

Running head: EFFECTIVENESS OF FACILITIES DEPARTMENT

Measuring the Effectiveness of South Metro Fire Rescue Authority Facilities Department

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed: _____
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Abstract

As a result of the consolidation between Parker Fire District and South Metro Fire Rescue, the South Metro Fire Rescue Authority (SMFRA) Facilities Department was created. The problem was SMFRA had not evaluated the effectiveness of the Facilities Department since its creation. The purpose of this Applied Research Paper was to evaluate the effectiveness of the SMFRA Facilities Department compared to identified industry standards. The Descriptive Research Method was used to answer the following questions: (a) what standards have similar sized fire departments used to measure the effectiveness of their facilities maintenance department, (b) what standards have public and private agencies used to measure the effectiveness of their facilities maintenance department, (c) what standard should SMFRA use to measure the effectiveness of their facilities maintenance department, (d) based on the identified industry standards, how effective was the SMFRA Facilities Department? Questionnaires and research were utilized to identify current facility maintenance industry standards for public and private organizations. The results showed that SMFRA should identify the level of maintenance desired and develop performance measures and benchmarks as the best method to evaluate the Facilities Department. Surveys, SMFRA Facilities data, and SMFRA End of Year reports were utilized to evaluate the established performance measures and determine the effectiveness of the SMFRA Facilities Department. Based on the data presented, the SMFRA Facilities Department has not achieved the level of maintenance desired; however, customer satisfaction amongst the SMFRA leadership remains high. SMFRA Facilities Department has shown a level of success with cost control and improved program efficiency; though, sufficient data is not available for definitive conclusions at this time.

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Introduction

South Metro Fire Rescue Authority (SMFRA) facilities form the foundation for all services provided by the Authority. According to the 2011 Commission on Fire Accreditation International document, SMFRA has committed to provide facilities that allow employees to perform at the highest level possible (M. Langelo, personal communication, June 15, 2011). To accomplish this goal, SMFRA must provide safe, efficient, functional, and comfortable facilities for the employees.

Dr. Harry Carter (2010), in an article for *Firehouse.com*, confirmed the importance of fire department facilities by stating, “The fire station is the single most vital element in a fire department” (p. 1). Carter believes poor fire department facilities not only impact employee productivity but they can also have a negative effect on employee morale. On a broader scale, Teicholz and Edgar (2001) came to the same conclusion when they wrote, “...physical infrastructure greatly effects workers performance and productivity...” (p.2).

Dr. Carter (2010) continues, “...the station is a symbol of the protection of lives and property” (pg. 1). As such, the condition of the fire department facilities will impact, either positively or negatively, the citizen’s impression of the services provided by the fire department.

The SMFRA was formed in January 2009 as a consolidation between Parker Fire District and South Metro Fire Rescue. During the consolidation process, the SMFRA Executive Committee, consisting of the Fire Chief and Division Chiefs, identified the need to have a person devoted exclusively to managing the day to day facilities issues and plan for the ongoing care of the Authorities facilities (V. Turner, personal communication, June 2, 2011).

As a result of the Executive Committee’s decision, the SMFRA Facilities Department was created consisting of a Facilities Manager and a Facilities Maintenance Technician. The

problem was SMFRA had not evaluated the effectiveness of the Facilities Department since its creation. The purpose of this ARP was to evaluate the effectiveness of the SMFRA Facilities Department based on identified industry standards.

The Descriptive Research Method was used to answer the following questions: (a) what standards have similar sized fire departments used to measure the effectiveness of their facilities maintenance department, (b) what standards have public and private agencies used to measure the effectiveness of their facilities maintenance department, (c) what standard should SMFRA use to measure the effectiveness of their facilities maintenance department, (d) based on the identified industry standards, how effective was the SMFRA Facilities Department?

Background and Significance

South Metro Fire Rescue Authority (SMFRA) is located south of the Denver, Colorado metropolitan area. SMFRA covers approximately 176 square miles including the communities of Centennial, Greenwood Village, Castle Pines, Parker and Lone Tree. Total residential population served by SMFRA is estimated at 198,000 citizens residing in both Arapahoe and Douglas Counties (South, 2009).

SMFRA provides fire and emergency medical responses, training, and administration services from two administrative buildings, seventeen fire stations, one joint use facility, and two storage buildings. The SMFRA facilities range in age from a two year old state of the art fire station to a forty-eight year old, undersized, and outdated fire station. SMFRA facilities total 345,000 square feet with a replacement value, building and contents, of approximately \$88,000,000 (V. Turner, personal communication, June 2, 2011).

The Facilities Department structure recommended by the SMFRA Executive Committee consisted of a Facilities Manager and a Facilities Maintenance Technician. The Facilities

Manager was charged with managing the day to day activities of the Facilities Department and long range planning. The Facilities Maintenance Technician was responsible for the maintenance, repairs, and improvements at each facility. In addition, a Line Captain at each station was assigned as a Station Commander. The Station Commander was responsible for overseeing the facilities related administrative duties and minor repairs at their assigned station.

The SMFRA Executive Committee purposely did not establish a formal method to evaluate the effectiveness of the Facilities Department. According to Chief Turner (personal communication, June 2, 2011), the Executive Committee anticipated that the Facilities group would develop the effectiveness standards. Leonard and Hilgert (2004) point out the significance of creating a method to evaluate the effectiveness of the Facilities Department when they state, “The important point to recognize is that the task of decision making is incomplete without some form of follow-up and action appraisal” (p. 153).

Creating a Facilities Department without establishing a program to measure its effectiveness went against the concept of systems thinking outlined in the National Fire Academy (NFA) student manual for Executive Leadership (EL). The student manual defines system thinking as looking “at a system as a whole, including its subsystems, and the patterns that recur between each component, rather than viewing the system as a series of specific, linear events” (Federal Emergency Management Agency [FEMA], 2011, p. SM 3-5). As Leonard and Hilgert (2004) remind us, by not establishing a standard to measure the effectiveness of the Facilities Department, the SMFRA Executive Committee did not address the system as a whole.

The EL class focused heavily of the difference between technical problems and adaptive challenges. Heifetz, Grashow, and Linsky (2009) state that technical problems can be very important and complex; however, they “have known solutions that can be implemented by

current know how” (p. 19). Heifetz et al. go on to define adaptive challenges as issues that “can only be addressed through changes in people’s priorities, beliefs, habits, and loyalties” (p. 19). The establishment of the Facilities Department created an adaptive challenge for the employees at SMFRA, particularly the Station Commanders. The Facilities Manager is a civilian position without rank, yet he or she supervises Line Fire Captains on issues related to the facilities. The Line Fire Captains were forced to alter their perspective of the traditional “Chain of Command” and accept supervision from a civilian employee.

This Applied Research Paper (ARP) addressed all five United States Fire Administration (USFA) directives as listed in the Department of Homeland Security (DHS) Executive Fire Officers Program (EFOP) (2008) applied research project guidelines. Directives one, two, and three call for the reduction in the loss of life for children under 14 years old, adults over 65 years old, and firefighters respectively. SMFRA facilities are utilized on a daily basis to provide emergency responses; fire, medical, and special operations training; maintenance and repair of emergency vehicles; and provide for the physical fitness, rest, and nourishment of the firefighters. These services are vitally important to achieving the reduction in loss of life by fire as mandated by the USFA.

Ross and Pacheco (2006) agree with the importance of the fire station in meeting the first three USFA directives. They wrote in the *Chief Fire Officers Desk Reference* that the fire station is the primary location for firefighters to work, live, and train. In addition, they state that the majority of the emergency responses start from the fire station, making it an important first step in the successful completion of the emergency response. SMFRA firefighters spend, on average, 84 percent of their work day in the fire station (Jeremy Manning, personal communication, September 15, 2011).

USFA directive four requires promoting a comprehensive, multi-hazard risk reduction plan within the communities. Directive five states that SMFRA will respond appropriately and in a timely manner to emerging issues (Department, 2008). SMFRA administrative offices are utilized daily by the Operations and Support Services Divisions to identify and plan for emerging issues as required by USFA Directive four. The Community Safety Services Division, Public Education, and the Emergency Management Department utilize SMFRA facilities daily to identify and develop risk reduction programs for the communities and citizens residing in SMFRA in accordance with USFA Directive five.

In summary, South Metro has identified that the Authority's facilities form the foundation for all services provided by SMFRA. South Metro has committed to providing safe, comfortable, well equipped facilities to ensure that all employees are effectively and efficiently performing their duties to meet the needs of the citizens and the directives of the USFA. Establishing a standard for evaluating the effectiveness of the Facilities Department would be beneficial to SMFRA in multiple ways. First, it would give direction to the Facilities Department when making short term, long term, and strategic decisions. Next, it would provide a method to evaluate the performance of the Facilities Department. Finally, it would confirm if SMFRA has provided a solid foundation for the services they provide as mandated by the 2011 Commission on Fire Accreditation International document.

Literature Review

The Chief Fire Officers Desk Reference (Cochran, 2006) asserts that the condition of fire department facilities will convey to the public and elected officials a declaration of the character and personality of the department. Chief Cochran goes on to state that fire facilities, especially fire stations, should be kept clean and well maintained at all times. Clean, well maintained

facilities will improve the fire departments image with the public and elected officials, as well as, improve employee morale and organizational pride.

The Florida Department of Education (“*Maintenance*”, 2003) asserts that maintenance of facilities should begin before the new building becomes occupied. Facility maintenance should continue from that point until the building has reached the end of its useful life. They go on to state that the level of facility maintenance will vary by building due to the frequency of use, abuse by the occupants, weather, and age. “However, good maintenance practices that address the total building envelope, major systems, equipment, and other critical features will significantly decrease the number of problems, add value, and shorten the rate at which a structure shows signs of functional obsolescence” (p. 77).

TRIRIGA, a corporation dedicated to the advancement of facility lifecycle management software and services contends that poorly maintained facilities will experience a higher than normal level of deferred maintenance and a lack of funding for preventative maintenance and capital renewals. The result will be higher life cycle costs, reduced systems reliability, and a lack of support for the important work being performed in the buildings (Wilson, 2011).

The National Institute of Building Sciences (Sapp, 2010) echoes the statements made by the Florida Department of Education and TRIRIGA. According to Sapp, the desired effects of a comprehensive maintenance program include, “reduced capital repairs, reduced unscheduled shutdowns and repairs, extend equipment life, thereby extending facility life, realize life-cycle savings, and provide safe, functional systems and facilities that meet the design intent” (p. 2).

Sapp (2010) goes on to say that a Computer Maintenance Management System (CMMS) is an important tool for the Facility Manager to coordinate preventative maintenance, track work order status, maintenance hours, and associated costs. CMMS software will also provide the

necessary information to establish metrics and evaluate organizational and personnel effectiveness. In addition, the information provided by the CMMS will assist the Facility Manager in justifying funding and staffing requests to maintain the organizations facilities.

Numerous examples illustrating the negative effects of poor maintenance of fire department facilities can be readily found by searching the Internet. Paul Kiska (2011) reported that in late 2010, a local television station in Cleveland, Ohio produced a story on the deteriorating condition of their local fire stations. The 2010 story showed members of the city council touring fire stations and finding leaking roofs, rusted pipes, holes in walls and ceilings, and rodent infestations. The Council members found the conditions deplorable; however, city administrators contended that there was no money available for repairs. Kiska's 2011 follow-up article was written five months after the initial city council tours. According to Kiska, no fire station repairs had been performed since the first article.

City council members from Lodi, California witnessed similar conditions when they toured their local fire stations (Bohm, 2010). According to Bohm, Council members encountered leaking roofs, inoperable HVAC systems, and black mold in several rooms of the fire station. Just prior to the fire station tour, the city council authorized spending a half million dollars for a skate park and two million dollars for artificial turf. After the fire station tours, the Lodi City Council decided they needed to prioritize the city's public facilities to make more informed decisions in the future.

The conditions found at the fire stations in Cleveland and Lodi was unfortunate for both the firefighters and the residents of the two cities. To prevent similar conditions from occurring at SMFRA, it is important that standards are identified and implemented to measure the effectiveness of the Facilities Department.

In 1957, the military identified a need to develop a standard to measure the effectiveness of the facilities maintenance on their Navy shipyards. A few years later, the Navy's new program, Engineered Performance Standards (EPS), was adopted by the other branches of the military. EPS was defined by the military as:

The time a trained worker or group of workers, working at a normal pace, takes to produce a prescribed unit of work of an acceptable quality, according to a specified method, under specific working conditions. It is derived from a complete, objective analysis and measurement of the task by recognized work measurement techniques with a standard degree of statistical reliability and includes allowances for personal needs, fatigue, and delays (Armor, 1987, p. 10).

In an article written for Maintenance Technology Online, Ray Atkins (2010) states that Key Performance Indicators (KPI) are the best way to measure the effectiveness of an organization's facilities maintenance program. KPI's are a standard measurement of a process that can be compared to internal or industry benchmarks. To be effective, KPI's must analyze information that is important to the organization and the information must be meaningful, honest, and consistent.

John Reh (2011) expanded on the information presented by Atkins. According to Reh, KPI's must be specific to an organization. To establish meaningful KPI's, the organization must have a good understanding of their mission, stakeholders, and goals. KPI's are then established to help the organization achieve their stated goals. Reh goes on to say that KPI's must also be based on the organizations goals, be measurable, and key to the organization's success.

The Association of Physical Plant Administrators (APPA) is an international association focused on maintaining and protecting college campuses. The APPA (Ness, 2002) believes the

first step in evaluating the effectiveness of a facilities maintenance program is determining the level of maintenance desired. The APPA established five levels of maintenance to identify the current and desired levels of facilities maintenance. The five levels of maintenance are defined by Ness (2002) as follows:

Level 1, Showpiece Facility. Maintenance activities appear highly focused. Typically, equipment and building components are fully functional and in excellent operating condition. Service and maintenance calls are responded to immediately. Buildings and equipment are regularly upgraded, keeping them current with modern standards and usage (Ness, 2002, p. 50).

Level 2, Comprehensive Stewardship. Maintenance activities appear organized with direction. Equipment and building component are usually functional and in operating condition. Service and maintenance calls are responded to in a timely manner. Buildings and equipment are regularly upgraded, keeping them current with modern standards and usage (Ness, 2002, p. 50).

Level 3, Managed Care. Maintenance activities appear to be somewhat organized, but they remain people-dependent. Equipment and building components are mostly functional, but suffer occasional breakdowns. Service and maintenance call response times are variable and sporadic without apparent cause. Buildings and equipment are periodically upgraded to current standards and usage, but not enough to control the effects of normal usage and deterioration (Ness, 2002, p. 50).

Level 4, Reactive Management. Maintenance activities appear to be somewhat chaotic and are people dependent. Equipment and building components are frequently broken and inoperable. Service and maintenance calls are typically not responded to in a timely manner. Normal usage and deterioration continues unabated, making buildings and equipment inadequate to meet present usage needs (Ness, 2002, p. 50).

Level 5, Crisis Response. Maintenance activities appear chaotic and without direction. Equipment and building components are routinely broken and inoperable. Service and maintenance calls are never responded to in a timely manner. Normal usage and deterioration continues unabated, making buildings and equipment inadequate to meet present usage needs (Ness, 2002, p. 51).

Ness (2002), goes on to state that each of the five levels of maintenance contains eleven characteristics that further assist managers to distinguish between the levels of maintenance. The eleven characteristics include: customer service; customer satisfaction; preventative maintenance; maintenance mix; interior, exterior, and lighting aesthetics; service efficiency; system reliability; operating budget; and average Facility Condition Index (FCI). The APPA model provides Managers with a method to establish a baseline level of maintenance desired, along with a way to evaluate the effectiveness of their maintenance program.

Failing to achieve the desired level of maintenance is not necessarily an indication that the facilities maintenance department is not operating effectively. Other factors such as inadequate staffing levels or insufficient funding of the facilities department could directly impact the outcome of the analysis (Ness, 2002).

The Office of Facilities Engineering and Operations (OFEO), who perform maintenance on the Smithsonian owned facilities in Washington D.C., incorporated the APPA maintenance levels into their facility maintenance program. The OFEO established a desired baseline of Level 2, Comprehensive Stewardship, for their maintenance program. Currently, they estimate their maintenance program is operating at Level 4, Reactive Management. The OFEO intended to use the information they identified through the APPA model to justify future budget and staffing increases (Smithsonian, 2009).

The International City/County Management Association (ICMA) (Ammons, Norfleet, and Coble, 2002) believes that local governments are requiring more from managers than only operating within their budgets. Governments want managers to provide the best service possible in an efficient and cost effective manner. The best way, according to ICMA, to achieve the local governments mandate is through performance measures or benchmarks. “Performance measures, collected systematically and compiled regularly, will allow local officials to gauge the quantity of services being provided and, ideally, their quality, effectiveness, and efficiency” (p. 1).

Ammons et al. (2002) identified 29 local governments that were considered leading professionals in the facilities maintenance field to determine how they measured and documented their facilities maintenance operations. The data collected by ICMA uncovered three types of performance measures that were widely used. The first, Workload Measures, is defined as, “How many units of service were provided” (p. 3). Workload Measures can easily convey the number of work orders or preventative maintenance procedures that were completed; however, they do not evaluate the quality or effectiveness of the service provided.

The second type of performance measure according to Ammons et al. (2002) is Efficiency Measures. Efficiency Measures can take several forms such as output-to-input ratios,

turnaround time, cost per square foot, or employee hours per task. When properly constructed, Efficiency Measures can give the manager important information on how efficiently the facility maintenance services are being performed.

Ammons et al. (2002) concludes with the third performance measure, Effectiveness Measures. Effectiveness Measures are used to measure response time, customer satisfaction, work order completion rates, and facilities condition. To effectively evaluate the performance of the facilities department, performance measures from all three categories should be evaluated. In addition, the performance measures must be adapted and refined to the individual organizations needs. When done correctly, the collection of performance measures will give the organization an effective method for tracking and evaluating their operations.

The International Facility Management Association (IFMA) believes that Benchmarking is the most effective way to measure facilities maintenance effectiveness (Epstein, 2009). Benchmarking is defined by Epstein as, “a continuous and systematic management process that measures work processes, protocols and services for the purpose of organizational comparison and improvement” (p. 6).

According to Epstein (2009) there are three types of benchmarking; internal, competitive, and generic. Internal benchmarking evaluates similar functions within an organization to establish the benchmarks. Internal benchmarking works best for organizations operating out of several locations but conducting similar operations at each facility. Competitive benchmarking occurs when an organization compares its operations against another organization that conducts similar operations. Generic benchmarking is similar to competitive benchmarking with one exception. Generic benchmarking focuses on processes and functions rather than operations. As a result, the organizations being compared do not necessarily need to be from the same industry.

Epstein (2009) concludes with a word of caution. Utilizing the benchmarking process to identify potential areas needing improvement is just the first step. Epstein recommends that the organization perform additional research on ways to improve before any steps are taken to overhaul their current processes.

Hayden (n.d.) agrees with Epstein that benchmarking is the most beneficial way to measure the effectiveness of a facilities maintenance program. Hayden believes that a properly designed benchmarking program will allow the organization to compare itself with other organizations and identify processes that are inefficient or overpriced. In addition, benchmarking will allow the Facility Manager to make intelligent decisions concerning spending and strategic planning.

There are several decisions an organization must make to establish an effective benchmarking program according to Hayden (n.d.). First, the organization must choose the specific aspects of the maintenance program that they want to evaluate. Service levels, utility usage, productivity and processes, and customer service are all categories that a benchmarking program can evaluate effectively. Next, the organization must establish specific objectives they want to achieve from the benchmarking program. Objectives can include increasing productivity, lowering maintenance costs, justifying staffing and budget increases, or renegotiating preventative maintenance contracts.

In summary, the literature review confirmed the importance of SMFRA to evaluate the effectiveness of their Facilities Department. The evaluation process will afford SMFRA the opportunity to establish a desired level of maintenance for their facilities. In addition, evaluation process will allow the Facilities Department to justify future hiring and budget requests. Lastly,

the evaluation process will confirm that SMFRA is providing efficient, functional, and comfortable facilities for the employees to perform at the highest level possible.

Procedures

The Descriptive Research Method was used to collect data through research, surveys, and questionnaires. Data collected was analyzed to answer the following questions: (a) what standards have similar sized fire departments used to measure the effectiveness of their facilities maintenance department, (b) what standards have public or private agencies used to measure the effectiveness of their facilities maintenance department, (c) what standard should SMFRA use to measure the effectiveness of their facilities maintenance department, (d) based on the identified industry standards, how effective was SMFRA Facilities Department?

Similar Sized Fire Department Effectiveness Measures

An e-mail questionnaire (Appendix A) was created and used to collect data regarding what standards fire departments similar in size to SMFRA (Appendix B) used to measure the effectiveness of their facilities maintenance departments (see Appendix C for results). The questionnaire was sent to 53 fire departments throughout the United States that were identified as being of similar size to SMFRA. The United States Fire Administration (USFA) National Fire Department Census Database accessed from www.usfa.fema.gov/applications/census/ was used as the initial list of fire departments.

Several steps were taken to condense the USFA Database to create a list of fire departments similar in size to SMFRA. The first step taken was to define “similar sized” fire departments. SMFRA has seventeen fire stations. It was decided that similar size fire departments would be those with no less than twelve fire stations and no more than twenty-two

fire stations. This decision identified a range of five more or five less fire stations than SMFRA. The fire departments that did not fall into the identified range were removed from the database.

Next, it was decided that similar sized departments should have the same staffing models. As such, all fire departments that were not “Career” fire departments were removed from the database. The questionnaire was sent on July 15, 2011 to the e-mail address of the Chief of the Department. The database was further reduced when accurate e-mail addresses could not be identified. A total of 53 questionnaires were e-mailed and 20 questionnaires were returned for a return rate of 38 percent.

The data received from the 20 fire departments may be biased in its accuracy due to SMFRA being a fire district rather than a city fire department. The USFA Database did not provide adequate information to accurately assess each fire department as a city department or fire district. Given that city fire departments may have other city departments managing facilities maintenance, the fire chief may not have accurate information on how the effectiveness of facilities maintenance is measured.

Private and Public Agency Effectiveness Measures

Questionnaires were sent to two private property management companies and six local governmental agencies (Appendix D). The governmental agencies included three school district, two town governments and one county government. A total of two private agencies and four public agencies returned the questionnaire for a return rate of 75 percent. The Questionnaire was designed to collect data regarding how private and public agencies measure the effectiveness of their facilities maintenance programs. Data obtained from the local public and private agencies was supplemented with information obtained through Internet searches of professional

organizations representing governmental, higher education, and private sector facilities maintenance.

How Should SMFRA Measure Effectiveness

Data from several sources was collected to identify the information necessary to measure the effectiveness of the SMFRA Facilities Department. Chief Turner provided a glimpse of the information he and the Executive Committee anticipated as being important measures of the Facilities Department effectiveness during a personal communication on June 2, 2011. Data collected from the fire department and public and private facilities maintenance questionnaires was analyzed to uncover the best method to evaluate the effectiveness of the SMFRA Facilities Department. Data obtained from the questionnaires was supplemented with information obtained through Internet searches of professional organizations representing governmental, higher education, and private sector facilities maintenance.

Effectiveness of SMFRA Facilities Department

SMFRA implemented a Computer Maintenance Management System (CMMS) called Maintenance Connection in January of 2010. Maintenance Connection is utilized on a daily basis to report and track facilities maintenance work order requests. It is also utilized to collect data on work order response times, repair costs, asset identification, and preventative maintenance. Information collected through Maintenance Connection will be utilized to provide data for SMFRA to measure the effectiveness of their facilities department.

Survey Monkey (www.surveymonkey.com) was utilized to collect data to measure the Station Commander's satisfaction with the SMFRA Facilities Department (Appendix E). The Station Commanders were identified as a survey group because of their daily interactions with the SMFRA Facilities Department. The satisfaction survey was sent to the 17 Station

Commanders on July 7, 2011. Thirteen Station Commanders completed and returned the survey for a return rate of 76 percent. In addition, a condensed version of the same survey was sent by Survey Monkey to the four members of the Executive Committee to determine the level of maintenance they intended for SMFRFA Facilities Department to provide (Appendix F). The survey was sent to the Fire Chief, Assistant Chief of Operations, Assistant Chief of Community Safety Services, and Assistant Chief of Support Services. All four chiefs completed the survey for a return rate of 100 percent.

Finally, data made available through contractor invoices, utility usage, SMFRA End of Year reports, and Facilities budgets were utilized to measure the effectiveness of the SMFRA Facilities Department against identified standards.

Results

South Metro Fire Rescue Authority mandated in the 2011 Commission on Fire Accreditation International document that their facilities would provide a stable foundation that would allow employees to perform at the highest level possible (M. Langello, personal communication, June 15, 2011). To accomplish this mandate, SMFRA Executive Committee created a Facilities Department under the Support Services Division. How to measure the effectiveness of the new Facilities Department was left to the discretion of the Facilities Department.

Similar Sized Fire Department Effectiveness Measures

To identify how other fire departments of similar size and composition measured the effectiveness of their facilities maintenance, an e-mail questionnaire was sent to 53 fire departments throughout the United States. Twenty fire departments completed and returned the questionnaire. Of the twenty responding fire departments, 50% did not have a formal evaluation

process for their facilities maintenance program; however, 95 percent of the reporting fire departments acknowledged that they did track costs associated with their facilities maintenance.

The remaining ten fire departments who measured the effectiveness of their facilities maintenance program were asked to identify what standard they utilized; established industry standards or “In House” standards. Seventy percent of the fire departments utilized fire station inspections as their primary method of evaluating their facilities maintenance. Twenty percent of the fire departments relied on other city departments to measure the effectiveness of their fire station maintenance. Only one fire department acknowledged they performed data analysis and cost tracking to measure the effectiveness of their facilities maintenance program. None of the fire departments acknowledged utilizing established industry standards to measure facilities maintenance effectiveness.

Private and Public Agency Effectiveness Measures

The questionnaire sent to local governmental and school district agencies identified that 100 percent used in house standards to measure the effectiveness of their facilities maintenance program. A Computer Maintenance Management System (CMMS) was utilized by 50 percent of the respondents. The remaining 50 percent evaluated work order details, budget analysis, and customer service surveys to evaluate the effectiveness of their facilities maintenance programs.

The private property management firms surveyed also reported that they measure the effectiveness of their facilities maintenance programs through in house standards. They reported that customer satisfaction, response time, and pricing were the measurements they utilized most. Identical to the fire department survey, 100 percent of the public and private agencies reported that they did not utilize an established industry standard to measure the effectiveness of their

facilities maintenance programs. A search of the Internet was performed to identify established industry standards that have been used by other public and private organizations.

According to the International City/County Management Association (ICMA) (Ammons, Norfleet, and Coble, 2002) to be effective, the organization must establish good performance measures to evaluate the quality, quantity, effectiveness, and efficiency of the services provided by the facilities department. Benchmarking is then utilized to evaluate the effectiveness of the performance measures.

ICMA (Ammons et al., 2002) uncovered three types of performance measures that were widely used by public sector agencies. The first, Workload Measures, is utilized to measure the quantity of units of service provided. Workload Measures can easily convey the number of work orders completed or preventative maintenance procedures performed; however, they do not evaluate the quality or effectiveness of the service provided.

The second type of performance measure according to Ammons et al. (2002) is Efficiency Measures. Efficiency Measures can take several forms such as output-to-input ratios, turnaround time, cost per square foot, or employee hours per task. When properly constructed, Efficiency Measures can give the manager important information on how efficiently the facility maintenance services are being performed. The third performance measure, Effectiveness Measures, is used to measure response time, customer satisfaction, work order completion rates, and facilities condition.

Ammons et al. (2002) found that to effectively evaluate the overall performance of their Facilities Department, public sector agencies must utilize performance measures from all three categories. In addition, the performance measures must be adapted and refined to each

organizations needs. When done correctly, the collection of performance measures will give the organization an effective method for tracking and evaluating their operations.

The International Facility Management Association (IFMA), contends that benchmarking is the standard method to measure the effectiveness of facility maintenance programs. Proper benchmarking will identify inefficient and costly procedures, as well as, assist the public or private sector organizations to justify staffing and budget requests (Epstein, 2009).

Epstein (2009) asserts that many forms of benchmarking are available for agencies to use; however, the three most widely used are internal, competitive, and generic. Internal benchmarking evaluates similar operations within an organization. Internal benchmarking works best for organizations operating from several facilities but who conduct similar operations at each facility. Competitive benchmarking occurs when an organization compares its operations against other organizations that conduct similar operations. Whereas internal and competitive benchmarking focuses on similar operations, generic benchmarking focuses primarily on processes and functions. As a result, with generic benchmarking, the organization being compared to does not necessarily need to be from the same industry.

The Association of Physical Plant Administrators (APPA) contends an organization cannot establish performance measures or performance benchmarks until they have determined the level of maintenance they desire. The levels of maintenance established by APPA are: Level 1- Showpiece Facility, Level 2- Comprehensive Stewardship, Level 3- Managed Care, Level 4- Reactive Management, and Level 5- Crisis Response (Ness, 2002, p. 50-51).

Ness (2002) relates that each level has eleven characteristics that will assist the organization to determine which level of maintenance they desire. The first characteristic, Customer Service and Response Time, identifies how quickly the facilities department responds

to service requests. The second characteristic is Customer Satisfaction. As the title suggest, this characteristic measures how happy the customers are with the services provided by the facilities department. The third characteristic, Preventative Maintenance, measures the amount of preventative maintenance performed. It is important that the organization not ignore preventative maintenance needs as a way to improve customer service.

Ness (2002) continues with the fourth characteristic, Maintenance Mix. Similar to characteristic three, Maintenance Mix demonstrates how well the facilities manager balances the workforce to address the service requests. Characteristics five, six, and seven involve Aesthetics of the interior, exterior, and lighting respectively. These three characteristics measure whether the facility feels clean, warm, and inviting to the employees and customers. Service Efficiency is the eighth characteristic used to measure the level of maintenance. Service Efficiency measures the organization's ability to "predict, prepare, address, record, and follow up on maintenance activities" (p. 53).

Characteristic nine, Building System Reliability, measures the effectiveness of the agencies preventative and predictive maintenance programs. An effective program will keep the number of unexpected breakdowns to a minimum. Characteristic ten identifies the Facilities Maintenance Operating Budget as a percentage of the organization's Current Replacement Value (CRV). The final characteristic to determine the level of maintenance is Campus Average Facility Condition Index (FCI). FCI is defined by Ness as "deferred maintenance divided by current replacement value (CRV)" (2002, p. 227).

How Should SMFRA Measure Effectiveness

The questionnaires sent to fire departments similar in size and composition to SMFRA and to the six public and private agencies were not successful at identifying established industry

standards to measure the effectiveness of facility maintenance programs. Data collected showed that station inspections, customer satisfaction, and work order response times were most often used by these agencies when measuring the effectiveness of their facilities maintenance programs.

Chief Turner identified how the SMFRA Executive Committee intended to measure the effectiveness of the SMFRA Facilities Department. Chief Turner stated that cost control was the easiest measure. However, he also believed that maintaining the systems that add value or support to the emergency operation was very important. In addition, tracking problems, maintenance cycles, efficiency of programs, and component life expectancy are programs that he and the Executive Committee wanted the new Facilities Department to provide (personal communication, June 2, 2011).

The APPA (Ness, 2002) believes the first step to developing a standard to measure the effectiveness of SMFRA Facilities Department is determining the level of maintenance desired. Establishing the level of maintenance desired would allow SMFRA to first, determine if they are achieving their stated objective and secondly, to justify budget and staffing requests to achieve the desired level of maintenance.

Next, the International City/County Management Association (ICMA) (Ammons, Norfleet, and Coble, 2002) asserts that SMFRA must establish performance measures; workload, efficiency, and effectiveness that they intend to evaluate. Workload measures that provide data desired by the Executive Committee would include; number of work orders submitted, work orders by asset type, and percentage of repairs by SMFRA Facilities Department vs. outside vendors. As Ammons et al. state, workload measures by themselves do not evaluate the efficiency or effectiveness of the operation.

Efficiency measures SMFRA Facilities Department should evaluate include the cost per square foot for supplies, maintenance, improvements, preventative maintenance, and utilities. Each of these five categories should also be reported and analyzed by cost per occupant and cost per square foot. Effectiveness measures SMFRA should evaluate include work order completion by priority and customer satisfaction.

The final step SMFRA should undertake is comparing the data collected from the performance measures against established internal, competitive, or generic benchmarks (Epstein, 2009). Internal benchmarks would evaluate the SMFRA performance measures between fire stations or with other departments and bureaus within the SMFRA organization. Competitive benchmarks would evaluate the SMFRA performance measures with facilities maintenance programs from other fire departments in the region that are similar in size and composition. The final method of evaluation, generic benchmarking, would evaluate the SMFRA performance measures against private property management firms and public facilities maintenance programs in the Denver Metro Area.

Effectiveness of SMFRA Facilities Department

Data analyzed for this ARP identified that SMFRA should follow a three step process to evaluate the effectiveness of their Facilities Department: (a) establish the desired level of maintenance, (b) develop performance measures, and (c) establish benchmarks to compare acquired data internally and externally.

To establish the level of maintenance desired by SMFRA, the Station Commanders and Executive Committee were asked to identify the level of maintenance they felt the SMFRA Facilities Department should provide. Of the thirteen responding Station Commanders, 70 percent identified Level 2- Comprehensive Stewardship, as the most appropriate level. Level 1-

Showpiece Facility, was identified as the proper level by the remaining 30 percent of the Station Commanders. When asked the same question, the four members of the Executive Committee unanimously chose Level 2- Comprehensive Stewardships, as the level of maintenance they desired. Level 2- Comprehensive Stewardship, has been established as the level of maintenance SMFRA Facilities Department should be providing.

The Station Commanders and Executive Committee were then asked to identify the level of maintenance currently provided by the SMFRA Facilities Department. Eight Station Commanders, 61.5 percent, felt the Facilities Department was performing at Level 3- Managed Care. Two Executive Committee members agreed with the level of maintenance identified by the Station Commanders. Combining the results of the two questionnaires clearly illustrates that 59 percent of the respondents believe SMFRA Facilities Department has been operating below the established standard of Level 2- Comprehensive Stewardship. Conversely, 41 percent believed the Facilities Department was meeting or exceeding the established level of maintenance standard.

To further evaluate the effectiveness of the SMFRA Facilities Department, performance measures were established for Workload, Efficiency, and Effectiveness. The first Workload measure established was the number of work orders processed yearly. The 2009 data was compiled by manually counting the completed work order requests. In 2010, SMFRA Facilities Department implemented Computer Maintenance Management System (CMMS) software called Maintenance Connection. Maintenance Connection was used to collect data presented for 2010.

In 2009, the SMFRA Facilities Department completed 434 work order requests. In 2010, the number of work order requests increased by 23 percent to a total of 533. Identifying the total number of work orders completed yearly provides very limited useful data. SMFRA Facilities

Department further analyzed the number of work orders completed by categorizing the data by asset type. Data made available from this analysis identified that the majority of service requests received are electrical and plumbing in nature. Providing additional training in these two areas will reduce the number of repairs performed by outside vendors. For 2009, data necessary to categorize the completed work orders by asset type was not available. However, Maintenance Connection provided the necessary data for 2010.

Table 1

2010 Work Order Request by Asset Type

TYPE	FIRST	SECOND	THIRD	FOURTH	YEAR
	QUARTER	QUARTER	QUARTER	QUARTER	END
HVAC	13	9	15	17	54
Plumbing	29	29	22	16	96
Electrical	22	19	22	18	81
Appliances	19	13	8	7	47
Garage Doors	16	13	7	10	46
Bay Exhaust	9	10	6	4	29
Generator	6	4	6	4	20
Roof Leaks	0	5	1	0	6
Landscaping	1	9	11	5	26
Pests	2	1	1	2	6
Windows and Doors	13	9	6	12	40
Fire Systems	5	5	2	3	15
Opticom	11	2	1	5	19
Other	12	15	10	11	48
TOTALS	158	143	118	114	533

Another Workload Measure identified as important to SMFRA was calculating the ratio of completed work orders by SMFRA Facilities personnel compared to outside vendors. In 2009, 60 percent (260) work orders were completed by SMFRA Facilities personnel. The remaining 40 percent (174) work orders were completed by outside vendors. Attempts to collect this data for 2010 were unsuccessful. Information necessary to collect this data had not been entered in Maintenance Connection when the work orders were closed.

Efficiency performance measures were established to evaluate the cost per square foot and cost per occupant for supplies, maintenance, and utilities. Supplies are defined as items necessary for the day-to-day operation of the facility including cleaning supplies, office supplies, and small household furnishings such as clocks, pictures, and kitchen utensils.

Table 2

2009-2010 Supplies Cost per Square Foot and Cost per Occupant

Description	Sta 31	Sta 32	Sta 33	Sta 34	Sta 35	Sta 36	Sta 37	Sta 38	Sta 39
2009 Supply Costs	4,245	4,639	5,123	9,690	7,916	6,307	2,994	4,162	5,235
2010 Supply Costs	3,412	5,962	5,769	6,129	4,609	2,464	1,461	4,477	3,974
2009 Supplies- Per Square Foot	1.03	0.80	0.75	0.52	0.37	0.94	0.59	1.35	0.55
2010 Supplies- Per Square Foot	0.83	1.03	0.85	0.33	0.32	0.37	0.29	1.45	0.42
2009 Supplies- Per Person	386	193	285	646	264	573	499	378	291
2010 Supplies- Per Person	310	248	321	409	230	224	244	407	221
Description	Sta 40	Sta 41	Sta 42	Sta 43	Sta 44	Sta 45	Sta 46	Sta 47	AVG
2009 Supply Costs	5,545	4,268	6,388	4,344	6,057	6,296	3,214	9,645	5,651
2010 Supply Costs	4,640	5,336	4,851	2,843	5,580	5,470	4,299	3,865	4,420
2009 Supplies- Per Square Foot	0.81	0.25	0.85	0.47	0.69	0.61	0.32	0.89	0.69
2010 Supplies- Per Square Foot	0.68	0.31	0.64	0.31	0.63	0.53	0.42	0.36	0.57
2009 Supplies- Per Person	326	203	355	395	303	370	189	877	384
2010 Supplies- Per Person	273	254	270	258	279	322	253	351	287

Analysis of the data presented indicates that the fire stations decreased their overall spending on supplies by an average of 22 percent between 2009 and 2010. Further analysis of the supplies cost for cost per square foot shows the decrease was 17.4 percent while the supplies cost for cost per person dropped by just over 25 percent.

The 2009 and 2010 data for maintenance expenditures include costs associated with maintenance, repairs, preventative maintenance, and improvement projects. Attempts to separate

the expenditures by each category were unsuccessful due to current SMFRA Finance Department reporting practices.

Table 3

2009-2010 Maintenance Cost per Square Foot and Cost per Occupant

Description	Sta 31	Sta 32	Sta 33	Sta 34	Sta 35	Sta 36	Sta 37	Sta 38	Sta 39
2009 Maintenance Costs	10,303	12,730	34,953	30,073	30,914	9,376	8,067	10,866	24,007
2010 Maintenance Costs	6,858	12,849	11,079	19,502	25,618	27,616	10,798	18,066	21,904
2009 Maintenance Per Square Foot	2.50	2.20	5.14	1.60	1.44	1.40	1.58	3.51	2.54
2010 Maintenance Per Square Foot	1.66	2.22	1.63	1.04	1.19	4.12	2.12	5.84	2.32
Description	Sta 40	Sta 41	Sta 42	Sta 43	Sta 44	Sta 45	Sta 46	Sta 47	AVG
2009 Maintenance Costs	16,192	29,084	21,638	21,602	25,630	18,538	26,170	10,559	20,041
2010 Maintenance Costs	12,842	22,620	19,679	15,940	12,839	17,659	12,112	5,652	16,096
2009 Maintenance Per Square Foot	2.36	1.71	2.88	2.34	2.90	1.79	2.57	0.98	2.32
2010 Maintenance Per Square Foot	1.87	1.33	2.62	1.73	1.45	1.71	1.19	0.52	2.03

Data available for analyzing overall maintenance costs and maintenance costs per square foot are less dependable given that they include costs for repairs, improvements, and preventative maintenance. However, the available data does illustrate that the SMFRA Facilities Department was successful at reducing the overall cost of maintenance by 20 percent between 2009 and 2010.

Utility usage is the final efficiency performance measure identified as being important to SMFRA. Utilities can either be measured by yearly expenditures or yearly consumption. The SMFRA facilities are serviced by several different electric, gas, and water companies making cost comparisons between the companies impractical. SMFRA chose to analyze utilities by facility usage. Data for 2009 utility usage had not been collected for analysis.

Table 4

2010 Utility Usage by Facility

Description	Sta 31	Sta 32	Sta 33	Sta 34	Sta 35	Sta 36	Sta 37	Sta 38	Sta 39
2010 Yearly Gas Usage (Therms)	1,216	3,601	2,691	7,294	11,661	2,009	2,879	2,304	2,687
2010 Gas Usage Per Sq/Ft	0.29	0.62	0.40	0.39	0.54	0.30	0.57	0.74	0.28
2010 Yearly Electrical (kWh)	42,646	70,269	74,015	186,622	193,136	48,476	31,175	44,236	94,760
2010 Electrical Usage Per Sq/Ft	10.4	12.1	10.9	10.0	9.0	7.2	6.1	14.3	10.0
2010 Yearly Water Usage (Gal)	352,000	472,000	305,000	593,000	568,000	178,870	364,800	405,000	374,000
2010 Water Usage Per Sq/Ft	85.4	81.5	44.8	31.6	26.4	26.7	71.6	131.0	39.6
2010 Monthly Increase w/ Sprinkler	53,000	38,000	22,000	68,000	62,000	12,500	70,000	70,000	55,000
Description	Sta 40	Sta 41	Sta 42	Sta 43	Sta 44	Sta 45	Sta 46	Sta 47	AVG
2010 Yearly Gas Usage (Therms)	2,579	4,961	3,833	4,220	3,903	5,057	6,521	3,272	4,158
2010 Gas Usage Per Sq/Ft	0.38	0.29	0.51	0.46	0.44	0.49	0.64	0.30	0.45
2010 Yearly Electrical (kWh)	119,844	119,060	97,640	64,291	90,925	114,280	109,280	81,840	93,088
2010 Electrical Usage Per Sq/Ft	17.5	7.0	13.0	6.9	10.3	11.0	10.7	7.6	10.23
2010 Yearly Water Usage (Gal)	Well	247,000	146,000	80,000	470,000	383,000	609,000	Well	326,334
2010 Water Usage Per Sq/Ft	N/A	14.6	19.4	8.7	53.2	37.1	59.8	N/A	43.0
2010 Monthly Increase w/ Sprinkler	Well	18,000	9,000	15,000	60,000	40,000	109,000	Well	41,265

Expenses for utilities were collected by overall usage of gas, electric, and water at each facility. For easier comparison between facilities, the data was then calculated to determine the usage per square foot of each utility. Water usage was evaluated further to determine water usage increases associated with landscape watering. While some conclusions can be drawn for utility usage between fire stations, the available data is too limited at this time for in-depth analysis.

Effectiveness performance measures were established to measure responsiveness to work orders by priority and measure customer satisfaction. Work orders were classified by priority; emergency, high, normal, and low. Target completion times of work orders were then established based on the priority level. Emergency priority work orders have a target completion time of 24 hours. High priority work order completion time was established as 48 hours. Target completion

times of 5 days and 14 days were established for normal priority and low priority work orders respectively. Work order priorities were implemented in Maintenance Connection in July of 2010. Work orders submitted for the first six months of 2010 defaulted to a normal priority setting. Personnel submitting work orders were required to establish the priority level based on parameters established by the SMFRA Facilities Department. The Facilities Manager had the ability to adjust work order priority levels if necessary.

Table 5

Work Order Completion by Priority

Priority	# Hours	Count	Met Goal	Missed Goal	% Actual	% Target
Emergency	24	8	5	3	63%	95%
High	48	90	48	42	53%	90%
Normal	120	414	285	129	69%	85%
Low	336	21	18	3	86%	80%

The data clearly indicates that SMFRA Facilities Department did not achieve the established completion time desired for emergency, high, or normal priority work orders. However, the data evaluated is limited due to mid-year implementation of the priority system and potential discrepancies of priority setting by work order submitters.

Customer satisfaction is the final Effectiveness performance measure utilized by SMFRA. A survey of the 17 Station Commanders identified that 92.3 percent of the respondents were either satisfied or very satisfied with the work order process. The same percentage was satisfied or very satisfied with the responsiveness of the Facilities Department. The percentage of satisfied or very satisfied responses dropped to 76.9 percent when asked about the quality of repairs and maintenance provided by the SMFRA Facilities Department. None of the Station Commanders chose Unsatisfied or Very Unsatisfied for any of the survey questions.

The final question presented to the Station Commanders asked if the SMFRA Facilities Department was meeting their goal of providing safe and comfortable facilities for the employees to efficiently and effectively perform their duties. Eleven of the thirteen responding Station Commanders, almost 85 percent, answered in the affirmative. The same question was presented to the SMFRA Executive Committee. They were unanimous in their response that the SMFRA Facilities Department was meeting their goal.

The final process for SMFRA to undertake, when evaluating the effectiveness of the Facilities Department, was to establish benchmarks to compare their performance measures against. Benchmarks should be both internal and competitive in nature to accurately assess the established performance measures. Internal benchmarks have been established for Level of Maintenance desired, Work Order Response Time by Priority, and Customer Satisfaction. The Level of Maintenance desired and Work Order Response Time by Priority benchmarks clearly identify that SMFRA Facilities Department has not achieved the established standard. Conversely, the Customer Service benchmark has identified that most Station Commanders and all members of the Executive Committee are satisfied or very satisfied with the services provided by the SMFRA Facilities Department. Further evaluation of the performance measures is impractical until the remaining benchmarks have been established and additional data has been collected.

Discussion

The SMFRA Executive Committee, as part of the consolidation process between Parker Fire District and South Metro Fire Rescue, decided to create a new department under the Support Services Division. As a result of the Executive Committee's decision, the SMFRA Facilities Department was created consisting of a Facilities Manager and Facilities Maintenance

Technician. The problem was SMFRA had not evaluated the effectiveness of the Facilities Department since its creation. The purpose of this ARP was to evaluate the effectiveness of the SMFRA Facilities Department based on identified industry standards.

Local governments are demanding more of managers, department heads, and supervisors than just operating within the budget according to Ammons et al. (2002). They expect managers and supervisors to actively participate in the pursuit of continuous improvement. To reassure taxpayers that they are achieving optimum results, managers and supervisors must have a way to measure their effectiveness. Chief Turner and the SMFRA Executive Committee had the same expectations of the new Facilities Department (personal communication, June 2, 2011). With the higher expectation placed on local government to achieve optimum results, it was surprising that only 50 percent of the similar sized fire departments surveyed acknowledged measuring the effectiveness of their facilities maintenance. It was even more surprising that none of the fire departments had identified or utilized an established industry standard.

Similar data was collected through a survey of public and private facility maintenance agencies operating in the Denver metro area. All respondents confirmed they measure the effectiveness of their facilities maintenance. However, they all utilized standards developed internally rather than an established industry standard. The data clearly indicates that SMFRA must develop an internal standard to measure the effectiveness of their Facilities Department.

According to Ness (2002), the first step SMFRA should take to develop a standard is determining the level of maintenance desired. Through questionnaires sent to the Station Commanders and SMFRA Executive Committee, it was determined that the SMFRA Facilities Department should provide Level 2- Comprehensive Stewardship level of maintenance. Data has

identified that 41 percent of the respondents felt the SMFRA Facilities Department was achieving or exceeding the Level 2- Comprehensive Stewardship level of maintenance.

Ness (2002) goes on to state that achieving the desired level of maintenance is impacted by more than just the effectiveness of the Facilities Department. The priorities of the organization and the resources, both staffing and financial, committed to facilities maintenance play an important part in determining the final level of maintenance provided. If the SMFRA Facilities Department continues to perform below the desired level of maintenance standard, data collected can be utilized to validate future requests for additional staffing or financial support much like the Office of Facilities Engineering and Operations did in Washington D.C. (Smithsonian, 2006).

SMFRA established Workload Performance Measures to evaluate the number of work orders completed. This data has limited value to SMFRA as predicted by Ammons et al, (2002) when they stated Workload Performance Measures do not evaluate the quality or effectiveness of the service provided. Atkins (2010) states that performance measures must analyze the right information and be meaningful. Creating more detailed Workload Performance Measures to identify work orders completed by asset type would provide more meaningful data for SMFRA. Similarly, collecting and analyzing data to determine the ratio of work orders completed in-house compared to outside vendors would provide both Workload and Effectiveness Measures. Currently, insufficient data exists to accurately evaluate the effectiveness of the SMFRA Facilities Department against these performance measures.

To fully evaluate the effectiveness of the SMFRA Facilities Department, Efficiency and Effectiveness Performance Measures should also be considered (Ammons et al., 2002). SMFRA established Efficiency Measures to analyze expenses and usage for station supplies, utilities, and

maintenance. Analyzing the data by square footage and by occupant allows for Internal Benchmarking between stations as recommended by Epstein (2009). However, data available for analysis of these three Efficiency Measures is limited. In addition, sufficient variables exist in all three Efficiency Measures that drawing conclusions at this time is premature.

According to Epstein (2009), benchmarks must be established to evaluate the performance measures established by SMFRA. There are three types of benchmarks that can be utilized; Internal, Competitive, and Generic. Both Internal and Competitive Benchmarks would work well to evaluate the performance measures of the SMFRA fire stations. Competitive Benchmarks would most accurately evaluate the Administration Buildings; however, Generic Benchmarks could also be used.

Establishing benchmarks is a two step process according to Hayden (n.d.). SMFRA has accomplished the first step when they chose the specific areas they wanted to evaluate. The second step required SMFRA to have a clear understanding of the objectives they hoped to achieve. For SMFRA, the primary objectives were cost control and improved program efficiency. Although the data appears to show that SMFRA Facilities Department has achieved a level of success with both cost control and improved program efficiency, sufficient data is not available for definitive conclusions.

Recommendations

Analyzing method to evaluate the effectiveness of the SMFRA Facilities Department revealed that industry standards for facilities maintenance evaluation are not widely available or utilized. As a result, SMFRA established Internal Performance Measures and Benchmarks to measure the effectiveness of their facilities maintenance. Analysis of the available performance

measure data identified the need for SMFRA to collect more accurate facilities maintenance information.

To improve the accuracy of the data, SMFRA must program the Computer Maintenance Management System used by the facilities department to collect specific data on who completed the work orders; SMFRA Facilities Department, line fire fighters, or outside vendors. This information will allow SMFRA to more accurately analyze program effectiveness and maintain cost control.

The second adjustment necessary to improve data accuracy requires changing the method SMFRA Finance Department reports maintenance costs. Currently, facility maintenance, repairs, improvements, and preventative maintenance are reported together as “Maintenance”. As a result, facilities that undergo remodel projects or major component replacements appear to be more costly to maintain than other facilities. Separating out these costs by category will allow for more accurate Internal Benchmarking between the facilities.

The SMFRA Facilities Department has been collecting the proper data to analyze the Efficiency Performance Measures. However, data collected from one or two years is not sufficient to identify trends or draw conclusions. The SMFRA must continue to collect accurate, meaningful, and consistent data from which to measure the effectiveness of their Facilities Department.

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Appendix A

Questionnaire Sent to Fire Departments Similar to SMFRA

2011 Facilities Questionnaire

1. Is your facilities maintenance performed by Fire Department employees, outside contractors, or a combination of the two?

2. If maintenance is performed by Fire Department employees, please give an overview of the staffing levels, titles, and responsibilities.

3. How do line members report maintenance/repair issues at the stations?

4. Do you track repair costs, maintenance costs, utility usage, etc. for each facility?

5. Do you measure the effectiveness of their facilities maintenance? If so, what standards are used?

Thank you again for your assistance with this survey.

Appendix B
Fire Departments Similar in Size to SMFRA

Akron Fire Department	Akron	OH	44308
Arlington Texas Fire Department	Arlington	TX	76004
Aurora Fire Department	Aurora	CO	80012
Baton Rouge Fire Department	Baton Rouge	LA	70807
Beaumont Fire/ Rescue Services	Beaumont	TX	77701
Boise City Fire Department	Boise	ID	83704
Buffalo Fire Department	Buffalo	NY	14202
Charleston Fire Department	Charleston	SC	29401
Chattanooga Fire Department	Chattanooga	TN	37406
City of Dayton Fire Department	Dayton	OH	45402
City of Knoxville Fire Department	Knoxville	TN	37915
City of Riverside Fire Department	Riverside	CA	92504
City of Saint Paul Fire Department	Saint Paul	MN	55101
City of Scottsdale Fire Department	Scottsdale	AZ	85251
Colorado Springs Fire Department	Colorado Springs	CO	80910
Columbus Department of Fire and EMS	Columbus	GA	31901
Corpus Christi Fire Department	Corpus Christi	TX	78408
County of Maui Department of Fire & Public Safety	Kahului	HI	96732
Evansville Fire Department	Evansville	IN	47713
Gary Fire Department	Gary	IN	46402
Grand Rapids Fire Department	Grand Rapids	MI	49503
Gulfport Fire Department	Gulfport	MS	39501
Hall County Fire Services	Gainesville	GA	30501
Hartford Fire Department	Hartford	CT	06103
High Point Fire Department	High Point	NC	27260
Huntsville Fire & Rescue	Huntsville	AL	35801
Lafayette Fire Department	Lafayette	LA	70501
Lake County Fire Rescue	Tavares	FL	32778
Laredo Fire Department	Laredo	TX	78040
Lincoln Fire & Rescue	Lincoln	NE	68508
Little Rock Fire Department	Little Rock	AR	72201
Lubbock Fire Department	Lubbock	TX	79403
Macon-Bibb County Fire Department	Macon	GA	31201
Mesa Fire Department	Mesa	AZ	85201
Miami Fire-Rescue	Miami	FL	33136
Mobile Fire-Rescue Department	Mobile	AL	36602
Montgomery Fire Department	Montgomery	AL	36104
Norfolk Fire-Rescue	Norfolk	VA	23510
Ouachita Parish Fire Protection District #1	West Monroe	LA	71292
Peoria Fire Department	Peoria	IL	61603

Roanoke Fire- EMS	Roanoke	VA	24016
Rochester Fire Department	Rochester	NY	14614
Salt Lake City Fire Department	Salt Lake City	UT	84084
Santa Barbara County Fire Department	Santa Barbara	CA	93110
Seminole County EMS/Fire/Rescue	Sanford	FL	32773
Shreveport Fire Department	Shreveport	LA	71101
Tacoma Fire Department	Tacoma	WA	98402
Toledo Fire Department	Toledo	OH	43604
Topeka Fire Department	Topeka	KS	66607
West Metro Fire Rescue	Lakewood	CO	80226
Wichita Fire Department	Wichita	KS	67202
Winston Salem Fire Department	Winston Salem	NC	27102
Worcester Fire Department	Worcester	MA	01605

Appendix C

Results of Questionnaire to Fire Departments Similar in Size to South Metro Fire Rescue Authority

2011 Facilities Maintenance Survey													
Department	Performed			Staffing Levels	Reporting			Track Costs		Effectiveness		Standard	
	IN	VE	CI	and Rank	CM	EM	PN	Yes	No	Yes	No	IN	IND
Boise City		X	X	Deputy Chief		X		X		X		X	
Buffalo Fire Department		X	X	N/A			X	X		X		X	
City of Colorado Springs	X		X	(1) Main Tech	X			X		X		X	
City of Knoxville			X	N/A			X	X			X		
City of Riverside Fire Department	X	X	X	Captains, F/F	X			X			X		
Corpus Christy Fire Department		X	X	Firefighters		X		X		X		X	
County of Maui Fire Department	X	X		Fire Service Officer	X			X		X		X	
Evansville Fire Department		X	X	Facility Manager	X			X		X		X	
Grand Rapids Fire Department	X			Captains	X			X		X		X	
Lake County Fire Department	X	X	X	Fire Captain	X			X			X		
Lincoln Fire Department	X	X		Part-time emp	X		X	X			X		
Mobile Fire Department			X	N/A		X	X	X			X		
Miami Fire Rescue	X	X		F/F with 6 staff	X			X			X		
Salt Lake City Fire Department		X	X	N/A	X			X			X		
Seminole County Fire Department		X		Asst Chief		X	X	X			X		
Toledo Fire Department		X	X	N/A		X			X	X		X	
Topeka Fire Department			X	N/A		X	X	X			X		
West Metro Fire Rescue	X	X		Captains		X		X			X		
Wichita Fire department			X	N/A	X			X		X		X	
Worcester Fire Department	X	X		Building Craftsman		X	X	X		X		X	

IN- In house, VE- Vender, CI- City, CM- Computer, EM- E-Mail, PN- Phone, IND- Industry

Appendix D

Results of Questionnaire to Public and Private Facilities Maintenance Agencies

Public and Private Facilities Maintenance Questionnaire				
Public Agency Name	Type of Facilities	M/E	How Measure	Other uses
Arapahoe County Government	Offices, Courthouse,	Yes	CMMS and BUI (building utilization)	Staffing, planning
Cherry Creek School District	Public School Facilities	Yes	Work Orders	Long range planning
Douglas County Schools	Public School Facilities	Yes	CMMS	Benchmarking with others
Town of Parker	Office, Rec Centers, Historic	Yes	Response and budget compare	Long term plan, hiring
Private Agency Name	Type of Facilities	M/E	How Measure	Other uses
Colorado Asset Management	Office and Warehouse	Yes	Customer Satisfaction	Training and planning
Collier International	Office and Retail	Yes	Timeliness, thoroughness, price	No

M/E - Measure Effectiveness

Appendix E

Station Commander Satisfaction Survey

APPA Levels of Facilities Maintenance

Level 1- Showpiece Facility. Equipment and building components are fully functional and in excellent operating condition. Work orders are responded to immediately and equipment is upgraded regularly to keep up to modern standards.

Level 2- Comprehensive Stewardship. Maintenance activities are organized with direction. Equipment and components are usually functional and in operating condition. Work orders are responded to in a timely fashion. Equipment is regularly updated to keep up to modern standards.

Level 3 - Managed Care. Maintenance activities appear to be somewhat organized but are people dependent. Equipment and building components experience occasional breakdown but are generally operational. Work orders are responded to in a variable time frame without apparent cause. Equipment is upgraded but not enough to control the effect of normal usage.

Level 4- Reactive Management. Maintenance activities are somewhat chaotic. Equipment is frequently broken and inoperative. Work orders are not responded to in a timely fashion. No attempt is made to update equipment or building components.

Level 5- Crisis Response. Maintenance activities are chaotic and without direction. Equipment and building components are routinely broken or inoperative. Work orders are never responded to in a timely manner. No equipment or building updates occur.

Question 1

Using the APPA "Levels of Facilities Maintenance" listed above, which level best describes the CURRENT performance of the Facilities Department?		
Answer Options	Response Percent	Response Count
Level 1- Showpiece Facility	7.7%	1
Level 2- Comprehensive Stewardship	30.8%	4
Level 3- Managed Care	61.5%	8
Level 4- Reactive Management	0.0%	0
Level 5- Crisis Management	0.0%	0
	<i>answered question</i>	13
	<i>skipped question</i>	0

Question 2

Using the "Levels of Facilities Maintenance" listed above, which level best describes where you feel the Facilities Department performance SHOULD BE?		
Answer Options	Response Percent	Response Count
Level 1- Showpiece Facility	30.8%	4
Level 2- Comprehensive Stewardship	69.2%	9
Level 3- Managed Care	0.0%	0
Level 4- Reactive Management	0.0%	0
Level 5- Crisis Management	0.0%	0
	<i>answered question</i>	13
	<i>skipped question</i>	0

Question 3

How satisfied are you with the Work Order Request process on Maintenance Connection?		
Answer Options	Response Percent	Response Count
Very Satisfied	15.4%	2
Satisfied	76.9%	10
Neither	7.7%	1
Unsatisfied	0.0%	0
Very Unsatisfied	0.0%	0
	<i>answered question</i>	13
	<i>skipped question</i>	0

Question 4

How satisfied are you with the responsiveness of the Facilities Department to your Work Order requests?		
Answer Options	Response Percent	Response Count
Very Satisfied	15.4%	2
Satisfied	76.9%	10
Neither	7.7%	1
Unsatisfied	0.0%	0
Very Unsatisfied	0.0%	0
	<i>answered question</i>	13
	<i>skipped question</i>	0

Question 5

How satisfied are you with the quality of repairs and maintenance performed by the Facilities Department?		
Answer Options	Response Percent	Response Count
Very Satisfied	15.4%	2
Satisfied	61.5%	8
Neither	23.1%	3
Unsatisfied	0.0%	0
Very Unsatisfied	0.0%	0
<i>answered question</i>		13
<i>skipped question</i>		0

Question 6

Does the Facilities Manager provide the proper level of support for you as the Station Commander?		
Answer Options	Response Percent	Response Count
Yes	69.2%	9
No	30.8%	4
<i>answered question</i>		13
<i>skipped question</i>		0

Question 7

If your answer to Question 6 was "No", would you like to see more or less support from the Facilities Manager?		
Answer Options	Response Percent	Response Count
More	76.9%	10
Less	23.1%	3
<i>answered question</i>		13
<i>skipped question</i>		0

*Question 7 incorrectly required an answer to submit the survey. Station Commanders were instructed to answer Question 7 as "More" if they answered Question 6 as "Yes". Actual Response Count to Question 7 should be: More 1, Less 3.

Question 8

What reports, such as utility usage, would you like Facilities to provide to better assist you with managing your station? Please list below.	
Answer Options	Response Count
	13
<i>answered question</i>	13
<i>skipped question</i>	0

- Monthly detail of ALL expenses, not just a summary of broad categories.
- None
- I would like to see the actual budget numbers that I can utilize throughout the year.
- nothing more needed
- Utility Usage is great.
Bi-Annual Inspections with St Commander for overall cleanliness and upkeep.
- I would like to see actual cost of repairs. It should be automatic that Finance sends the detail for each station every month instead of having to request it.
- reports are fine,
- Be involved more in station long term planning.
- None, I would the ability to buy what I need when I need it.
- None
- Quarterly reports of utilities and accurate accounting of budgetary items
- Life expectancy of items so I have some idea where the facility currently stands.
Also would like to see last 3-5 years of expenses to see if the station is in line with past expenses.
- A comparison of last year would be helpful to diagnose any changes that may be occurring.

Question 9

The Facilities Department currently has policies that address Facilities Management and Facilities Maintenance. In your opinion, are there other policies that need to be implemented? Please list topics below.

Answer Options	Response Count
	13
<i>answered question</i>	13
<i>skipped question</i>	0

- No
- No
- Nope
- No
- Can't think of any, other than station cleanliness as I see a huge disparity across the district.
- Currently, there are no forms to use to submit our budget. It seems that it would be helpful.
- To many policies
- No
- No additional policies are needed. When dealing with the facilities manager it feels like we're Are bartering for what we need.
- Budgeting process for facilities once again the Captains were for the most part left out of the process.
- No
- No
- None

Question 10

Overall, do you feel the current facilities maintenance system is meeting the goal of providing safe and comfortable facilities for the firefighters to efficiently and effectively perform their duties?

Answer Options	Response Percent	Response Count
Yes	84.6%	11
No	15.4%	2
<i>answered question</i>		13
<i>skipped question</i>		0

Appendix F

Executive Committee Satisfaction Survey

APPA Levels of Facilities Maintenance

Level 1- Showpiece Facility. Equipment and building components are fully functional and in excellent operating condition. Work orders are responded to immediately and equipment is upgraded regularly to keep up to modern standards.

Level 2- Comprehensive Stewardship. Maintenance activities are organized with direction. Equipment and components are usually functional and in operating condition. Work orders are responded to in a timely fashion. Equipment is regularly updated to keep up to modern standards.

Level 3 - Managed Care. Maintenance activities appear to be somewhat organized but are people dependent. Equipment and building components experience occasional breakdown but are generally operational. Work orders are responded to in a variable time frame without apparent cause. Equipment is upgraded but not enough to control the effect of normal usage.

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Level 5- Crisis Response. Maintenance activities are chaotic and without direction. Equipment and building components are routinely broken or inoperative. Work orders are never responded to in a timely manner. No equipment or building updates occur.

Question 1		
Using the "Levels of Facilities Maintenance" listed above, which level best describes the CURRENT performance of the Facilities Department?		
Answer Options	Response Percent	Response Count
Level 1- Showpiece Facility	0.0%	0
Level 2- Comprehensive Stewardship	50.0%	2
Level 3- Managed Care	50.0%	2
Level 4- Reactive Management	0.0%	0
Level 5- Crisis Management	0.0%	0
	<i>answered question</i>	4
	<i>skipped question</i>	0

Question 2		
Using the "Levels of Facilities Maintenance" listed above, which level best describes where you feel the Facilities Department performance SHOULD BE?		
Answer Options	Response Percent	Response Count
Level 1- Showpiece Facility	0.0%	0
Level 2- Comprehensive Stewardship	100.0%	4
Level 3- Managed Care	0.0%	0
Level 4- Reactive Management	0.0%	0
Level 5- Crisis Management	0.0%	0
<i>answered question</i>		4
<i>skipped question</i>		0

Question 3		
Overall, do you feel the current facilities maintenance system is meeting the goal of providing safe and comfortable facilities for the firefighters to efficiently and effectively perform their duties?		
Answer Options	Response Percent	Response Count
Yes	100.0%	4
No	0.0%	0
<i>answered question</i>		4
<i>skipped question</i>		0