.3	28.5	298	0.8
Breathing difficulty	41.1	74	3.5	12.2	108	0.3
Overdose and psychiatric	32.3	233	11.2	38.3	433	1.2
MVA	27.9	56	2.7	9.2	120	0.3
Fall and injury	28.7	368	17.6	60.4	769	2.1
Illness and other	26.4	415	19.9	68.2	942	2.6
EMS Total	**30.0**	**1,408**	**67.5**	**231.5**	**2,816**	**7.7**
Structure fire	21.7	17	0.8	2.8	48	0.1
Outside fire	16.4	10	0.5	1.6	36	0.1
Hazard	21.3	47	2.2	7.7	132	0.4
False alarm	12.0	28	1.3	4.5	138	0.4
Good intent	11.9	9	0.4	1.4	44	0.1
Public service	15.7	39	1.9	6.4	149	0.4
Fire Total	**16.4**	**149**	**7.2**	**24.6**	**547**	**1.5**
Mutual Aid	35.5	490	23.5	80.5	829	2.3
Canceled	5.6	40	1.9	6.6	427	1.2
Total	**27.1**	**2,088**	**100.0**	**343.2**	**4,619**	**12.7**

Observations from this table indicate:

- Total deployed time for the year, or deployed hours, was 2,088 hours. This is the total deployment time of all the units deployed on all type of calls, including 490 hours spent on mutual-aid calls. The deployed hours for all units combined averaged approximately 5.7 hours per day (this is a composite of all units responding to all incidents).
- There were 4,619 runs, including 829 runs dispatched for mutual-aid calls. The daily average was 12.7 runs for all units combined.
- Fire category calls accounted for 7.2 percent of the total workload.
- There were 84 runs for structure and outside fire calls, with a total workload of 27 hours. This accounted for 1.3 percent of the total workload. The average deployed time for structure fire calls was 22 minutes, and the average deployed time for outside fire calls was 16 minutes.
- EMS calls accounted for 67.5 percent of the total workload. The average deployed time for EMS calls was 30 minutes. The deployed hours for all units dispatched to EMS calls

averaged 3.9 hours per day (this includes transport time and time spent off-loading patients at the hospital).

- Mutual-aid calls accounted for 23.5 percent of the total workload.

Table 6: Call Workload by Unit

Unit Type	Unit ID	Average Deployed Minutes per Run	Annual Number of Runs	Annual Hours	Runs per Day	Deployed Minutes per Day
BLS ambulance	A12	37.4	1,246	775.9	3.4	127.5
Engine	E12	15.9	1,722	478.1	4.8	78.6
ALS ambulance	R11	30.3	1,651	833.8	4.5	137.1

Note: In this section, the actual time spent by each unit on calls is reported in two types of statistics: workload and runs. A dispatch of a unit is defined as a run; thus a call might include multiple runs.

Observations from this table indicate:

- ALS ambulance R11 was deployed most often and had the most deployed hours. It averaged 4.5 runs and 137.1 minutes per day.
- BLS ambulance A12 was dispatched on an average of 3.4 runs per day and was deployed 127.5 minutes per day.
- Engine E12 was dispatched on an average of 4.8 runs per day and was deployed 78.6 minutes per day.

As discussed above, deploying the most appropriate unit(s) to an incident must be done as efficiently as possible. It is essential that the HBFD evaluate its deployment of resources as it is a single-resource fire-service provider and at times a single-resource EMS service provider. Table 7 illustrates the response deployment pattern currently in place by the HBFD.

Table 7: Number of Units Dispatched to Calls

Call Type	Number of Units			
	One	Two	Three or Four	Total
Cardiac and stroke	4	17	36	57
Seizure and unconsciousness	3	50	65	118
Breathing difficulty	2	17	24	43
Overdose and psychiatric	12	72	92	176
MVA	7	22	23	52
Fall and injury	25	136	157	318
Illness and other	37	150	201	388
EMS Total	**90**	**464**	**598**	**1,152**
Structure fire	5	11	7	23
Outside fire	10	10	2	22
Hazard	32	38	8	78
False alarm	30	30	16	76
Good intent	14	12	2	28
Public service	51	34	10	95
Fire Total	**142**	**135**	**45**	**322**
Mutual aid	689	58	8	755
Grand Total	**921**	**657**	**651**	**2,229**
Percentage	**41.3**	**29.5**	**29.2**	**100**

Observations from this table show that:

- Overall, three or four units were dispatched to 29 percent of calls.
- On average, 1.7 units were dispatched per fire category call.
- For fire category calls, one unit was dispatched 44 percent of the time, two units were dispatched 42 percent of the time, and three or four units were dispatched 14 percent of the time.
- For structure fire calls, one unit was dispatched 22 percent of the time, two units were dispatched 48 percent of the time, and three or four units were dispatched 30 percent of the time.
- For outside fire calls, one unit was dispatched 45 percent of the time, two units were dispatched 45 percent of the time, and three or four units were dispatched 9 percent of the time.
- On average, 2.4 units were dispatched per EMS category call.
- For EMS category calls, one unit was dispatched 8 percent of the time, two units were dispatched 40 percent of the time, and three or four units were dispatched 52 percent of the time.

- For mutual-aid calls, one unit was dispatched 91 percent of the time, two units were dispatched 8 percent of the time, and three units were dispatched 1 percent of the time.

Essentially the HBFD serves as a first-response fire agency, due to the resources it currently deploys. Figures 7 and 8 illustrate the resources required in two different risk scenarios (low and moderate). The HBFD calls on mutual aid from contiguous and at times non-contiguous jurisdictions for assistance for incidents requiring multiple units.

Figure 7: Low-Risk Fire Response

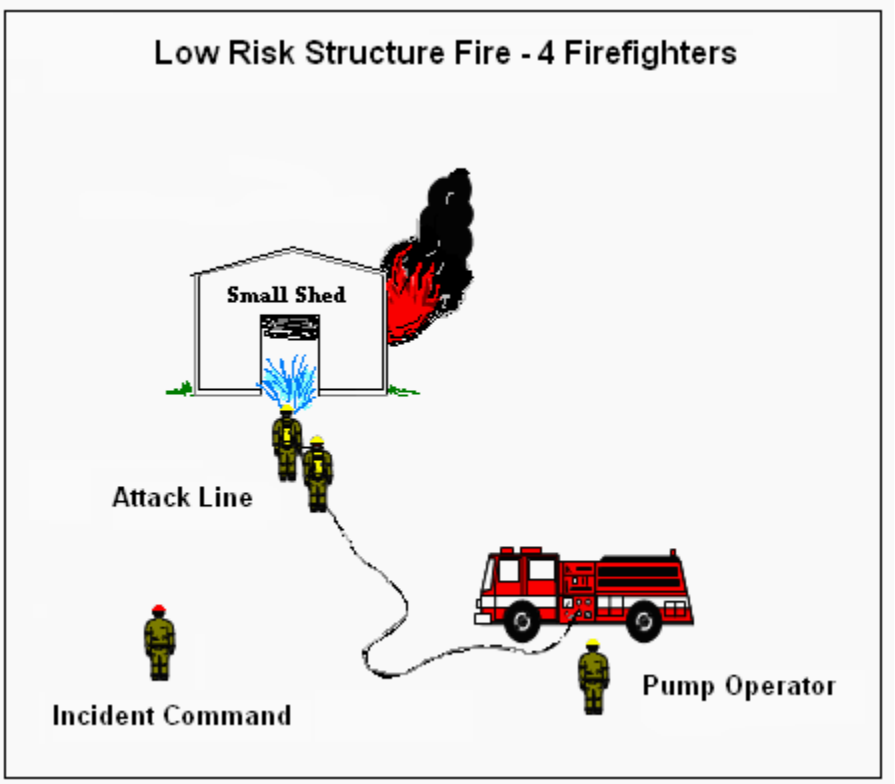
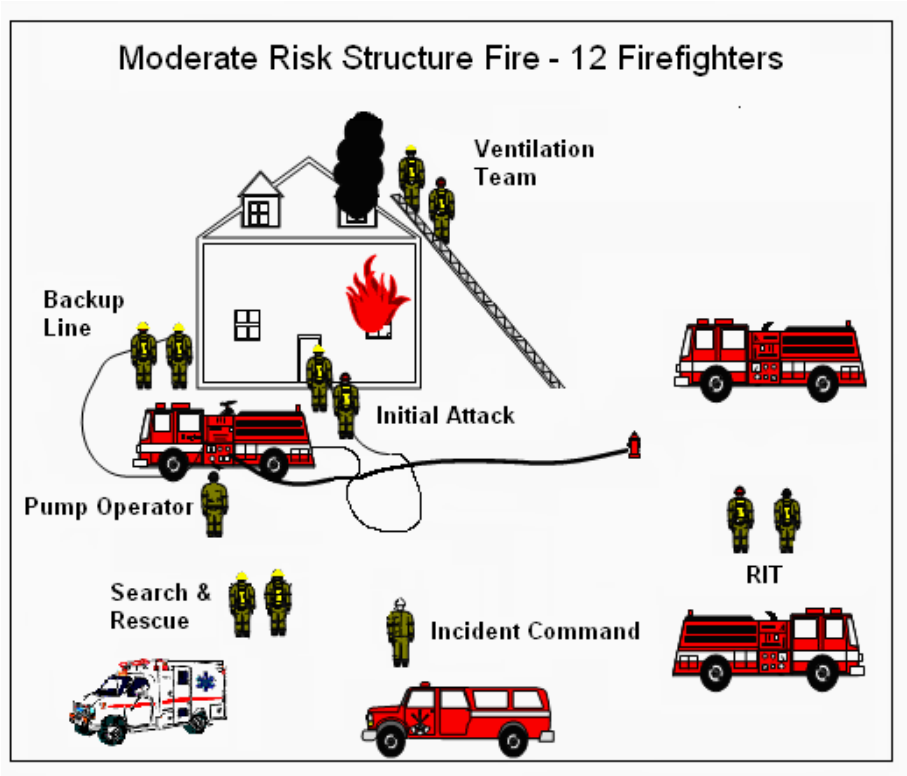


Figure 7 represents critical task elements for a moderate-risk structure fire. Some jurisdictions add additional response resources to meet and in some cases exceed the specifics of national benchmarking, such as NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments (2010 ed.).

Figures 7 and 8 are intended to illustrate the foundational critical tasks associated with these types of risk and are not intended to recommend that the city of Hermosa Beach add staffing to meet these critical tasks in a stand-alone fire department. Current data does not support the need for additional staffing. The HBFD relies on mutual aid from contiguous and at times non-contiguous jurisdictions to fulfill the critical tasking associated with this risk.

Figure 8: Moderate Risk Fire Response



As discussed, during the data study period conducted by ICMA the HBFD responded to total of 45 fire-related calls (structure and outside fires). The total fire loss (property and contents) for all fires was estimated to be $43,150. ICMA found that an estimate of actual fire damage recorded for only nine of the structure fires. For all structure fires the average combined structure and content loss was only $1,341. When analyzing the forty-five fires within city limits during the study period, the average fire loss associated with all incidents was $938 per incident.

The limited data set makes it hard to evaluate the quality of fire protection and agency effectiveness. The difficulty is compounded by the relatively high property values in the Hermosa Beach area. A single fire in a multimillion-dollar structure would significantly skew fire loss estimates. The fire problem in the period evaluated for this study is uncharacteristically low. As a comparison, the NFPA found that the average loss per structure fire (including contents) in 2011 was $20,006.[14] This is nearly the entire fire loss experience for a full year evaluated in Hermosa Beach.

Table 8 depicts property and content loss for fire incidents as reported to ICMA by the HBFD.

[14] Michael Karter, *Fire Loss in the United States, 2011* (Quincy, MA: National Fire Protection Association), 23.

Table 8: Property and Content Loss for Structure and Outside Fires

Call Type	Property Loss		Content Loss	
	Loss Value	**Number of Calls**	**Loss Value**	**Number of Calls**
Structure fire	$8,900	9	$21,950	9
Outside fire	$11,300	3	$1,000	2
Total	**$20,200**	**12**	**$22,950**	**11**

Note: This analysis includes only fire-related property or content losses in which the total is greater than $0.

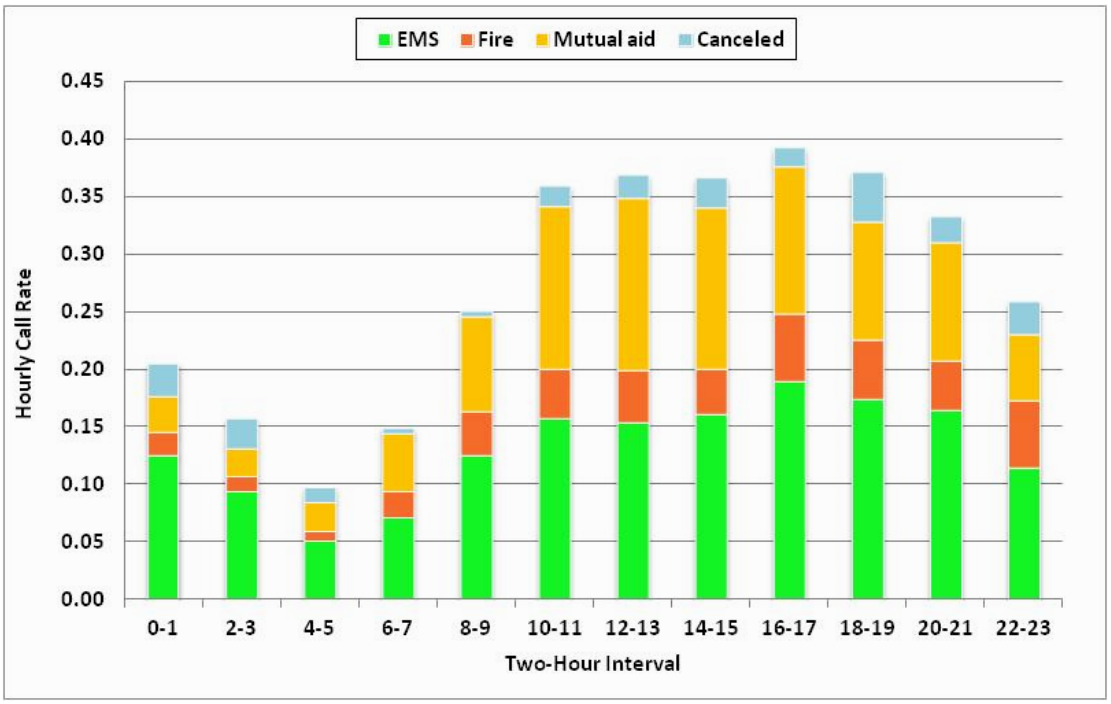
Another measure of workload for fire-related incidents is what actions the fire department took after arrival on the scene. Of specific interest is how many times the fire department actually extinguished a fire. Table 9 depicts actions taken by the HBFD after arrival on the scene. Of the forty-five structure and outside fires occurring in the city limits during the study period, the HBFD extinguished the fire twenty-two times, or 49 percent of the time.

Table 9: Actions Taken Analysis for Structure and Outside Fire Calls

Action Taken	Non-Mutual Aid		Mutual Aid	
	Structure fire	**Outside fire**	**Structure fire**	**Outside fire**
Other	1	0	0	0
Establish safe area	0	0	2	0
Extinguishment by fire service personnel	8	14	8	0
Fires, rescues & hazardous conditions, other	0	0	1	0
Investigate	9	3	4	1
Investigate fire out on arrival	0	1	0	0
Notify other agencies.	0	1	0	0
Provide manpower	0	0	3	0
Restore fire alarm system	0	0	1	0
Salvage & overhaul	2	2	2	0
Search & rescue, other	0	1	0	0
Standby	0	0	1	0
Ventilate	2	0	2	0

One last piece discussed in the operational report regarding workload is when calls for service are occurring. Figure 9 illustrates calls for service by hour of day.

Figure 9: Calls by Hour of Day



Observations from Figure 9 include:

- Hourly call rates averaged between 0.10 calls and 0.39 calls per hour.
- Call rates were highest during the day between 10:00 a.m. and 10:00 p.m., averaging between 0.33 and 0.39 calls per hour. The rate peaked between 4:00 p.m. and 6:00 p.m., when it averaged 0.39 calls per hour.
- Call rates were lowest between 2:00 a.m. and 8:00 a.m., averaging between 0.10 to 0.16 calls per hour. This is equivalent to one call in this six-hour period of the day.

Operational Response Times

Dispatch time is the time interval that begins when an alarm is received at the communication center and ends when the response information is transmitted via voice or electronic means to the emergency response facility or emergency response units in the field. ***Turnout time*** is the time interval that begins when the notification process to emergency response facilities and emergency response units begins by an audible alarm or visual announcement or both and ends when the unit is en route to the incident. The fire department has the greatest control over these segments of the total response time. ***Travel time*** is the time interval that initiates when the unit is en route to the call and ends when the unit arrives at the scene. ***Response time*** (or total response time) is the time interval that begins when the call is received by the primary dispatch center (RCC) and ends when the dispatched unit arrives on the scene to initiate action.

According to NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments (2010 ed.) the alarm processing or dispatch time should be less than or equal to 60 seconds 90 percent of the time. This standard also states that the turnout time should be less than or equal to 80 seconds (1.33 minutes) for fire and special operations 90 percent of the time, and travel time shall be less than or equal to 240 seconds for the first arriving engine company 90 percent of the time. The standard further states the initial first-alarm assignment should be assembled on scene in 480 seconds 90 percent of the time. NFPA 1710 response time criterion is a benchmark for service delivery and not an ICMA recommendation.

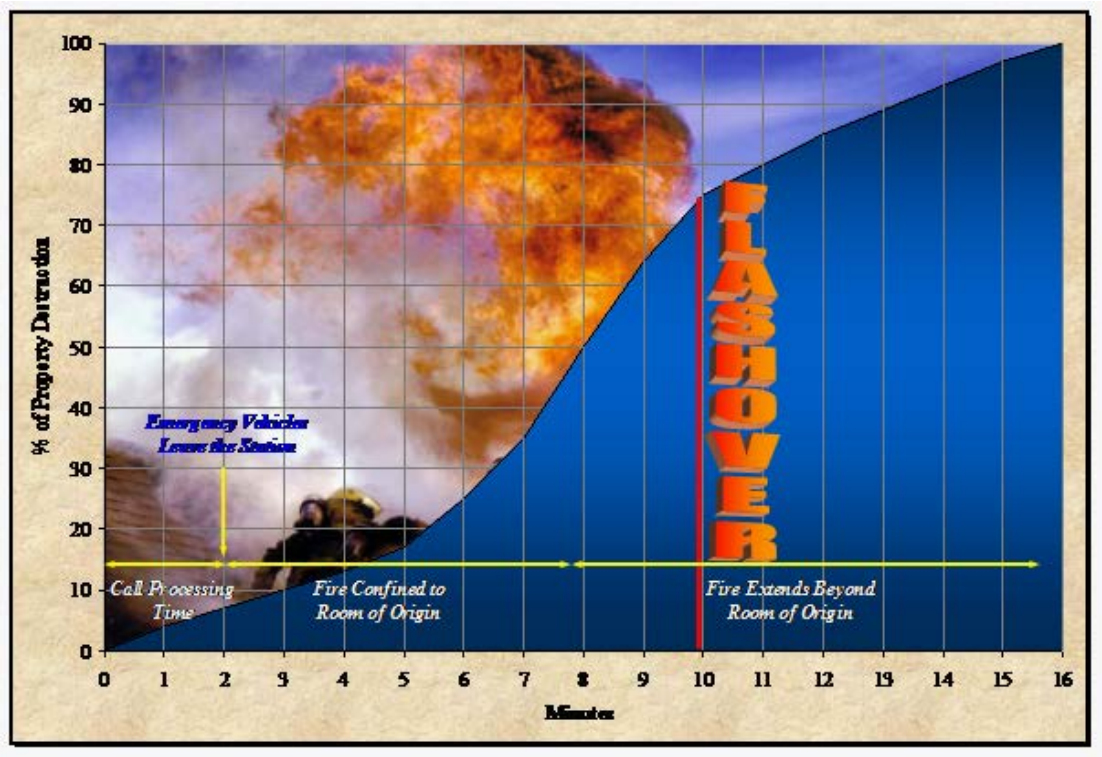
The 90th percentile measurement, often referred as a *fractile response,* is a more conservative and stricter measure of total response time. Most fire agencies are unable to meet this standard. Simply explained, for 90 percent of calls, the first unit arrives within a specified time, and if measured, the second and third unit. Table 10 depicts average dispatch, turnout, travel, and total response times of first-arriving fire units for fire calls. Table 11 includes the 90th percentile response time, which as indicated is a stricter evaluation of performance.

For this study, ***unless otherwise indicated response times and travel times measure the first-arriving unit only***. The following averages were determined from the data provided to ICMA (see Tables 10 and 11): the average dispatch time was 1.3 minutes, the average turnout time was 1.4 minutes, and the average travel time was 2.6 minutes. The total average response time (EMS and Fire) was 5.3 minutes, and the 90th percentile total response time (EMS and Fire) was 7.5 minutes.

A total of 1,138 calls in Hermosa Beach were utilized in developing the response time analysis, as these were the total calls that had valid dispatch, turnout, and travel times. This accounts for 77 percent of the EMS and fire calls. The average dispatch time was 1.3 minutes. The average turnout time was 1.4 minutes, and the average travel time was 2.6 minutes. The average total response time for EMS calls was 5.0 minutes, and the average total response time for fire category calls was 7.3 minutes. The 90th percentile total response time for EMS and fire category calls was 6.8 and 10.8 minutes, respectively.

Regarding response times for fire incidents, the criterion is based on a concept called “flashpoint” or “flashover”. This is an occurrence in which super-heated gasses from a fire are released rapidly, causing the fire to burn freely and become so volatile that the fire reaches an explosive state. In this situation, usually after approximately eight to twelve minutes, the fire expands rapidly and is much more difficult to contain. These situations do not occur with any great frequency, but when flashover does occur it presents greater challenges for fire suppression. Figure 10 illustrates this phenomenon and its potential impact on firefighters and fire extinguishment as the fire propagation curve.

Figure 10: Fire Propagation Curve



Further depicting the criticality of ensuring the appropriate and timely response of fire suppression units are the five critical time frames that a fire department attempts to manage and which revolve around the total reflex time sequence for any incident response (some of which have already been discussed). As can be seen from the following definitions, some of these segments are more manageable than others:

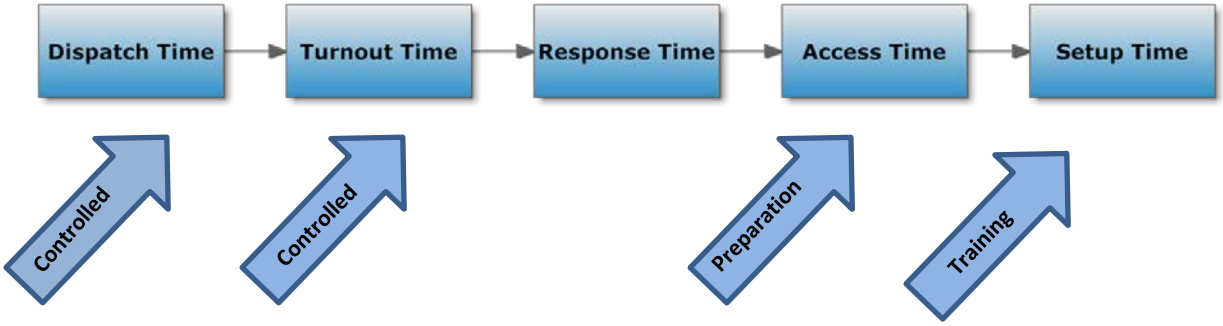
- **Dispatch time,** defined as the amount of time that it takes to receive and process an emergency call. The dispatch time includes receiving the call, determining what the emergency is, verifying where the emergency is located, determining what resources are required to handle the call, and notifying the units that are to respond.
- **Turnout time,** defined as the period beginning from when units acknowledge notification of the emergency to the beginning point of response time. ***Turnout time can be managed by monitoring data recorded in computer-aided dispatch; it is one of the most manageable segments in the reflex sequence.***
- **Travel time,** defined as the time that begins when units are en route to the emergency incident and ends when units arrive on the scene.
- **Access time,** defined as the amount time required for the crew to move from where the apparatus stops to the emergency. This can include moving to the interior of upper floors of a large building and dealing with any barriers along the way. ***Access time is managed through a good prefire planning process that familiarizes the firefighters with access***

points, automatic system controls, annunciator panel locations, and travel routes through buildings.

- **Setup time,** defined as the time required for fire department units to set up, connect hoselines, position ladders, and otherwise prepare to extinguish the fire. It includes disembarking from the apparatus, pulling and placing hoselines, charging hose lines, donning self-contained breathing apparatus, making entry into the building, and beginning to apply water. ***The opportunity for saving time during setup is minimal, even for trained personnel.*** [15]

By looking at each segment within the total reflex time sequence and understanding the objectives of the segment (see flow chart below), a fire department can measure its current performance against these objectives. Figure 11 illustrates the total reflex time sequence.

Figure 11: Total Reflex Time Sequence



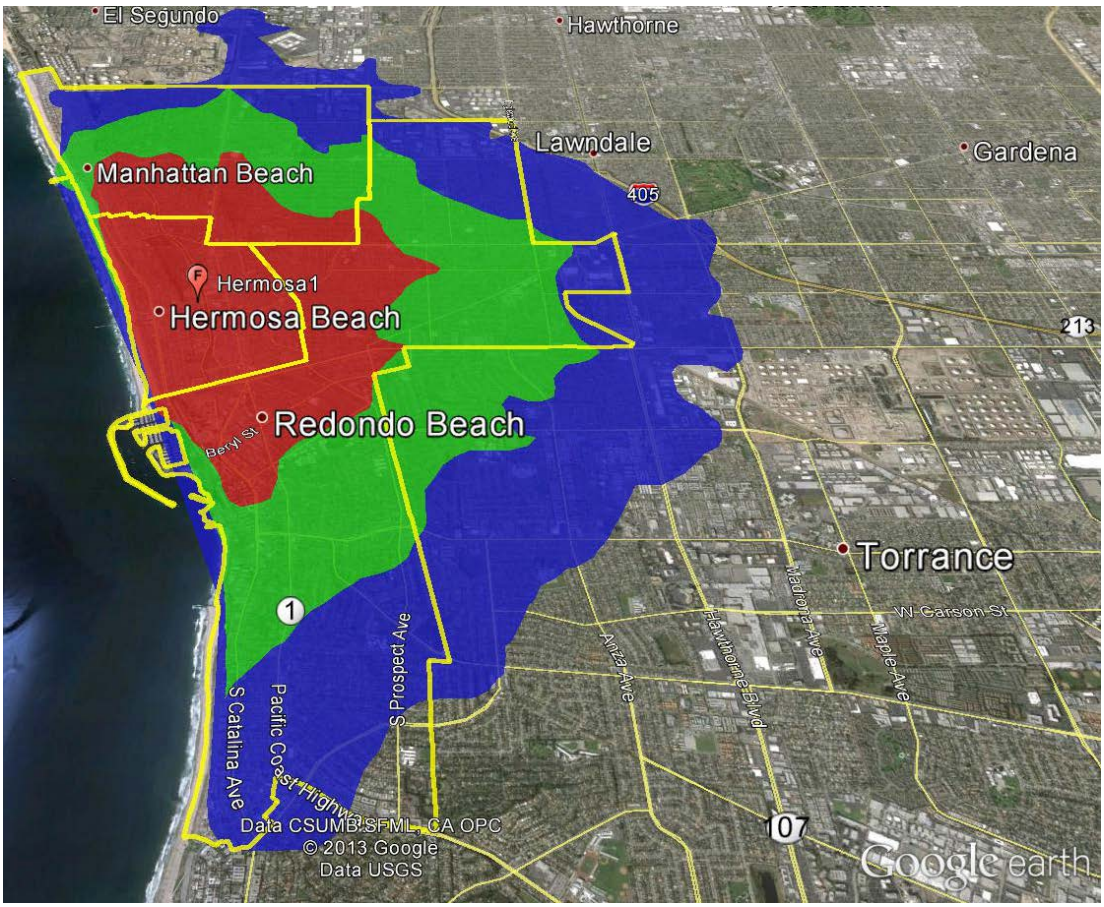
ICMA noted the HBFD does not currently use performance measures in assessing all of its operations. We believe the system will be more apt to achieve community expectations if such measure are developed and monitored on a regular basis.

Understanding response time capabilities from a jurisdiction's fire station or stations is an essential planning element. To illustrate the importance of this, the following figure shows the HBFD response area and industry standard response travel time bleeds from the HBFD station on maps derived from a geographic information system (GIS). Figure 12 uses GIS mapping to illustrate response time probabilities, showing 240-second, 360-second, and 480-second travel time bleed comparisons, respectively. These comparisons are made by road network from the HBFD fire station and normal conditions. ICMA does realize at certain times of the day traffic patterns may change due to traffic congestion, weather and other factors.

[15] "Non-Emergency Fire Department Functions," In A.E. Cote, (Ed.) et al*, Fire Protection Handbook,* Volume II, Twentieth Edition (Quincy, MA: National Fire Protection Association), 12-218.

Figure 12: 240/360/480-Second Response Bleed Layers from the HBFD Station

Red=240 seconds/Green = 360 seconds/Blue=480 seconds



Observations from Figure 12 tell us from the HBFD facility, the entire city is within the 240-second travel time window. ICMA further analyzed the travel time bleeds from two contiguous jurisdictions that routinely provide mutual aid to the HBFD (Manhattan Beach and Redondo Beach). These are illustrated in Figures 13 and 14. Observations from these maps show that additional resources for moderate- and high-risk fire incidents can be assembled within a 360-second window from both jurisdictions. Additionally, there are significant 240-second travel times from these jurisdictions into Hermosa Beach.

Figure 13: 240/360/480-Second Response Bleed Layers from the Manhattan Beach Fire Facilities

Red=240 seconds/Green = 360 seconds/Blue=480 seconds

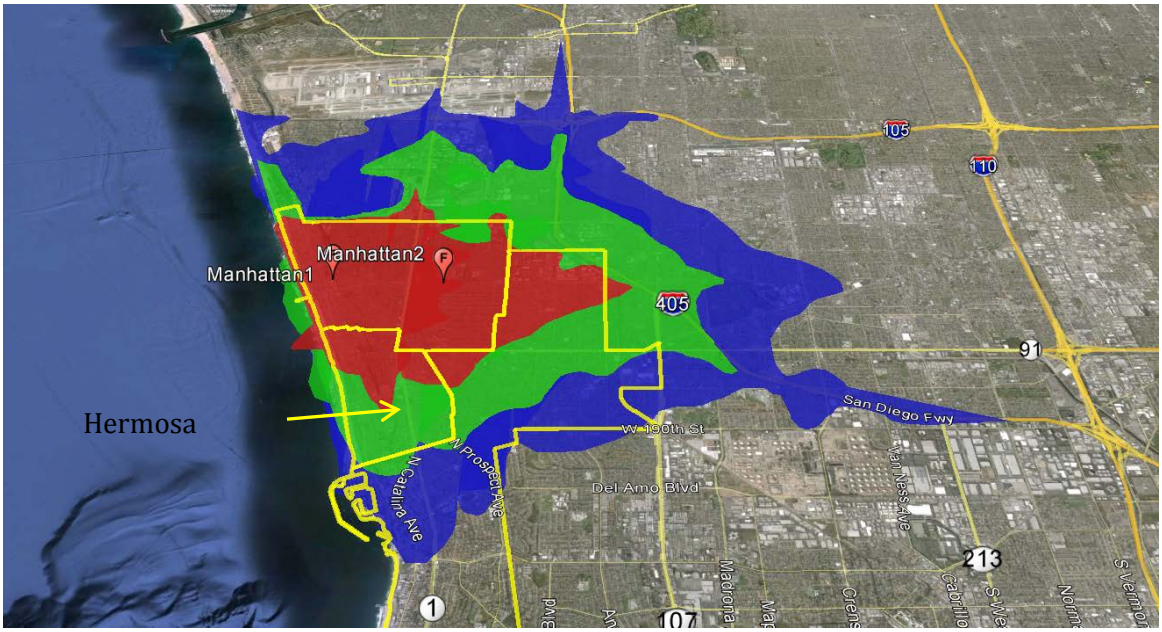


Figure 14: 240/360/480-Second Response Bleed Layers from the Redondo Beach Fire Facilities

Red=240 seconds/Green = 360 seconds/Blue=480 seconds

Table 10: Average Dispatch, Turnout, Travel, and Response Times of First Arriving Unit, by Call Type

Call Type	Dispatch Time	Turnout Time	Travel Time	Response Time	Sample Size
Cardiac and stroke	1.3	1.4	2.2	4.9	45
Seizure and unconsciousness	1.0	1.2	2.2	4.4	107
Breathing difficulty	0.9	1.5	2.5	4.8	41
Overdose and psychiatric	1.2	1.5	2.3	5.0	142
MVA	1.3	1.2	2.3	4.9	47
Fall and injury	1.2	1.5	2.5	5.2	269
Illness and other	1.2	1.4	2.5	5.1	330
EMS Total	**1.2**	**1.4**	**2.4**	**5.0**	**981**
Structure fire	1.7	1.7	2.7	6.1	20
Outside fire	1.5	1.4	3.6	6.5	18
Hazard	2.2	1.4	4.3	7.9	38
False alarm	1.9	1.5	3.9	7.3	63
Good intent	1.9	1.4	4.6	7.9	18
Fire Total	**1.9**	**1.5**	**3.9**	**7.3**	**157**
Total	**1.3**	**1.4**	**2.6**	**5.3**	**1,138**

Note: First arriving units with valid dispatch, turnout, and travel times were used in this analysis.

Observations from Table 10 indicate:

- The average dispatch time was 1.3 minutes.
- The average turnout time was 1.4 minutes.
- The average travel time was 2.6 minutes.
- The average response time for EMS calls was 5.0 minutes.
- The average response time for fire category calls was 7.3 minutes.
- The average response time for structure fire calls was 6.1 minutes. The average response time for outside fire calls was 6.5 minutes.

Table 11: 90th Percentile Dispatch, Turnout, Travel, and Response Times of First Arriving Unit, by Call Type

Call Type	Dispatch Time	Turnout Time	Travel Time	Response Time	Sample Size
Cardiac and stroke	1.5	2.2	3.4	6.4	45
Seizure and unconsciousness	1.8	1.9	3.3	5.8	107
Breathing difficulty	1.5	2.4	3.3	6.3	41
Overdose and psychiatric	2.0	2.4	3.3	6.7	142
MVA	2.0	1.8	3.8	6.5	47
Fall and injury	2.0	2.3	4.0	7.2	269
Illness and other	1.9	2.2	3.8	6.9	330
EMS Total	**1.9**	**2.2**	**3.6**	**6.8**	**981**
Structure fire	3.0	2.0	3.3	10.1	20
Outside fire	3.4	2.0	6.9	9.6	18
Hazard	4.6	2.5	7.2	11.7	38
False alarm	3.3	2.6	7.2	11.1	63
Good intent	3.6	2.3	10.1	11.5	18
Fire Total	**3.6**	**2.5**	**7.1**	**11.1**	**157**
Total	**2.1**	**2.2**	**4.0**	**7.5**	**1,138**

Note: A 90th percentile value of 7.5 indicates that the total response time was less than 7.5 minutes for 90 percent of all calls. Unlike averages, the 90th percentile response time is not equal to the sum of 90th percentile of dispatch time, turnout time, and travel time.

Observations from Table 11 indicate:

- The 90th percentile dispatch time was 2.1 minutes.
- The 90th percentile turnout time was 2.2 minutes.
- The 90th percentile travel time was 4.0 minutes.
- The 90th percentile response time for EMS calls was 6.8 minutes.
- The 90th percentile response time for fire category calls was 11.1 minutes.
- The 90th percentile response time for structure fire calls was 10.1 minutes.
- The 90th percentile response time for outside fire calls was 9.6 minutes.

Our observations indicate that the dispatch handling times are high for EMS and fire calls. An average time of 1.2 minutes and a fractile time of 1.9 at the 90 percentile should be improved. Considering that little call screening is done, ICMA feels that these dispatch times warrant further evaluation. Fire dispatch handling times are poorer than EMS; at 1.9 minutes on average and 3.6 minutes at the 90 percentile. This is an exceeding slow processing time, even when taking the multiple page-outs required for mutual aid or automatic response assignments into consideration. The slow processing time impacts total response time and could contribute to difficulties in incidents with flashover and critically ill or injured patients.

There are several potential ways to reduce dispatch handling times. The city might be able to reduce the amount of information required of the 911 dispatcher for the initial station notification by the 911 dispatcher. In many systems this information is limited to the unit assigned; the type of call (fire, EMS, other); and the address of the call. A further description of the call is then included once the unit is en route. Another method is through a pre-alerting system transmitted electronically and received via a printed form when the unit is in the station or via the MDC when the unit is on the road. Again, the alerting provides a brief initial notification with limited essential information (unit assigned, type of call, and address) that allows the unit to respond sooner and shortens the verbal transmission associated with the call.

Recommendations:

- Continue to develop performance measures for those critical tasks that can be implemented on low and moderate risks, regularly train on these measures for continuous improvement, and evaluate each member in the department annually against established benchmarks for the purpose of continuous process improvement.
- Continue to evaluate options for deploying fewer vehicles on the initial response to emergency incidents; conduct a comprehensive review of all current medical priority dispatch system call typing in the regional communications center and a comprehensive review of fire related responses and run card assignments.
- Continue with the comprehensive review of current fire reporting to ensure that the proper information is being entered, with particular focus on estimated fire loss, and implement a quality assurance program for all incident reporting that links to continuous training and improvement.
- Continue to discuss the dispatch handling times with the RCC management and pursue efforts to improve these times, particularly on fire calls.
- Continue developing and monitoring performance measures specific to fire services that are benchmarked against demand and response time and that measure elements such as percent of fires contained to room of origin (in place now), percent of fires contained to building of origin, and target goals for call processing, turnout, access, set-up, travel, and total response times. The results of these performance measures should be reported with explanation in an annual report.

Essential Resources

Fire Prevention/Fire Investigation/Public Education

Fire suppression and response, although necessary to protect property, have little impact on preventing fire deaths. Rather, public fire education, fire prevention, and built-in fire protection systems are essential elements in protecting citizens from death and injury due to fire, smoke inhalation, and carbon monoxide poisoning.

The HBFD enforces the 2010 edition of the California Fire Code (CFC) as adopted according to city of Hermosa Beach Code of Ordinances (Chapter 15.20). Chapter 15.20 of the city's code further defines certain elements of fire prevention in Hermosa Beach to include enforcement of the code,

storage of certain commodities, fire code appeals processes, and penalties for violating the Hermosa Beach fire prevention code.[16] Fire inspection procedures are administrated through a comprehensive standard operation procedure (SOP), namely SOP #902.

The fire prevention program is managed by a shift operational captain as a collateral duty, which according to this captain occupies twelve to fifteen hours of his administrative time weekly. Actual inspection of occupancies is handled by on-duty shift firefighters, a best practice. The HBFD has a goal of conducting one thousand of these inspections per year. SOP #902 establishes targeted occupancy types that should receive regular inspections.

Plan review for fire suppression extinguishing and alarm systems, as well as the review of site plans involving fire lanes, ingress and egress for fire apparatus, are handled through a third-party vendor. Rough and final inspections of these systems are conducted by the fire department, usually by the captain who manages the program.

Arson investigation is managed by the same captain that manages the fire prevention program. This captain is assisted by an engineer/paramedic assigned to his shift. Both are sworn peace officers and have arrest powers. Origin and cause is the responsibility of the on-duty operational officer. If arson is suspected, one or both arson investigators will respond to investigate. The HBFD is a member of the "Area G" fire departments arson investigation program, and can call on the other departments in this program for assistance if needed.

The HBFD public education program works jointly with various neighborhood groups to provide fire education and home safety programs. Additionally, the HBFD offers at certain times of the year citizen sidewalk CPR training. The HBFD also provides various fire prevention and fire/EMS education segments in the city's newsletter. All of these public education programs are best practices.

Emergency Communications

The HBFD receives its emergency communication services from the South Bay Regional Public Communication Authority, known by participants as the Regional Communication Center, or RCC. The RCC is an independent agency that provides 911 dispatching services to five cities: Gardenia, Hawthorne, Manhattan Beach, El Segundo, and Hermosa Beach. It is the public safety answering point (PSAP) for all police and fire requests in Hermosa Beach. The RCC received a total of 115,412 emergency-911 calls in 2012, resulting in 27,143 combined police and fire dispatches for the five participating departments. There were a total of 6,634 fire related dispatches for the cities of El Segundo, Manhattan Beach, and Hermosa Beach. The HBFD had 1858 incident responses in 2012 that originated within city limits. In addition, HBFD responded to 619 incidents that originated in mutual-aid or automatic-response jurisdictions. Of the 1858 responses to incidents within city limits, 404 (21.7 percent) were fire related, 1400 (75.4 percent) were emergency medical responses, and 54 (2.9 percent) were other types of calls.

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[16] "Chapter 15.20 Fire Prevention Code," Hermosa Beach, http://www.hermosabch.org/index.aspx?page=388#010.

The RCC is located at 4440 West Broadway in Hawthorne. The center has three managing members: Gardenia, Hawthorne, and Manhattan Beach. El Segundo and Hermosa Beach are contracting members. Funding for these services is divided among the five departments. Hermosa Beach currently pays an annual fee of $64,942 for its fire/EMS-related dispatching services.

The RCC is a professionally run and well equipped center. It is staffed with fully trained telecommunicators, and e-911 call takers. Staffing levels are relatively stable, and employee turnover has not been a problem.

The center maintains a floor supervisor at all times. Staffing levels vary depending on the time of day, from a minimum of eight personnel during late-night shifts and slower timeframes to a high of ten personnel during peak-demand periods. During special events or major incidents, additional staffing is added to accommodate the anticipated increased call volume. The RCC staffs two fire positions for the participating agencies. However, the cities of Gardena and Hawthorne receive fire protection through LA County Fire, so their fire-related dispatching is not provided through the RCC. The center has three staff members at all times to handle e-911 telephone traffic. Staffing levels for the RCC appear appropriate to handle the e-911 call volume and radio traffic. In the most recent ISO review for Hermosa Beach, the center received maximum credit with regard to its staffing levels. Hermosa fire officials are very pleased with this service and did not voice any concerns regarding proficiency or responsiveness to issues.

The center has designated the Torrance Police Dispatch Center as a back-up dispatch center in case of an emergency, equipment failure, or other situation that would require the RCC to go off-line. The facility is secure, and auxiliary generators are on site to ensure uninterrupted operations during power outages. All radio and telephone communications are recorded and the RCC utilizes a Tiburon computer aided dispatch (CAD) system. The RCC uses a PowerPhone Total Response Tablet, which has a series of questions that assist in identifying the nature and severity of the illness and the pre-arrival instructions that are appropriate. This system is used on a limited basis to alter response assignments.

The center has the capacity to expand its use of emergency medical dispatching (EMD) into its dispatching operations for Hermosa. EMD is a systematic process in which dispatchers utilize a pre-defined series of questions to determine the severity of the call. EMD also gives dispatch personnel the ability to provide pre-arrival instructions (first aid and safety instructions) while callers await the arrival of emergency personnel. EMD in its optimum application recommends an altered level of response based on the severity of the call. EMD systems have improved system efficiency in managing EMS workloads in many jurisdictions across the nation.

Typically the EMD call screening process categorizes responses into four levels of severity:

- **Alpha:** Non-life-threatening where time will not affect patient outcome (e.g., band-aids and non-acute illness);
- **Beta:** Non-life-threatening where time may affect outcome (e.g., acute illness, minor fractures, and/or immobilizing injuries due to pain);

- **Charlie:** Potentially life-threatening where time may affect outcome (e.g., major fractures or blunt trauma);
- **Delta:** Life-threatening of highest priority (e.g., cardiac arrest or respiratory difficulty/arrest.).

These determinants can also foster an altered emergency response mode. Typically the breakdown of these response modes is as follows:

- **Alpha:** Single BLS response, no lights or sirens;
- **Beta:** Single BLS response, light and sirens;
- **Charlie:** ALS and BLS Response, one unit with lights and sirens;
- **Delta:** Priority ALS Response, all units responding with lights and sirens.

The RCC does classify its EMS calls for Hermosa Beach. These classifications are as follows:

- **Rescue:** EMS Response (one rescue and one engine);
- **Rescue Minor:** EMS Response (one rescue and one engine);
- **Rescue Major:** Typically multi-vehicle accidents (one B/C, one Rescue and one Engine).

There are a number of fire call categories in which units respond in a non-emergency mode (no lights or sirens). On these alarms a single engine is dispatched, and the rescue vehicle remains available for simultaneous calls. These non-emergency responses are substantial and account for more than 50 percent of the total fire responses. The categories for this low-level response include:

- Residential fire alarms (with no smoke or fire seen)
- Fire investigations
- Public assists
- Police assists
- Hazardous condition
- Overcrowding investigation.

The center does not have a medical director to support its EMD activities. Having one is a best practice. Any adjustments in response assignments are developed through the recommendations of PowerPhone Total Response Tablet and the decisions of the participating agencies. In addition, there is not a formal quality assurance process that reviews the performance of call takers regarding pre-arrival directives or call prioritization.

The dispatch process is the first line of response in pre-hospital emergency medical care. The ability to dispatch the most appropriate resources to an incident is a proven method in ensuring optimum efficiency. With the limited resources available in Hermosa Beach and the frequent use of automatic response and mutual aid, it is imperative that the dispatching process be as efficient as possible. RCC employees currently receive little feedback regarding the call screening process. Organizations

that excel in their call screening process usually have a vibrant and consistent quality review process that utilizes training and remediation in maintaining system proficiency.

The emergency radio system used by HBFD and its neighboring partners appears robust and fully able to accommodate the workload and the communications environment in which these departments operate. The system operates a series of UHF conventional analog frequencies designated as dispatch, command, and tactical channels. Portable radios and mobile and base station equipment are fully interoperable with neighboring communities. The system also provides direct radio communications between Hermosa police and fire units. This interoperability is relatively rare and is highly commendable. HBFD and partner agencies have established radio protocols that appear effective in assigning units to the appropriate channels both during the dispatch mode and during extended field operations. The system has been described by HBFD officials as having suitable coverage; there are policy directives in place to address alternative channel selection when coverage is poor due to tower locations or atmospheric interference. The RCC has technical support personnel on staff that provides oversight of the system. Downtime associated with maintenance and repairs appear minimal.

All HBFD units are equipped with mobile data computers (MDCs). This technology allows the transmission and receipt of data via air card, allowing each unit to have direct multi-modal communication links from field locations. The system is also designed to have stored files on the computer that include such things as street mapping and addressing, building schematics, contact information, fire hydrant locations, and other occupancy or storage information that can assist in managing field operations. HBFD utilizes its MDCs primarily for the transmission of response data between the dispatch center and field units. It also provides street mapping and address locations. Typically transmissions from an MDC are achieved through a key-type entry that depicts unit status (e.g., en route, arrival, assignment completed, available, etc.).

MDCs use key-stroke transmission to ensure that messages are transmitted and received. The system also supports the accuracy of the transmission by placing a time stamp in the CAD when the entry is made. The primary reasons for utilizing key-stroke transmission from an MDC rather than radio voice transmission is to ensure accuracy of the transmission and to minimize the amount of radio voice traffic. Many agencies and response personnel do not fully embrace key-stroke transmission over voice transmission because determining a unit's status with key-stroke transmission requires visual monitoring of a computer screen. When personnel are en route in emergency response mode, they tend to prefer voice transmission. The main advantage of key-stroke transmissions is that they are always captured by CAD; voice communications, on the other hand, are often missed by dispatchers who are engaged in multiple transmissions at the same time or because one unit overrides the transmission of another.

HBFD gives response personnel the option to document vehicle status either by voice radio or a key-stroke transmission through the MDC. This policy is unusual; most agencies require one or the other. As such, ICMA has no basis to judge its effectiveness from an accuracy or consistency perspective. HBFD officials have indicated that they have not experienced any accuracy issues and that CAD data is being recorded properly.

ICMA believes that the use of the MDCs needs to be expanded to include the storage of information regarding critical building occupancy files, pre-plan information, and contact information. Given the frequency of response into neighboring jurisdictions and the need for reliable information for in-city structures, it would be prudent to have this information available on responding units.

As mentioned above, the Tiburon CAD system used by the RCC provides the capability to utilize automatic vehicle locators (AVL) as part of their dispatching operation. AVL is a real-time tracking process in which vehicles are equipped with transmitters that monitor their location via GPS coordinates. When a call is initiated, the AVL identifies the closest available unit and assigns it to the incident. AVL has proven to be effective in larger metropolitan settings with multiple vehicles and high workloads. AVL is a viable technology solution in certain environments, and as such HBFD is currently working with Manhattan Beach in regards to AVL in conjunction with dissolving jurisdictional boundaries and EMS priority dispatching. Current discussion links EMS priority dispatching and AVL with a goal of dispatching the closest unit to Charlie and Delta EMS calls for service regardless of jurisdictional location. One identified impact to this model is that it may prevent dispatching the closest unit from a neighboring jurisdiction to a non-emergency, or Alpha EMS call for service. ICMA recommends these discussions continue.

Recommendations:

- Continue use of the South Bay Regional Public Communication Authority for fire and EMS dispatching. The services received, the quality of operation, and technical support balances the annual fee paid.
- Continue discussions with RCC regarding expanding the use of emergency medical dispatch (EMD) through the South Bay Regional Public Communication Authority in order to further define the severity of EMS call and adjust response assignment to incidents with a focus on efficiency and effectiveness of service delivery.
- Request changes in operations with the South Bay Regional Public Communication Authority with regard to the quality assurance process for call screening and pre-arrival instructions. Emphasis should focus on ensuring that these functions are being carried out in accordance with the recommended guidelines.

External System Relationships/Consolidation Alternative

The city of Hermosa Beach has developed an extensive series of formal and working relationships with neighboring communities that facilitate service delivery. The relationships Hermosa Beach has forged with its neighboring communities are truly commendable. These extensive and deeply intertwined relationships are built out of necessity. In reality, HBFD would be unable to effectively manage its service responsibilities without the assistance of its neighbors. Response of Hermosa Beach and the surrounding communities of Redondo Beach, Manhattan Beach, and El Segundo, along with LA County, are built around mutual aid agreements, automatic response agreements, and the city's participation in a Public Communications Authority that provides 911-emergency communications. In addition Hermosa Beach, Redondo Beach, and Manhattan Beach have been extremely innovative by establishing an apparatus and equipment loan program and a personnel cooperative agreement through which the three entities share vehicles, rescue equipment, and personnel to address shortfalls.

Hermosa Beach has evaluated consolidation options for the fire department a number of times in recent years. Most recently, in 2010, talks with Redondo Beach were discontinued. Fire department consolidations are difficult to organize and implement. The recent consolidation talks with Redondo highlighted as unresolved issues EMS transport, differences in employee pay and benefits, and different dispatching systems. However, consolidations in communities across the United States, including many in California, have resulted in lasting arrangements in which agencies have been able to maintain their autonomy, improve service delivery. and realize significant cost savings.

ICMA's observations suggest that a regional consolidation model to include the Hermosa Beach Fire Department can provide efficient and effective services. We do not believe that the technical obstacles cited in recent consolidation efforts are insurmountable. HBFD has begun this process and has a proven track record of working successfully with its neighbors. In addition, the adjoining cities are in close proximity and joint response is a daily undertaking. These agencies work well together, they generally operate under a common dispatch center, and the communities are generally very similar.

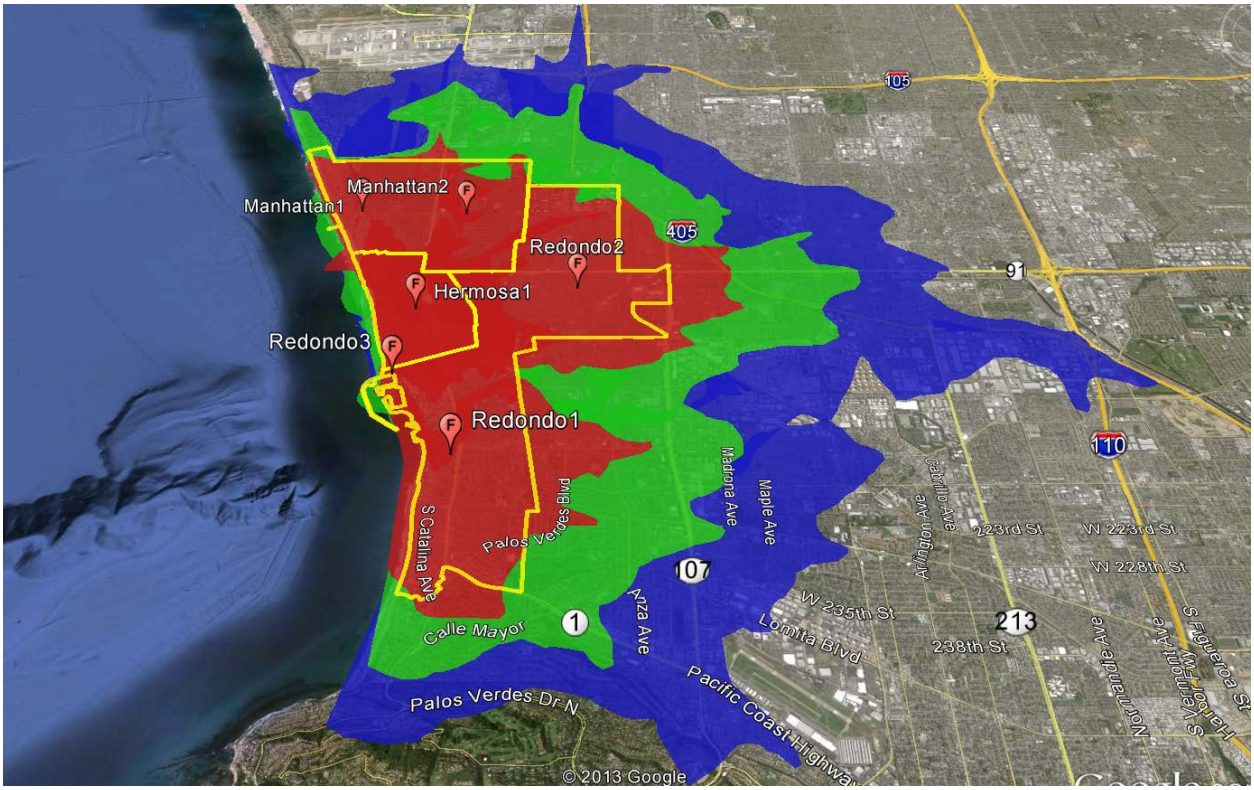
Table 12 provides a brief evaluation of the three-city area of Hermosa Beach, Redondo Beach, and Manhattan Beach. Figure 15 illustrates the very efficient travel times (does not consider certain times of the day with heavy traffic) of the three cities combined, in particular the almost 100 percent 240-second coverage of all three cities as a merged agency.

Table 12: Potential Consolidation Geographical Information

City	Population	# of Fire Stations	Square Miles	FY12 Budget (millions)	# of FTEs	2012 Alarms
Hermosa Beach	19,773	1	1.5	$4.9	18	1,716
Redondo Beach	66,748	3	6.2	$16.08	63	5,331
Manhattan Beach	35,135	2	3.9	$10.5	31	3,158
Total	121,389	6	11.62	$31.38	112	10,205

Figure 15: 240/360/480-Second Response Bleed Layers from the Hermosa Beach, Manhattan Beach, and Redondo Beach Fire Facilities

Red=240 seconds/Green = 360 seconds/Blue=480 seconds



Observations from this map include:

- Near 100-percent 240-second travel time coverage in all three cities.
- 100-percent 360- and 480-second travel time coverage in all three cities.

Recommendation:

- Preserve the options available for fire department consolidation.

Appendix A: Data Analysis Report

Introduction

This analysis covers all calls for service between May 1st, 2012, and April 30th, 2013, as recorded in the National Fire Incident Reporting System (NFIRS) by the Hermosa Beach Fire Department (HBFD). During the period covered by this study, the department operated out of one fire station with three frontline response apparatus, including one engine, one advanced life support (ALS) ambulance, and one basic life support (BLS) ambulance. In addition, the fire department also operated one reserve engine and one reserve utility unit.

During this period, HBFD units responded to 2,415 calls, including 755 mutual aid calls. HBFD units transported patients in 911 calls. Excluding mutual aid calls, the department responded to 23 structure fire calls and 22 outside fire calls. When mutual aid calls are included, the department responded to 51 structure fire and 24 outside fire calls. A total of 4,647 units were dispatched to all calls. The total combined yearly workload (deployed time) for all units was 2,104 hours. The average estimated response time was 5.3 minutes and the 90th percentile response time was 7.5 minutes.

This analysis is divided into four sections: the first section focuses on call types and dispatches; the second section explores time spent and workload of individual units; the third section presents analysis of the busiest hours in a year; and the fourth section provides a response time analysis.

The analysis is restricted to HBFD units. In cases where units other than HBFD units arrive on scene, the response time reflects the response time of the HBFD unit that arrives first.

Methodology

In this report, we analyze calls and runs. A call is an emergency service request or incident. A run is a dispatch of a unit. Thus, a call might include multiple runs.

We first processed the data to improve its accuracy. We first validated the data recorded in NFIRS using computer-aided dispatch (CAD) data. In cases where the timestamps were not recorded in NFIRS and were recorded in CAD, we used the CAD data. In all other cases we used the NFIRS data. We started with a total of 2,482 incidents recorded in NFIRS. We removed nine duplicate incidents which occurred at the same time and location, six calls where no units were dispatched, and forty-three where no HBFD units were dispatched. A total of nine incidents that were solely responded to by utility vehicle and the arson unit are not included in the first four sections of the report. Nevertheless, the workload associated with these units is documented in Appendix II. All canceled calls are included in the report.

We classified the remaining calls in a series of steps. When possible, we used standard NFIRS incident types to identify a call. The classification based upon these types is documented in Appendix III. As NFIRS does not describe the nature of EMS calls, these were distinguished based

on the EMS assessment information from the regional dispatch center. When the description was not available, EMS calls were listed, by default, as "illness and other."

For this report, we took the following steps to categorize all calls as mutual aid, canceled, fire, or EMS. First, we identified mutual aid calls, which were identified by "aid type" in NFIRS. Next, the NFIRS incident type allowed us to identify (non-mutual aid) canceled calls. All other calls were identified as either fire category or EMS category calls. We also separately categorized the mutual aid calls into fire and EMS categories and provided a summary of these calls.

In this report, mutual aid and canceled calls are included within the introductory summary and all analyses of the fire department's workload. However, they are not included in the response time analysis.

The NFIRS and CAD data recorded was not sufficient to identify calls responded with lights and sirens. HBFD identified NFIRS incident types that required lights and sirens responses and those calls were used in response time analysis.

Aggregate Call Totals and Dispatches

During the year studied, the Hermosa Beach Fire Department responded to 2,415 calls. Of these, 23 were structure fire calls and 22 were outside fire calls. There were 1,152 emergency medical service (EMS) calls.

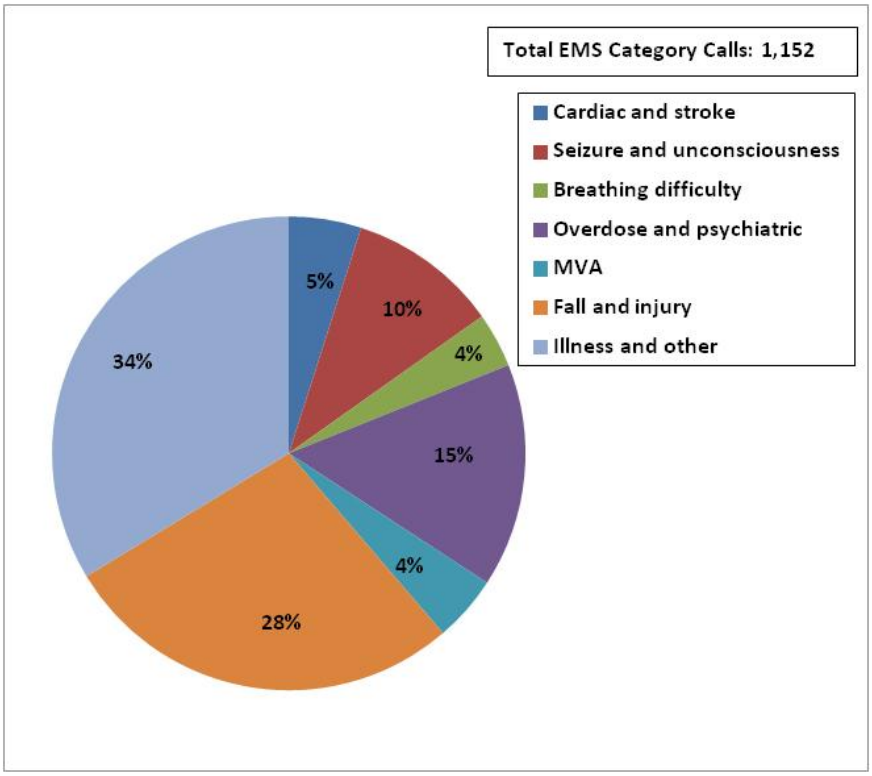
TABLE 1: Call Types

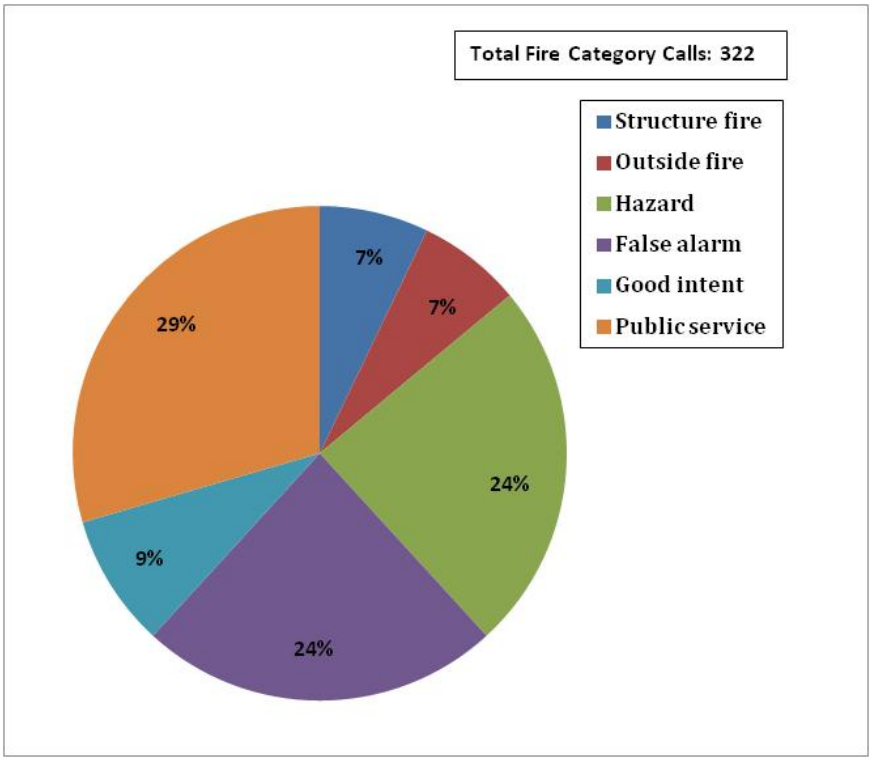
Call Type	Number of Calls	Calls per Day	Call Percentage
Cardiac and stroke	57	0.2	2.4
Seizure and unconsciousness	118	0.3	4.9
Breathing difficulty	43	0.1	1.8
Overdose and psychiatric	176	0.5	7.3
MVA	52	0.1	2.2
Fall and injury	318	0.9	13.2
Illness and other	388	1.1	16.1
EMS Total	**1,152**	**3.2**	**47.7**
Structure fire	23	0.1	1.0
Outside fire	22	0.1	0.9
Hazard	78	0.2	3.2
False alarm	76	0.2	3.1
Good intent	28	0.1	1.2
Public service	95	0.3	3.9
Fire Total	**322**	**0.9**	**13.3**
Mutual aid	755	2.1	31.3
Canceled	186	0.5	7.7
Total	**2,415**	**6.6**	**100**

Observations:

- The department received 6.6 calls, including 0.5 canceled calls and 2.1 mutual aid calls, per day.
- EMS calls for the year totaled 1,152 (48 percent of all calls), averaging 3.2 per day.
- Fire calls for the year totaled 322 (13 percent of all calls), averaging 0.9 per day.
- Structure and outside fires combined for a total of 45 calls during the year, averaging one call every 8.1 days.
- Of the 755 mutual aid calls, 314 calls (42 percent) were canceled.

FIGURE 1: EMS and Fire Calls by Type

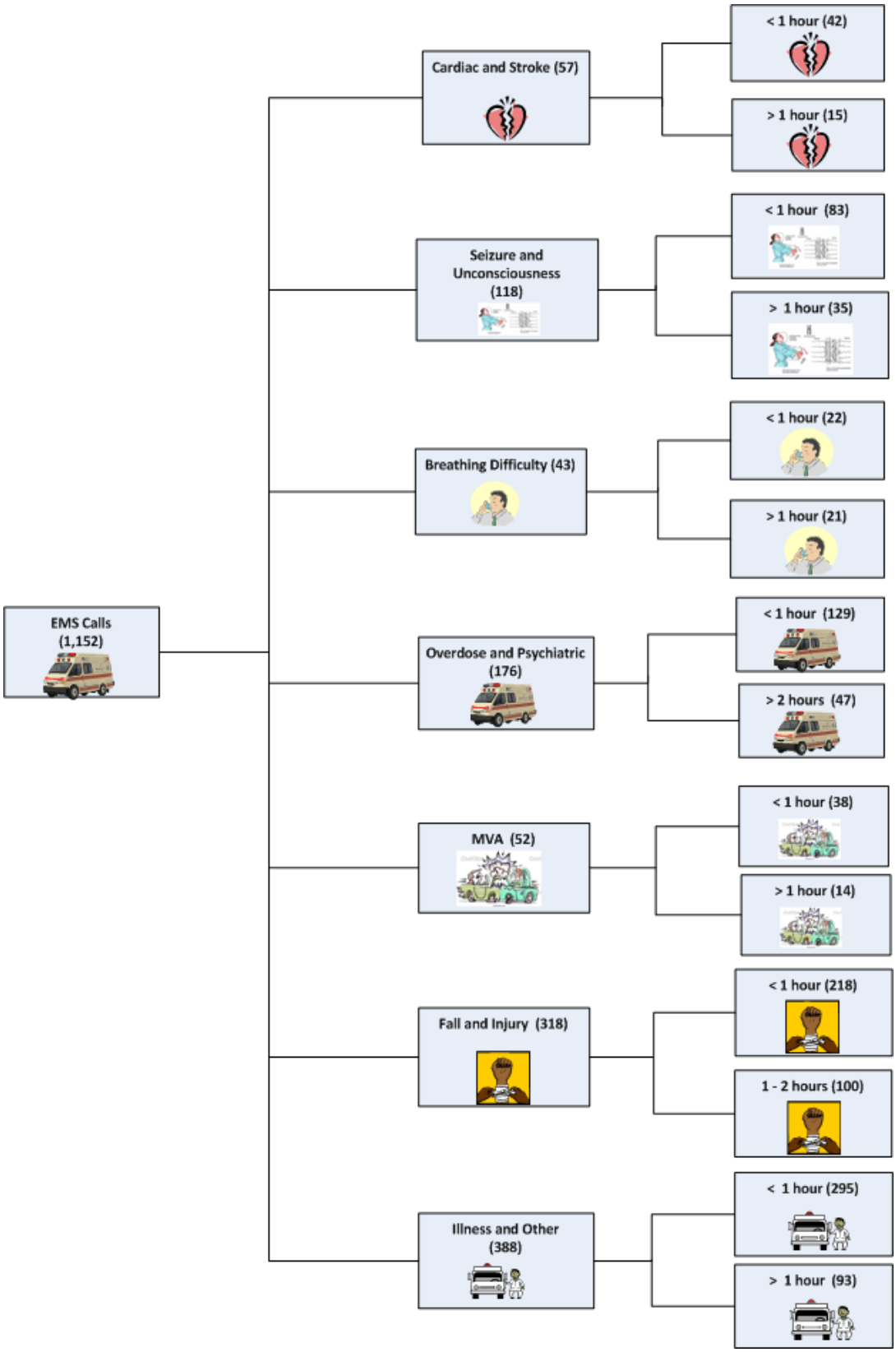




Observations:

- A total of 23 structure fire calls accounted for 7 percent of the fire category total.
- A total of 22 outside fire calls accounted for 7 percent of the fire category total.
- Public service calls were the largest fire call category and accounted for 29 percent of the fire category total.
- False alarm calls were 24 percent of the fire category total.
- Illness and other calls were the largest EMS call category and 34 percent of the EMS category total.
- Cardiac or stroke calls were 5 percent of the EMS category total.
- Motor vehicle accidents were 5 percent of the EMS category total.

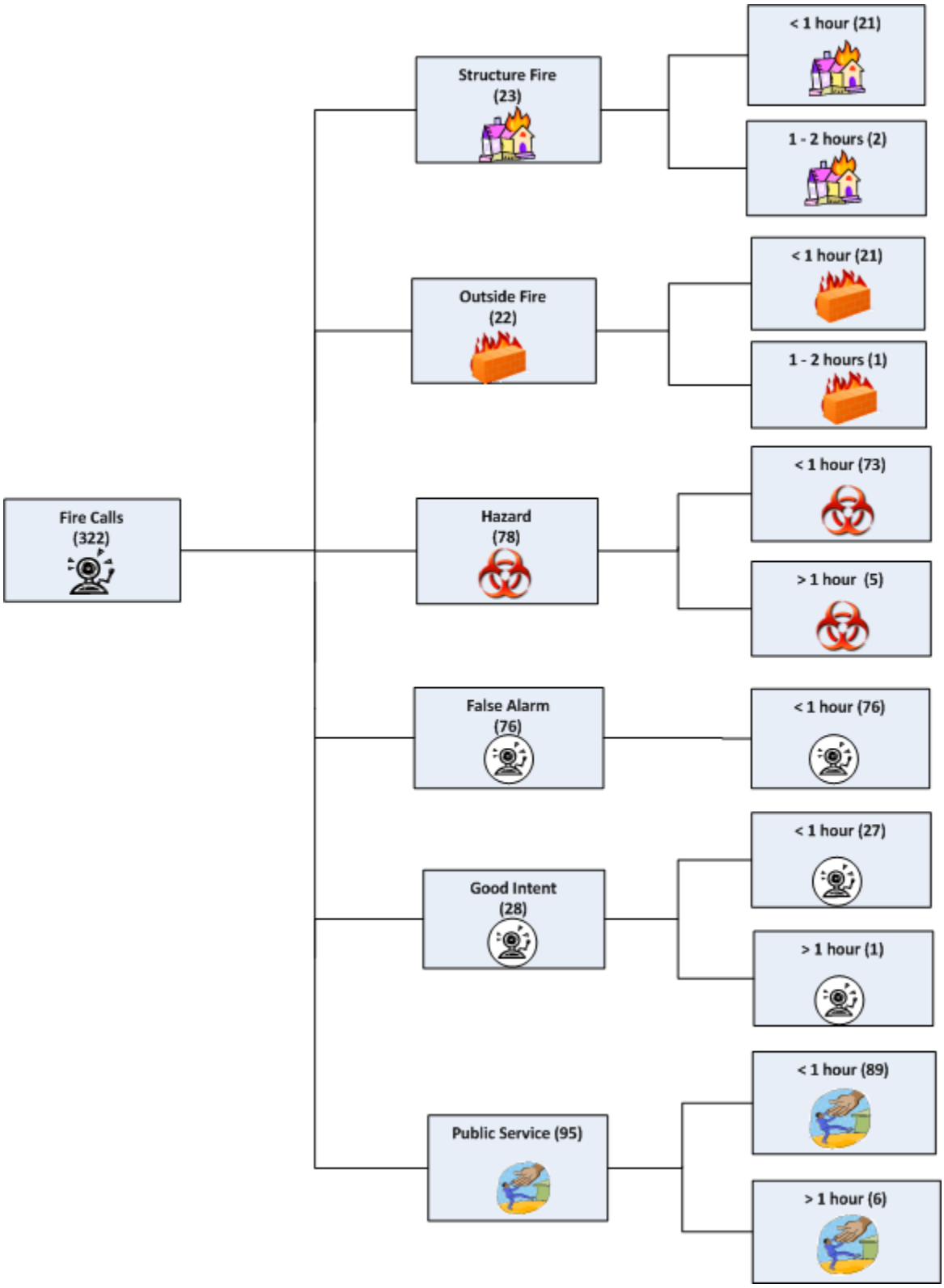
FIGURE 2: EMS Calls by Type and Duration



Observations:

- A total of 827 EMS category calls (72 percent) lasted less than one hour, 303 EMS category calls (26 percent) lasted between one and two hours, and 22 EMS category calls (2 percent) lasted more than two hours. On average, there were 0.9 EMS category calls per day that lasted more than one hour.
- A total of 42 cardiac and stroke calls (74 percent) lasted less than one hour, and 15 cardiac and stroke calls (26 percent) lasted more than an hour.
- A total of 38 motor vehicle accident calls (73 percent) lasted less than one hour, and 14 motor vehicle accident calls (27 percent) lasted more than an hour.

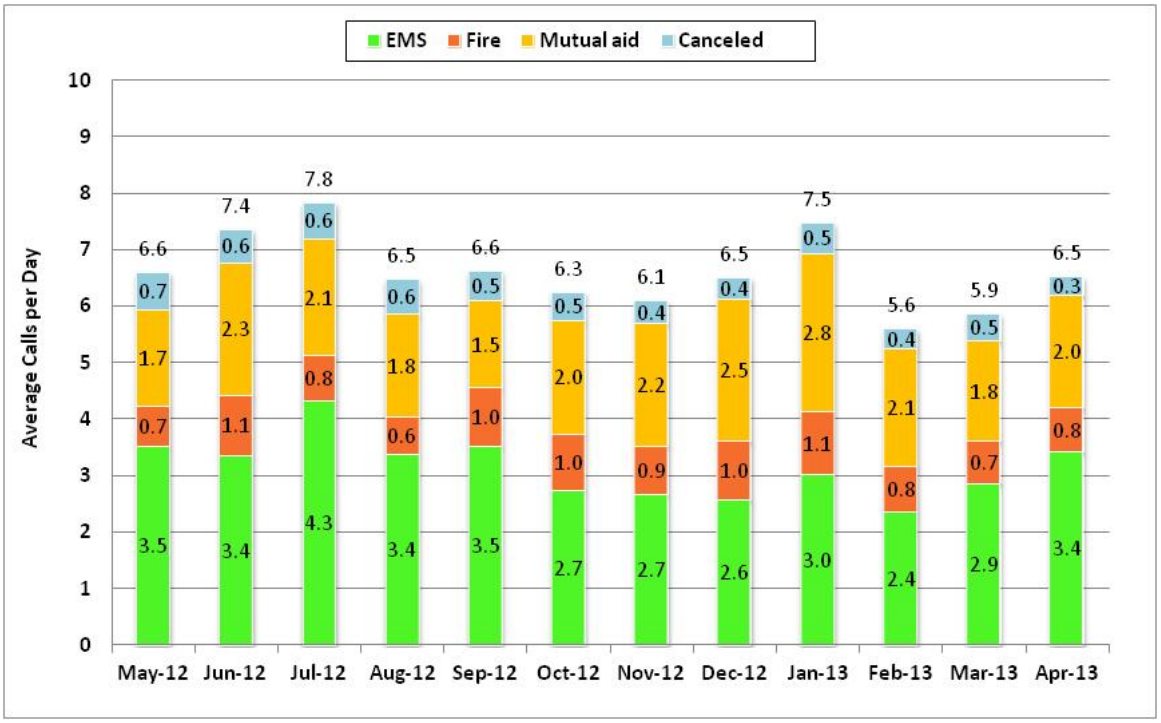
FIGURE 3: Fire Calls by Type and Duration



Observations:

- A total of 307 fire category calls (95 percent) lasted less than one hour, 12 fire category calls (4 percent) lasted between one and two hours, and 3 fire category calls (1 percent) lasted more than two hours.
- A total of 21 structure fire calls (91 percent) lasted less than one hour and 2 structure fire calls (9 percent) lasted between one and two hours.
- A total of 21 outside fire calls (95 percent) lasted less than one hour and 1 outside fire call (5 percent) lasted between one and two hours.
- A total of 76 false alarms (100 percent) lasted less than one hour.

FIGURE 4: Average Calls per Day, by Month



Observations:

- Average calls per day ranged from a low of 5.6 calls per day in February 2013 to a high of 7.8 calls per day in July 2012. The highest monthly average was 39 percent greater than the lowest monthly average.
- Average EMS calls per day ranged from a low of 2.4 calls per day in February 2013 to a high of 4.3 calls per day in July 2012.
- Average fire calls per day ranged from a low of 0.6 calls per day in August 2012 to a high of 1.1 calls per day in both June 2012 and January 2013.
- Average mutual aid calls per day ranged from a low of 1.5 calls per day in September 2012 to a high of 2.8 calls per day in January 2013.
- Average canceled calls per day ranged from a low of 0.3 calls per day in April 2013 to a high of 0.7 calls per day in May 2012.

FIGURE 5: Calls by Hour of Day

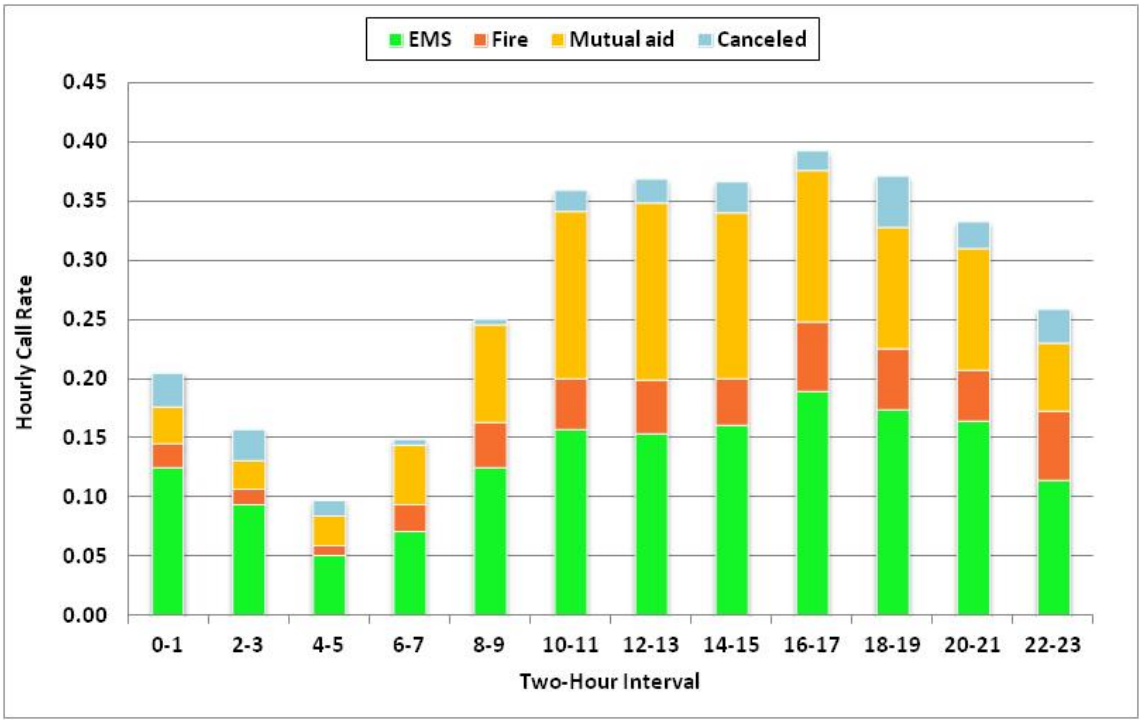


TABLE 2: Calls by Hour of Day

Two-Hour Interval	Hourly Call Rate				
	EMS	Fire	Mutual Aid	Canceled	Total
0-1	0.12	0.02	0.03	0.03	0.21
2-3	0.09	0.01	0.02	0.03	0.16
4-5	0.05	0.01	0.03	0.01	0.10
6-7	0.07	0.02	0.05	0.01	0.15
8-9	0.12	0.04	0.08	0.01	0.25
10-11	0.16	0.04	0.14	0.02	0.36
12-13	0.15	0.05	0.15	0.02	0.37
14-15	0.16	0.04	0.14	0.03	0.37
16-17	0.19	0.06	0.13	0.02	0.39
18-19	0.17	0.05	0.10	0.04	0.37
20-21	0.16	0.04	0.10	0.02	0.33
22-23	0.11	0.06	0.06	0.03	0.26
Calls per Day	**3.16**	**0.88**	**2.07**	**0.51**	**6.62**

Note: Average calls per day shown are the sum of each column multiplied by two, since each cell represents two hours.

Observations:

- Hourly call rates averaged between 0.10 calls and 0.39 calls per hour.
- Call rates were highest during the day between 10:00 a.m. and 10:00 p.m., averaging between 0.33 and 0.39 calls per hour. The rate peaked between 4:00 p.m. and 6:00 p.m., when it averaged 0.39 calls per hour.
- Call rates were lowest between 2:00 a.m. and 8:00 a.m., averaging between 0.10 to 0.16 calls per hour. This is equivalent to one call in this six-hour period of the day.

TABLE 3: Number of Transport Calls by Call Type

Call Type	Number of Calls	Calls per Day	Percentage
Cardiac and stroke	41	0.1	4.5
Seizure and unconsciousness	93	0.3	10.2
Breathing difficulty	40	0.1	4.4
Overdose and psychiatric	110	0.3	12.1
MVA	12	0.0	1.3
Fall and injury	137	0.4	15.0
Illness and other	147	0.4	16.1
Mutual aid	331	0.9	36.4
Total	**911**	**2.5**	**100.0**

Note: Transport calls were identified when at least one responding unit had recorded an arrival at a hospital.

Observations:

- Hermosa Beach Fire Department transported patients in 911 calls, averaging 2.5 transport calls per day.
- 37 percent of transport calls are mutual aids, averaging 0.9 mutual aid transport calls per day.

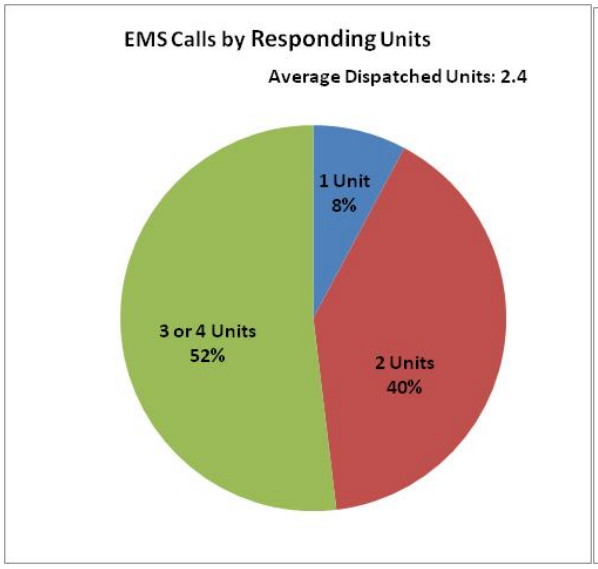
TABLE 4: Frequency Distribution of the Number of Transport Calls

Number of Transport Calls in a Day	Frequency	Percentage
0	37	10.1
1	70	19.2
2	104	28.5
3	58	15.9
4	54	14.8
5	26	7.1
6	7	1.9
7	5	1.4
8	2	0.5
10	2	0.5

Observations:

- The largest number of transport calls in a day, 10 calls per day, occurred twice (August 12, 2012, and March 17, 2013) in the study year.
- In 16 days of the year, the HBFD transported patients during 6 or more calls.
- In 37 days of the year, no patients were transported.

FIGURE 6: Number of Units Dispatched to Calls



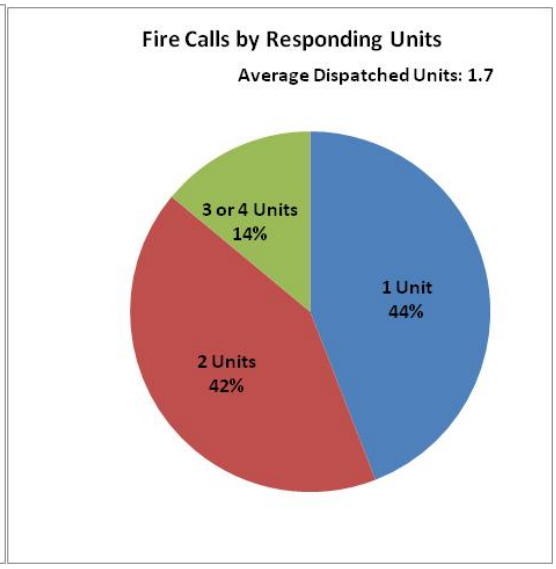


TABLE 5: Number of Units Dispatched to Calls

Call Type	Number of Units			Total
	One	Two	Three or Four	
Cardiac and stroke	4	17	36	57
Seizure and unconsciousness	3	50	65	118
Breathing difficulty	2	17	24	43
Overdose and psychiatric	12	72	92	176
MVA	7	22	23	52
Fall and injury	25	136	157	318
Illness and other	37	150	201	388
EMS Total	**90**	**464**	**598**	**1,152**
Structure fire	5	11	7	23
Outside fire	10	10	2	22
Hazard	32	38	8	78
False alarm	30	30	16	76
Good intent	14	12	2	28
Public service	51	34	10	95
Fire Total	**142**	**135**	**45**	**322**
Mutual aid	689	58	8	755
Canceled	31	69	86	186
Grand Total	**952**	**726**	**737**	**2,415**
Percentage	**39.4**	**30.1**	**30.5**	**100**

Observations:

- Overall, three or four units were dispatched to 31 percent of calls. Of all calls, four units were dispatched 4 times, responding to EMS calls.
- On average, 1.7 units were dispatched per fire category call.
- For fire category calls, one unit was dispatched 44 percent of the time, two units were dispatched 42 percent of the time, and three units were dispatched 14 percent of the time.
- For structure fire calls, one unit was dispatched 22 percent of the time, two units were dispatched 48 percent of the time, and three units were dispatched 30 percent of the time.
- For outside fire calls, one unit was dispatched 45 percent of the time, two units were dispatched 45 percent of the time, and three units were dispatched 9 percent of the time.
- On average, 2.4 units were dispatched per EMS category call.
- For EMS category calls, one unit was dispatched 8 percent of the time, two units were dispatched 40 percent of the time, and three or four units were dispatched 52 percent of the time.
- For mutual aid calls, one unit was dispatched 91 percent of the time, two units were dispatched 8 percent of the time, and three units were dispatched 1 percent of the time.
- For canceled calls, one unit was dispatched 17 percent of the time, two units were dispatched 37 percent of the time, and three units were dispatched 46 percent of the time.

TABLE 6: Annual Deployed Time by Call Type

Call Type	Average Deployed Minutes per Run	Annual Hours	Percent of Total Hours	Deployed Minutes per Day	Annual Number of Runs	Runs per Day
Cardiac and stroke	36.6	89	4.3	14.6	146	0.4
Seizure and unconsciousness	35.0	174	8.3	28.5	298	0.8
Breathing difficulty	41.1	74	3.5	12.2	108	0.3
Overdose and psychiatric	32.3	233	11.2	38.3	433	1.2
MVA	27.9	56	2.7	9.2	120	0.3
Fall and injury	28.7	368	17.6	60.4	769	2.1
Illness and other	26.4	415	19.9	68.2	942	2.6
EMS Total	**30.0**	**1,408**	**67.5**	**231.5**	**2,816**	**7.7**
Structure fire	21.7	17	0.8	2.8	48	0.1
Outside fire	16.4	10	0.5	1.6	36	0.1
Hazard	21.3	47	2.2	7.7	132	0.4
False alarm	12.0	28	1.3	4.5	138	0.4
Good intent	11.9	9	0.4	1.4	44	0.1
Public service	15.7	39	1.9	6.4	149	0.4
Fire Total	**16.4**	**149**	**7.2**	**24.6**	**547**	**1.5**
Mutual aid	35.5	490	23.5	80.5	829	2.3
Canceled	5.6	40	1.9	6.6	427	1.2
Total	**27.1**	**2,088**	**100.0**	**343.2**	**4,619**	**12.7**

Note: Each dispatched unit is a separate "run." As multiple units are dispatched to a call, there are more runs than calls. Therefore, the department recorded 6.6 calls per day and 12.7 runs per day.

Observations:

- Total deployed time for the year, or deployed hours, was 2,088 hours. This is the total deployment time of all the units deployed on all type of calls, including 490 hours spent on mutual aid calls. The deployed hours for all units combined averaged approximately 5.7 hours per day.
- There were 4,619 runs, including 829 runs dispatched for mutual aid calls. The daily average was 12.7 runs for all units combined.
- Fire category calls accounted for 7.2 percent of the total workload.
- There were 84 runs for structure and outside fire calls, with a total workload of 27 hours. This accounted for 1.3 percent of the total workload. The average deployed time for structure fire calls was 22 minutes and the average deployed time for outside fire calls was 16 minutes.
- EMS calls accounted for 67.5 percent of the total workload. The average deployed time for EMS calls was 30 minutes. The deployed hours for all units dispatched to EMS calls averaged 3.9 hours per day.
- Mutual aid call accounted for 23.5 percent of the total workload. Of the 829 runs for mutual aid calls, 338 runs (41 percent of mutual aid runs) were canceled and the total deployed time of those canceled runs was 35 hours (7 percent of total deployed mutual aid hours).

Workload by Individual Unit—Calls and Total Time Spent

In this section, the actual time spent by each unit on calls is reported in two types of statistics: workload and runs. A dispatch of a unit is defined as a *run*; thus a call might include multiple runs.

TABLE 7: Call Workload by Unit

Unit Type	Unit ID	Average Deployed Minutes per Run	Annual Number of Runs	Annual Hours	Runs per Day	Deployed Minutes per Day
BLS ambulance	A12	37.4	1,246	775.9	3.4	127.5
Reserve Engine	E11	14.8	165	40.7	0.5	6.7
Engine	E12	16.9	1,557	437.4	4.3	71.9
ALS ambulance	R11	30.3	1,651	833.8	4.5	137.1

Observations:

- ALS ambulance R11 was the unit deployed the most often and had the most deployed hours. It averaged 4.5 runs and 137.1 minutes per day.
- BLS ambulance A12 was dispatched on an average of 3.4 runs per day and was deployed 127.5 minutes per day.
- Engine E12 was dispatched on an average of 4.3 runs per day and was deployed 71.9 minutes per day.
- Reserve engine E11 (when filling in for Engine 12) was dispatched 165 runs, and its total annual deployed time was 40.7 hours.

FIGURE 7: Deployed Minutes by Hour of Day

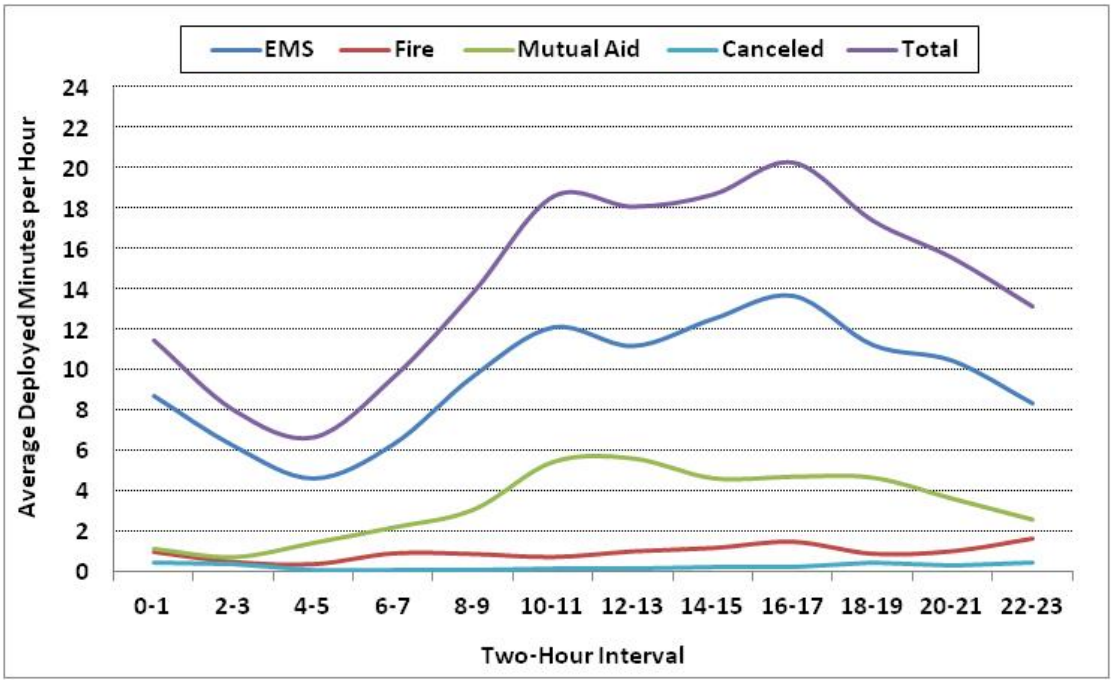


TABLE 8: Deployed Minutes by Hour of Day

Two-Hour Interval	EMS	Fire	Mutual Aid	Canceled	Total
0-1	8.8	1.0	1.2	0.5	11.5
2-3	6.3	0.5	0.8	0.4	8.0
4-5	4.7	0.4	1.5	0.1	6.7
6-7	6.4	1.0	2.2	0.1	9.7
8-9	9.7	0.9	3.1	0.1	13.9
10-11	12.2	0.8	5.5	0.2	18.6
12-13	11.2	1.1	5.6	0.2	18.1
14-15	12.6	1.2	4.7	0.2	18.7
16-17	13.7	1.5	4.7	0.3	20.3
18-19	11.3	1.0	4.7	0.5	17.4
20-21	10.5	1.1	3.7	0.3	15.6
22-23	8.4	1.7	2.6	0.4	13.2
Daily Total	231.5	24.6	80.5	6.6	343.2

Note: Daily totals shown equal the sum of each column multiplied by two, since each cell represents two hours.

Observations:

- Hourly deployed minutes were highest during the day between 10:00 a.m. and 8:00 p.m., averaging between 17.4 minutes and 20.3 minutes per hour. Average deployed minutes peaked between 4:00 p.m. and 6:00 p.m., averaging 20.3 minutes per hour.
- Hourly deployed minutes were the lowest between 2:00 a.m. and 8:00 a.m., averaging fewer than 10 minutes per hour.

TABLE 9: Fire Equipment: Total Annual and Daily Average Number of Runs by Call Type and Unit

Unit	EMS	**Structure Fire**	**Outside Fire**	Hazard	False Alarm	Good Intent	Public Service	Mutual Aid	Canceled	**Total**	**Runs per Day**
E11	108	**0**	**1**	7	5	4	11	14	15	**165**	**0.5**
E12	995	**18**	**18**	71	71	23	74	124	163	**1,557**	**4.3**

Note: A dispatch of a unit is defined as a *run*; thus a call might include multiple runs.

TABLE 10: Fire Equipment: Daily Average Deployed Minutes by Call Type and Unit

Unit	EMS	**Structure Fire**	**Outside Fire**	Hazard	False Alarm	Good Intent	Public Service	Mutual Aid	Canceled	**Total**	**Fire Category Calls Percentage**
E11	4.9	**0.0**	**0.0**	0.2	0.3	0.1	0.6	0.6	0.1	**6.7**	**26.9**
E12	50.6	**1.1**	**1.0**	4.6	2.4	0.8	3.4	5.9	2.1	**71.9**	**29.6**

Observations:

- Engine E12 made 1,557 runs during the year, averaging 4.3 runs per day. However, the vast majority of runs were not fire calls. Structure and outside fire runs accounted for just 36 of the runs.
- Reserve engine E11 was dispatched 165 times during the year.
- Engine E12 was deployed an average of 71.9 minutes (one hour and 12 minutes) per day. The unit spent 70 percent of its deployed time responding to EMS calls.
- Engine 11 averaged 6.7 minutes of deployed time per day.

TABLE 11: Ambulance Units: Total Annual and Daily Average Number of Runs by Call Type and Unit

Unit	Cardiac and Stroke	Seizure and Unconsciousness	Breathing Difficulty	Overdose and Psychiatric	MVA	Fall and Injury	Illness and Other	Structure and Outside Fire	Fire Other	Mutual Aid	Canceled	**Total**	**Runs per Day**
R11	51	111	43	160	42	298	337	21	70	374	144	**1,651**	**4.5**
A12	38	68	25	106	27	179	228	26	127	317	105	**1,246**	**3.4**

Note: A dispatch of a unit is defined as a *run*; thus a call might include multiple runs.

TABLE 12: Ambulance Units: Daily Average Deployed Minutes by Call Type and Unit

Unit	Cardiac and Stroke	Seizure and Unconsciousness	Breathing Difficulty	Overdose and Psychiatric	MVA	Fall and Injury	Illness and Other	Structure and Outside Fire	Fire Other	Mutual Aid	Canceled	**Total**	**EMS Calls Percentage**
R11	7.2	16.6	6.9	18.3	3.4	24.2	27	1.1	1.9	27.9	2.6	**137.1**	**75.6**
A12	2.9	4.8	2.2	10.2	2.7	24.5	25.3	1.3	5.8	46.1	1.8	**127.5**	**56.9**

Observations:

- R11 made 1,651 runs during the year, averaging 4.5 runs per day.
- A12 made 1,246 runs during the year, averaging 3.4 runs per day.
- On average, R11 was deployed 137.1 minutes (two hours and 17 minutes) per day. EMS calls accounted for 76 percent of its daily workload.
- On average, A12 was deployed 127.5 minutes (two hours and eight minutes) per day. EMS calls accounted for 57 percent of its daily workload.

Analysis of Busiest Hours

There is significant variability in the number of calls from hour to hour. One special concern relates to the fire and EMS resources available for hours with the heaviest workload. We tabulated the data for each of the 8,760 hours in the year. Approximately once every 29 hours (1 day and 5 hours), the Hermosa Beach Fire Department responded to two or more calls in an hour. This is less than 3.4 percent of the total number of hours. We report the top ten hours with the most calls received and discuss the two hours with the most calls received.

TABLE 13: Frequency Distribution of the Number of Calls

Number of Calls in an Hour	Frequency	Percentage
0	6,690	76.4
1	1,763	20.1
2	273	3.1
3	30	0.3
4	4	0.0

Observations:

- During 273 hours (3.1 percent of all hours), two calls occurred; in other words, HBFD responded to two calls in an hour roughly once every 32 hours (one day and eight hours).
- Three or four calls occurred during 34 hours of the year.

TABLE 14: Top 10 Hours with the Most Calls Received

Hour	Number of Calls	Number of Runs	Total Deployed Hours
7/4/2012, 7 p.m. to 8 p.m.	4	8	1.9
7/4/2012, 6 p.m. to 7 p.m.	4	6	2.5
9/2/2012, 11 p.m. to 12 a.m.	4	5	2.2
10/28/2012, 6 p.m. to 7 p.m.	4	5	1.5
8/12/2012, 2 a.m. to 3 a.m.	3	8	2.9
1/11/2012, 10 p.m. to 11 p.m.	3	8	0.9
7/4/2012, 4 p.m. to 5 p.m.	3	7	1.9
7/7/2012, 5 p.m. to 6 p.m.	3	7	2.1
6/27/2012, 7 p.m. to 8 p.m.	3	6	1.7
1/9/2013, 11 a.m. to 12 p.m.	3	6	2.4

Note: The combined workload is the total deployed minutes spent responding to calls received in the hour, and which may extend into the next hour or hours.

Observations:

- The hour with the most calls received was 7:00 p.m. to 8:00 p.m. on July 4, 2012. The four calls involved eight individual dispatches. These four calls included one illness and other call, one fall and injury call, one mutual aid, and one canceled call. The combined workload was 1.9 hours. The longest call was the fall and injury call; it lasted 52 minutes. The fall and injury call was responded to by three units.
- During the hour from 6:00 p.m. to 7:00 p.m. on July 4, 2012, four calls involving six individual dispatches occurred. These four calls included one illness and other call, one seizure and unconscious call, one mutual aid, and one canceled call. The combined workload was 2.5 hours. The longest call was the illness and other call; it lasted 50.5 minutes. It was responded to by two individual units.
- Three of the hours with the most calls received occurred on July 4, 2012.

The HBFD Fire Department is staffed with two ambulances and one engine at a time. When events remain active simultaneously or when a call requires a larger number of resources, mutual aid is requested. Thus, understanding how often multiple calls overlap is important when assessing the department's overall needs. Here we report overlapping events. We examine EMS calls and fire calls separately as they require different types of resources. In addition, for this analysis, we do not distinguish between calls within Hermosa Beach and mutual aid (given) calls. Nevertheless, canceled calls are still removed.

To determine overlapping events, we looked at each individual call and then identified the number of other calls that began at any time between when the first call began and ended. "No overlapped call" would mean that no other call of the same type occurred while the department was involved in the first call. "One overlapping call" means that one additional call began while the first call was still in progress, and so forth.

TABLE 15: Analysis of Overlapping Calls, by Type

Description	EMS	Fire
No overlapped call	1,149	351
One overlapping call	187	10
Two overlapping calls	14	0
Three overlapping calls	1	0

Note: The "EMS" column includes regular EMS category calls and all mutual aid calls which fit our standard EMS descriptions (including accidents); this is also the case for the "Fire" column. For this reason, the total number of EMS and fire calls is larger than shown previously. At the same time, due to the way that overlaps are counted, the total within the "EMS" column is smaller than a simple combination of regular EMS calls and mutual aid EMS calls. Finally, percentages shown in the observation below still use the overall total of 1,548 EMS calls and 367 fire calls.

Observations:

- A total of 1,149 EMS calls (74 percent of all EMS and mutual aid EMS calls) had no overlapping call.
- Situations where one EMS call overlapped another EMS call happened 187 times in the study period.
- The most demanding situation occurred when one EMS call overlapped three other EMS calls on January 21, 2013. One long mutual aid EMS call lasted 85 minutes (one hour and 25 minutes). During that time period, one fall and injury call and two other mutual aid EMS calls occurred.
- A total of 351 fire calls (96 percent of all fire and mutual aid fire calls) had no overlapping call.
- Situations where one fire call overlapped another fire call happened 10 times in the study period.

Dispatch Time and Response Time

This section presents dispatch and response time statistics for different call types and fire units. The main focus is the dispatch and response time of the first arriving units for calls responded with lights and sirens.

Different terms are used to describe the components of response time: ***Dispatch processing time*** is the difference between the unit dispatch time and call received time of the first arriving unit. ***Turnout time*** is the difference between the unit time en route and the unit dispatch time. ***Travel time*** is the difference between the unit on-scene arrival time and the time en route. ***Response time*** is the difference between the on-scene arrival time and call received time.

The NFIRS and CAD data could not identify calls responded with lights and sirens. HBFD identified NFIRS incident types which required emergency responses and those calls were used in our response time analysis. We also excluded mutual aid calls, thereby limiting our response time analysis to calls within the city of Hermosa Beach. A total of 1,138 calls that had valid dispatch, turnout, and travel times were used in the analysis. This accounts for 77 percent of the EMS and fire category calls. The average dispatch time was 1.3 minutes. The average turnout time was 1.4 minutes, and the average travel time was 2.6 minutes. The average response time for EMS calls was 5.0 minutes, and the average response time for fire category calls was 7.3 minutes. The 90th percentile response time for EMS and fire category calls was 6.8 and 10.8 minutes, respectively.

TABLE 16: Average Dispatch, Turnout, Travel, and Response Times of First Arriving Unit, by Call Type

Call Type	Dispatch Time	Turnout Time	Travel Time	Response Time	Sample Size
Cardiac and stroke	1.3	1.4	2.2	4.9	45
Seizure and unconsciousness	1.0	1.2	2.2	4.4	107
Breathing difficulty	0.9	1.5	2.5	4.8	41
Overdose and psychiatric	1.2	1.5	2.3	5.0	142
MVA	1.3	1.2	2.3	4.9	47
Fall and injury	1.2	1.5	2.5	5.2	269
Illness and other	1.2	1.4	2.5	5.1	330
EMS Total	**1.2**	**1.4**	**2.4**	**5.0**	**981**
Structure fire	1.7	1.7	2.7	6.1	20
Outside fire	1.5	1.4	3.6	6.5	18
Hazard	2.2	1.4	4.3	7.9	38
False alarm	1.9	1.5	3.9	7.3	63
Good intent	1.9	1.4	4.6	7.9	18
Fire Total	**1.9**	**1.5**	**3.9**	**7.3**	**157**
Total	**1.3**	**1.4**	**2.6**	**5.3**	**1,138**

Note: First arriving units with valid dispatch, turnout, and travel times were used in this analysis.

FIGURE 8: Average Dispatch, Turnout, and Travel Times of First Arriving Unit, by EMS Call Type

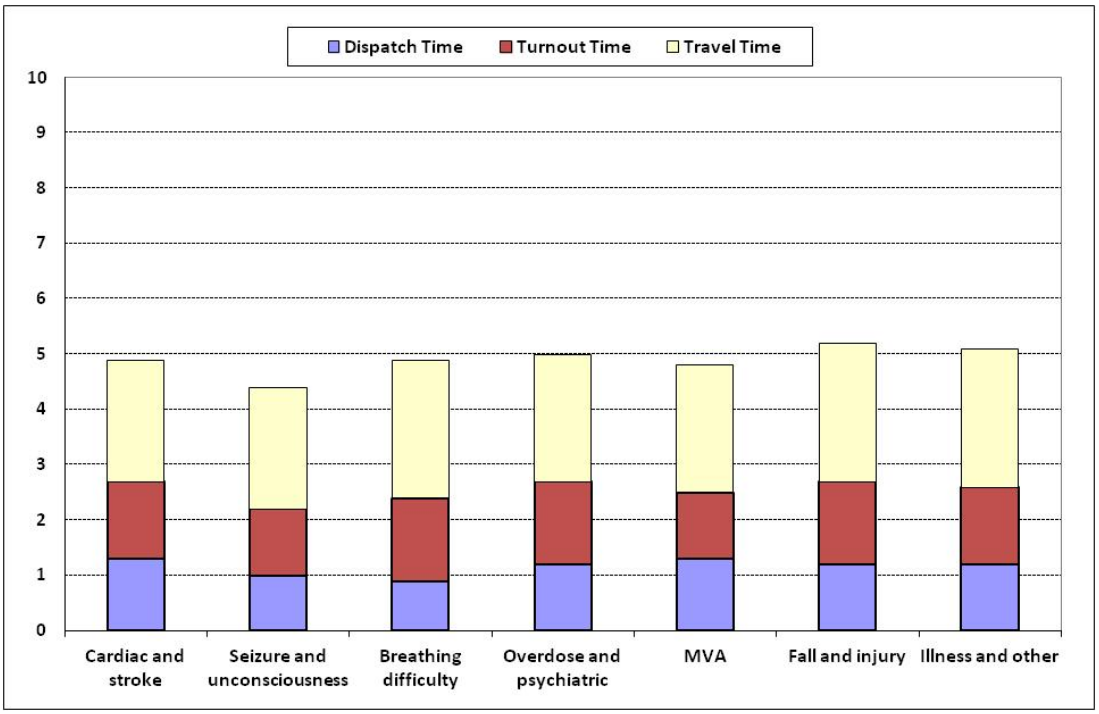
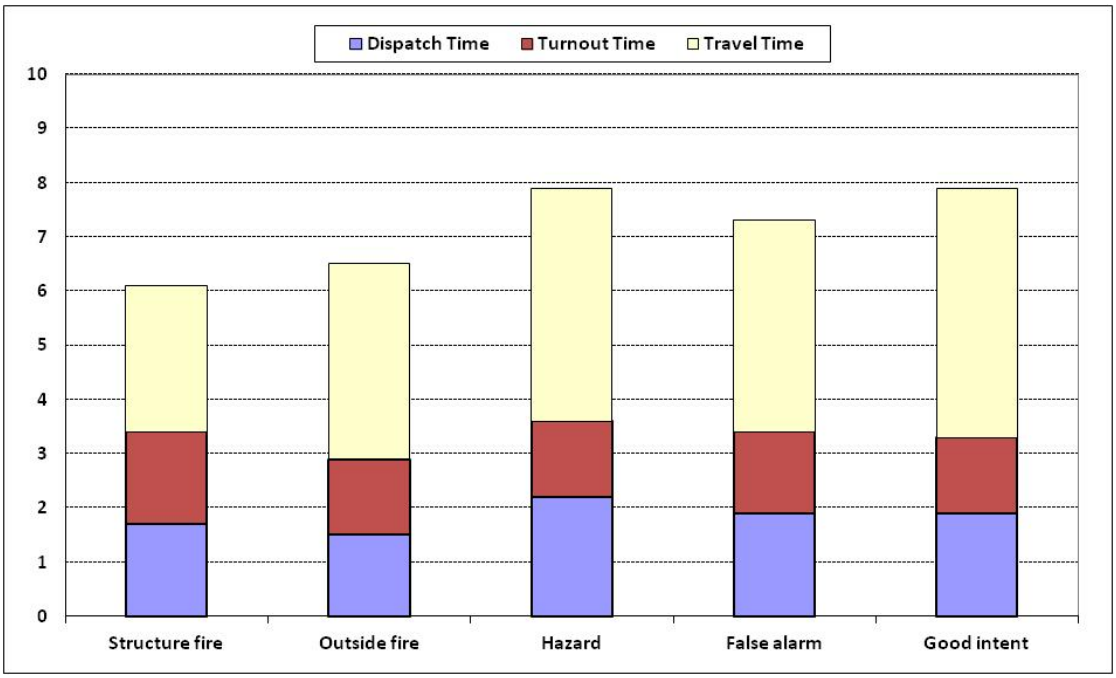


FIGURE 9: Average Dispatch, Turnout, and Travel Times of First Arriving Unit, by Fire Call Type



Observations:

- The average dispatch time was 1.3 minutes.
- The average turnout time was 1.4 minutes.
- The average travel time was 2.6 minutes.
- The average response time for EMS calls was 5.0 minutes.
- The average response time for fire category calls was 7.3 minutes.
- The average response time for structure fire calls was 6.1 minutes. The average response time for outside fire calls was 6.5 minutes.

TABLE 17: 90th Percentile Dispatch, Turnout, Travel, and Response Times of First Arriving Unit, by Call Type

Call Type	Dispatch Time	Turnout Time	Travel Time	Response Time	Sample Size
Cardiac and stroke	1.5	2.2	3.4	6.4	45
Seizure and unconsciousness	1.8	1.9	3.3	5.8	107
Breathing difficulty	1.5	2.4	3.3	6.3	41
Overdose and psychiatric	2.0	2.4	3.3	6.7	142
MVA	2.0	1.8	3.8	6.5	47
Fall and injury	2.0	2.3	4.0	7.2	269
Illness and other	1.9	2.2	3.8	6.9	330
EMS Total	**1.9**	**2.2**	**3.6**	**6.8**	**981**
Structure fire	3.0	2.0	3.3	10.1	20
Outside fire	3.4	2.0	6.9	9.6	18
Hazard	4.6	2.5	7.2	11.7	38
False alarm	3.3	2.6	7.2	11.1	63
Good intent	3.6	2.3	10.1	11.5	18
Fire Total	**3.6**	**2.5**	**7.1**	**11.1**	**157**
Total	**2.1**	**2.2**	**4.0**	**7.5**	**1,138**

Note: A 90th percentile value of 7.5 indicates that the total response time was less than 7.5 minutes for 90 percent of all calls. Unlike averages, the 90th percentile response time is not equal to the sum of 90th percentile of dispatch time, turnout time, and travel time.

Observations:

- The 90th percentile dispatch time was 2.1 minutes.
- The 90th percentile turnout time was 2.2 minutes.
- The 90th percentile travel time was 4.0 minutes.
- The 90th percentile response time for EMS calls was 6.8 minutes.
- The 90th percentile response time for fire category calls was 11.1 minutes.
- The 90th percentile response time for structure fire calls was 10.1 minutes.
- The 90th percentile response time for outside fire calls was 9.6 minutes.

FIGURE 10: Average Dispatch, Turnout, Travel, and Response Time of First Arriving Unit, by Hour of Day

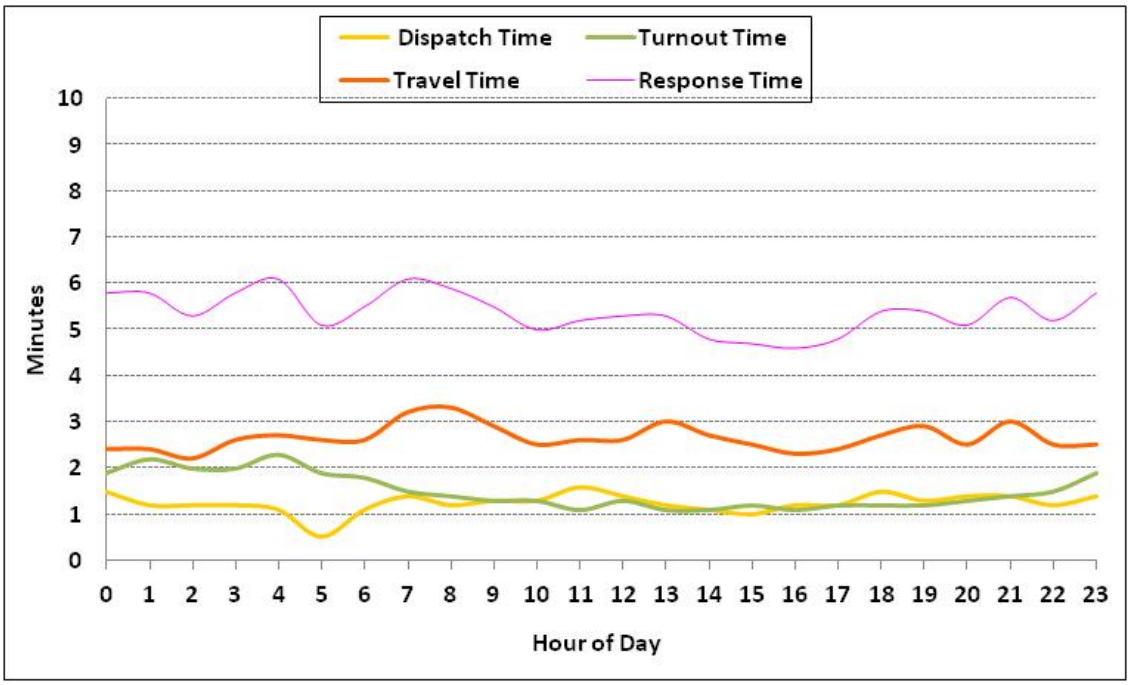


TABLE 18: Average Dispatch, Turnout, Travel, and Response Times of First Arriving Unit, by Hour of Day

Hour	Dispatch Time	Turnout Time	Travel Time	Response Time	Sample Size
0	1.5	1.9	2.4	5.8	46
1	1.2	2.2	2.4	5.8	43
2	1.2	2.0	2.2	5.3	41
3	1.2	2.0	2.6	5.8	22
4	1.1	2.3	2.7	6.1	25
5	0.5	1.9	2.6	5.1	9
6	1.1	1.8	2.6	5.5	28
7	1.4	1.5	3.2	6.1	32
8	1.2	1.4	3.3	5.9	44
9	1.3	1.3	2.9	5.5	49
10	1.3	1.3	2.5	5.0	48
11	1.6	1.1	2.6	5.2	66
12	1.4	1.3	2.6	5.3	54
13	1.2	1.1	3.0	5.3	51
14	1.1	1.1	2.7	4.8	52
15	1.0	1.2	2.5	4.7	54
16	1.2	1.1	2.3	4.6	65
17	1.2	1.2	2.4	4.8	62
18	1.5	1.2	2.7	5.4	64
19	1.3	1.2	2.9	5.4	71
20	1.4	1.3	2.5	5.1	63
21	1.4	1.4	3.0	5.7	53
22	1.2	1.5	2.5	5.2	44
23	1.4	1.9	2.5	5.8	52

Observations:

- Average dispatch time was between 0.5 and 1.6 minutes.
- Average turnout time was between 1.1 and 2.3 minutes. Between 1:00 a.m. and 5:00 a.m., the average turnout time was consistently more than 2.0 minutes.
- Average travel time was between 2.2 and 3.3 minutes.
- Average response time was between 4.6 and 6.1 minutes. Between 4:00 a.m. and 5:00 a.m., and between 7:00 a.m. and 8:00 a.m., the average response time peaked at 6.1 minutes.

TABLE 19: Number of Total Calls by First Arriving Units

Unit	EMS	Structure and Outside Fire	Other Fire	Total	Percentage	Cumulative Percentage
R11	715	13	12	740	65.0	65.0
E12	199	22	89	310	27.2	92.3
A12	48	2	11	61	5.4	97.6
E11	19	1	7	27	2.4	100.0

Observations:

- Ambulance unit R11 arrived first on scene most often, followed by engine E12. The top two first arriving units accounted for 92 percent of the first arrivals at calls.
    - For structure and outside fire calls, engine E12 arrived first on scene most often.

FIGURE 11: Cumulative Distribution Function (CDF) of Response Time of First Arriving Unit for EMS calls

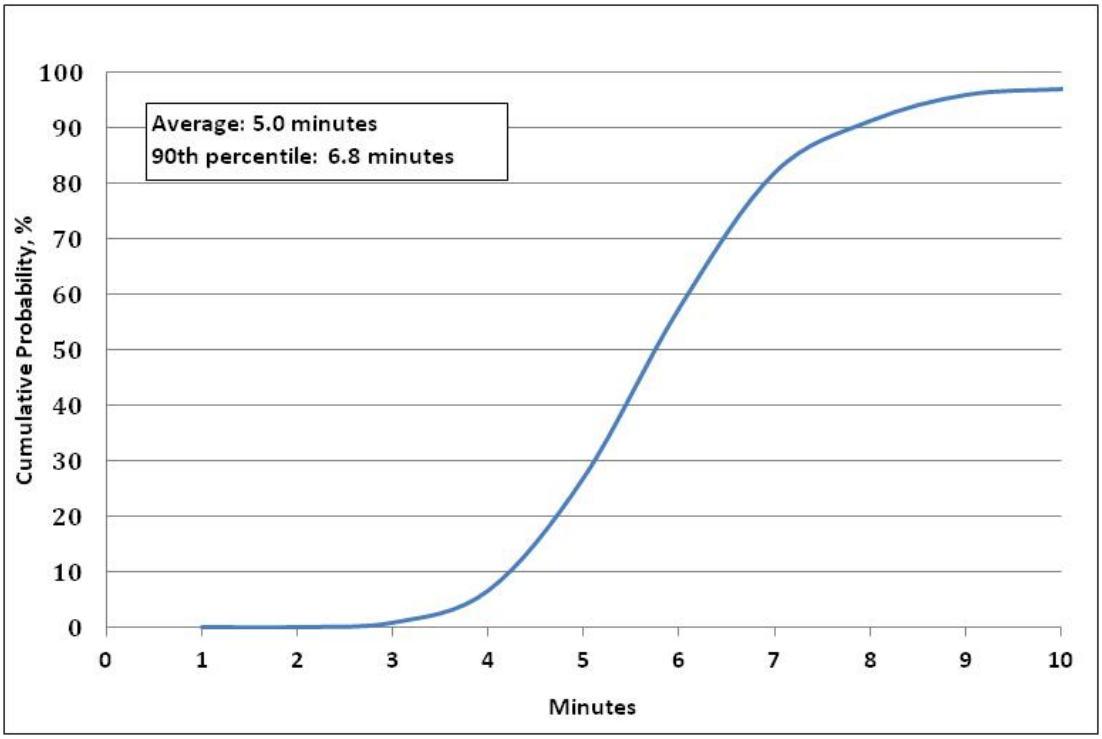


FIGURE 12: Frequency Distribution Chart of Response Time of First Arriving Unit for EMS calls

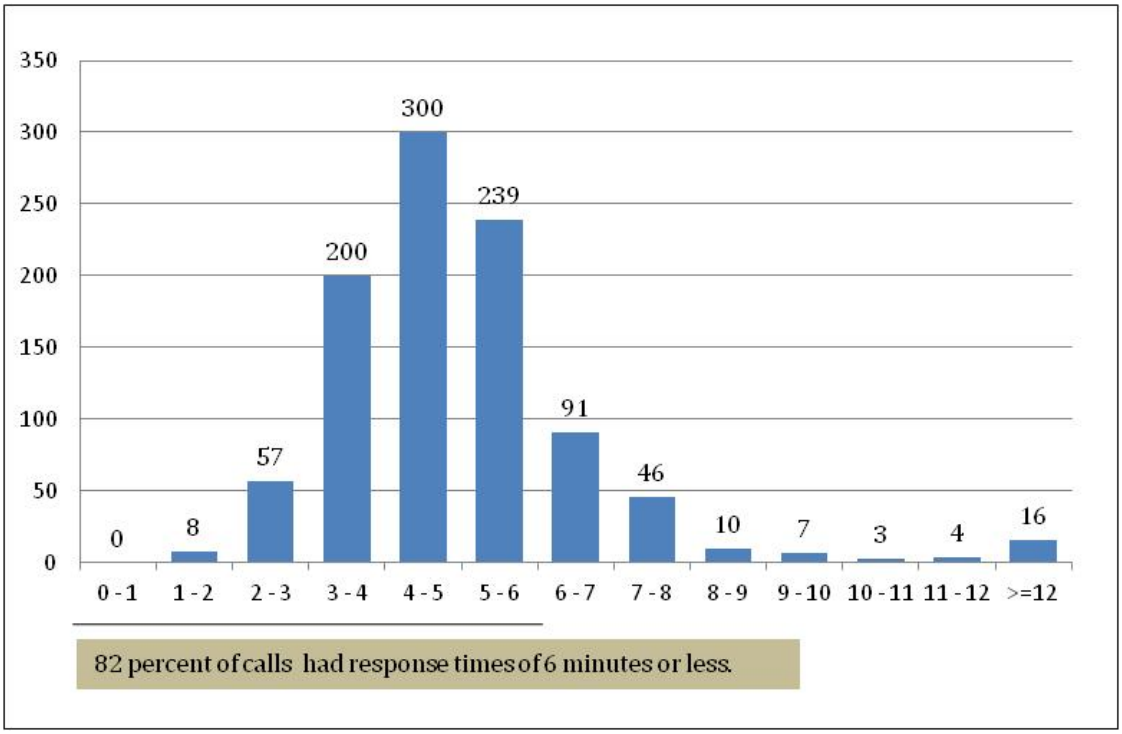


TABLE 20: Cumulative Distribution Function (CDF) of Response Time of First Arriving Unit for EMS Calls

Response Time (minute)	Frequency	Cumulative Percentage
0-1	0	0.0
1-2	8	0.8
2-3	57	6.6
3-4	200	27.0
4-5	300	57.6
5-6	239	82.0
6-7	91	91.2
7-8	46	95.9
8-9	10	96.9
9-10	7	97.7
10-11	3	98.0
11-12	4	98.4
>=12	16	100.0

Observations:

- The average response time for EMS calls was 5.0 minutes.
- For 82 percent of EMS calls, the response time was less than or equal to 6 minutes.
- For 90 percent of EMS calls, the response time was less than 6.8 minutes.

TABLE 21: Average Response Time for Structure and Outside Fire Calls by First Arriving Engine

First Arriving Engine	Outside Fire		Structure Fire		Total	
	Response Time	Number of Calls	Response Time	Number of Calls	Response Time	Number of Calls
E11	2.4	1	NA	0	2.4	1
E12	6.6	16	6.6	15	6.6	31
Total	**6.4**	**17**	**6.6**	**15**	**6.5**	**32**

Observations:

- For outside fire calls, the average response time of the first arriving engine was 6.4 minutes.
- For structure fire calls, the average response time of the first arriving engine was 6.6 minutes.

Appendix I

Number of Automatic/Mutual Aid Calls by Type

Type	Deployed Hours	Number of Dispatches		
		Non-Canceled	Canceled	Total
ALS response	170.0	206	168	374
BLS response	280.7	227	90	317
Engine response	39.2	58	80	138
Total	489.9	491	338	829

Observations:

- HBFD provided 374 ALS dispatches, and 168 (45 percent) were canceled.
- HBFD provided 317 ALS dispatches, and 90 (28 percent) were canceled.
- HBFD provided 138 engine dispatches, and 80 (58 percent) were canceled.
- HBFD received mutual aids in 43 calls, and automatic aids in 182 calls.

Appendix II

Workload of Other Units

Units	Annual Number of Runs	Annual Deployed Hours
ARSON	1	5.6
1X50	2	0.5
U11	25	10.0
Total	**28**	**15.8**

Observations:

- The three arson and utility units made 28 runs and were deployed 15.8 hours in a year.

Appendix III

Property and Content Loss Analysis for Structure and Outside Fire Calls

Call Type	Property Loss		Content Loss	
	Loss Value	Number of Calls	Loss Value	Number of Calls
Structure fire	$8,900	9	$21,950	9
Outside fire	$11,300	3	$1,000	2
Total	**$20,200**	**12**	**$22,950**	**11**

Note: This analysis only includes calls with property loss or content loss greater than 0.

Observations:

- Out of 23 structure fire calls, 9 calls (39 percent) had recorded property loss, with total recorded loss value of $ 8,900.
- Out of 23 structure fire calls, 9 calls (39 percent) had recorded content loss, with total recorded loss value of $21,950.
- Out of the 22 outside fire calls, three calls (14 percent) had recorded property loss, with total loss value of $11,300. Two outside fire calls had recorded content loss and the total loss value was $1,000.

Appendix IV

Actions Taken Analysis for Structure and Outside Fire Calls

Action Taken	Non-Mutual Aid		Mutual Aid	
	Structure fire	Outside fire	Structure fire	Outside fire
Action taken, other	1	0	0	0
Establish safe area	0	0	2	0
Extinguishment by fire service personnel	8	14	8	0
Fires, rescues & hazardous conditions, other	0	0	1	0
Investigate	9	3	4	1
Investigate fire out on arrival	0	1	0	0
Notify other agencies	0	1	0	0
Provide manpower	0	0	3	0
Restore fire alarm system	0	0	1	0
Salvage & overhaul	2	2	2	0
Search & rescue, other	0	1	0	0
Standby	0	0	1	0
Ventilate	2	0	2	0

Appendix V

Correspondence between NFIRS Incident Code and Call Type

Incident Type Code	Call Type	NFIRS Incident Description
111	Building fire	Structure fire
112	Fires in structure other than in a building	Structure fire
113	Cooking fire, confined to container	Structure fire
114	Chimney or flue fire, confined to chimney or flue	Structure fire
117	Commercial Compactor fire, confined to rubbish	Structure fire
118	Trash or rubbish fire, contained	Structure fire
130	Mobile property (vehicle) fire, other	Outside fire
131	Passenger vehicle fire	Outside fire
142	Brush or brush-and-grass mixture fire	Outside fire
151	Outside rubbish, trash or waste fire	Outside fire
154	Dumpster or other outside trash receptacle fire	Outside fire
162	Outside equipment fire	Outside fire
164	Outside mailbox fire	Outside fire
311	Medical assist, assist EMS crew	EMS
321	EMS call, excluding vehicle accident with injury	EMS
3210	EMS call, excluding vehicle accident with injury	EMS
322	Motor vehicle accident with injuries	MVA
3220	Motor vehicle accident with injuries	MVA
323	Motor vehicle/pedestrian accident (MV Ped)	MVA
324	Motor vehicle accident with no injuries.	MVA
331	Lock-in (if lock out , use 511)	EMS
353	Removal of victim(s) from stalled elevator	EMS
357	Extrication of victim(s) from machinery	EMS
364	Surf rescue	EMS
411	Gasoline or other flammable liquid spill	Hazard
412	Gas leak (natural gas or LPG)	Hazard
413	Oil or other combustible liquid spill	Hazard
422	Chemical spill or leak	Hazard
424	Carbon monoxide incident	Hazard
440	Electrical wiring/equipment problem, other	Hazard
441	Heat from short circuit (wiring), defective/worn	Hazard
442	Overheated motor	Hazard
444	Power line down	Hazard
445	Arcing, shorted electrical equipment	Hazard
451	Biological hazard, confirmed or suspected	Hazard

Incident Type Code	Call Type	NFIRS Incident Description
481	Attempt to burn	Hazard
510	Person in distress, other	Public service
511	Lock-out	Public service
520	Water problem, other	Public service
522	Water or steam leak	Public service
5220	Water or steam leak	Public service
531	Smoke or odor removal	Public service
551	Assist police or other governmental agency	Public service
552	Police matter	Public service
553	Public service	Public service
554	Assist invalid	Public service
561	Unauthorized burning	Public service
571	Cover assignment, standby, move-up	Public service
600	Good intent call, other	Good intent
611	Dispatched & canceled en route	Canceled
611F	Dispatched & canceled en route	Canceled
611M	Dispatched & canceled en route	Canceled
611T	Dispatched & canceled en route	Canceled
622	No incident found on arrival at dispatch address	Canceled
631	Authorized controlled burning	Good intent
651	Smoke scare, odor of smoke	Good intent
652	Steam, vapor, fog or dust thought to be smoke	Good intent
653	Smoke from barbecue, tar kettle	Good intent
661	EMS call, party transported by non-fire agency	Good intent
671	HazMat release investigation w/no HazMat	Good intent
672	Biological hazard investigation, none found	Good intent
714	Central station, malicious false alarm	False alarm
715	Local alarm system, malicious false alarm	False alarm
731	Sprinkler activation due to malfunction	False alarm
733	Smoke detector activation due to malfunction	False alarm
734	Heat detector activation due to malfunction	False alarm
735	Alarm system sounded due to malfunction	False alarm
736	CO detector activation due to malfunction	False alarm
740	Unintentional transmission of alarm, other	False alarm
741	Sprinkler activation, no fire - unintentional	False alarm
743	Smoke detector activation, no fire - unintentional	False alarm
744	Detector activation, no fire - unintentional	False alarm
745	Alarm system activation, no fire - unintentional	False alarm
911	Citizen complaint	Public service

Note: First, mutual aid calls were identified using "aid type" information in NFIRS. Then, we used the above correspondence table to categorize the remaining calls. For calls that are identified as medical in nature by NFIRS, we used the EMS assessment data to further assign detailed EMS categories as needed.