# Organizational Impacts of Changing Work Schedules from a 24/48 Hour Shift to a 48/96 Hour Shift

Christopher Kelly

College Station Fire Department, College Station, Texas

## 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.

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## Abstract

The problem was the College Station Fire Department wanted to implement a change in the shift work schedule from a 24/48 hour shift to a 48/96 hour shift and was uncertain how this would affect the organization. The purpose of the research was to identify potential impacts that would affect the organization by changing the shift work schedule from a 24/48 hour shift to a 48/96 hour shift. Descriptive research methods were used to conduct literature reviews on the topic and questionnaires were created. Questionnaires were used to assess the attitudes and opinions of those within the organization. Questionnaires were also sent to individuals in external organizations that were currently operating on the 48/96 hour shift schedule. The questionnaires focused on the perceived impacts by personnel and whether or not any of those perceived challenges actually occurred from changing to a 48/96 hour shift schedule. Employee morale was documented in the external organizations to draw conclusions on how morale would be affected internally by the change in schedule. Results showed that the 48/96 hour shift schedule is a viable option for the College Station Fire Department. Many of the valid concerns outlined before implementation were never realized in the reporting organizations and universally they all reported a positive increase in employee morale. A recommendation to conduct further research is prudent because a more comprehensive study is necessary to fully document all the potential impacts that would occur from changing work schedules.

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# Organizational Impacts of Changing Work Schedules from a 24/48 Hour Shift to a 48/96 Hour Shift

The problem is the College Station Fire Department (CSFD) wants to implement a change in the shift work schedule from a 24/48 hour shift to a 48/96 hour shift and is uncertain how this will affect the organization. The purpose of this research is to identify potential organizational impacts that may affect the organization by changing the shift work schedule from a 24/48 hour shift to a 48/96 hour shift.

The research to address this problem included asking internal members about the current state of the department and the perceived impacts that they felt may occur from this type of change. The research also reached outside the organization to look for similar agencies that have experienced this transition. This was done to see if their concerns were similar to those expressed by members of the CSFD and if any of those concerns were ever realized. Morale was also examined within all the organizations to see if any similarities could be derived.

The research method used to complete this project is descriptive research. Descriptive research methodology by definition is, “determining and reporting the present status of something” and “to look at the way things are at the present time” (National Fire Academy, 2012a, p. II-12). This method lends itself well to describing in detail how things are currently in an organization and the perception of how it may be impacted by change.

The following are the three research questions that were addressed during the research to help determine what may affect the organization: (a) What are the perceived impacts that members of our organization think may happen if we were to switch to the new 48/96 hour shift schedule? (b) For organizations of similar size and mission that have experienced this transition, what were the perceived challenges prior to implementation and did any of these challenges

actually occur? (c) How did organizations that changed work schedules describe the effect on morale prior to implementation, during implementation and after the change had been done at the six month mark?

## Background and Significance

The CSFD, located in College Station, Texas is a rapidly growing and proactive department serving both the city and Texas A&M University. Texas A&M University is the fourth largest university in our nation with a student population over 48,000 (City of College Station website, 2012). CSFD currently responds from six fire stations with 41 people on duty working a 24 hour shift with 48 hours off. CSFD has a total fire department staff including administration of 139 personnel. CSFD saw a 12.5% increase in call volume in calendar year 2008 over the previous year (City of College Station website, 2012). In 2011 the department responded to over 6,807 calls for emergency help in our response area. As the call volume increases over the years from continued growth there is concern that the number of responses may overload personnel and the stations.

CSFD has a response area that includes the 50.60 square miles of the City of College Station with an estimated population of 96,921 (City of College Station website, 2012), the city also provides ambulance service for the southern half of Brazos County. The City of Bryan, Texas is our sister city along our northern border with an estimated population of 76,000 residents over 43.4 square miles (City of Bryan website, 2012). Brazos County is approaching 200,000 people over 585.45 square miles per the 2011 estimates (United States Census Bureau, 2012). We have an automatic aid agreement between both cities and a mutual aid agreement with volunteer agencies in the unincorporated portions of Brazos County.

The Bryan Fire Department employs over 100 full time fire fighters and staff that operate out of five fire stations working an identical 24 hour shift with 48 hours off (City of Bryan website, 2012). This is significant because considering a change of work schedule may have an impact on them as well as the other agencies which employ fire department personnel on their off duty days. Working on a long shift schedule presents many challenges and there are varied schedules currently in use across the nation. So while there are many different shift alternatives, the intent of this research was to focus specifically on the comparison of our current 24/48 hour shift schedule with that of the 48/96 hour shift schedule. This schedule does not change the total number of hours worked in a year. An employee will work 48 hours on shift with 96 hours off shift, thereby reducing the amount of commutes to work in half.

It is prudent for organizations to be willing to look at ways to improve service delivery and some of the ways to do this could include reducing costs or through increasing morale from a more beneficial work schedule for our employees.

> Currently, over 40 agencies with diverse demographics, management structures, and overall philosophies are using the 48/96 as progressive change that addressed numerous issues. Most of the departments that adopted the 48/96 schedule were motivated by the reduction in commuting and the fact that employees could spend more quality time with their families. A number of departments chose to switch as a means of attracting and maintaining employees. Many departments changed because they saw the positive benefits and improvements in morale in surrounding departments who had switched to the 48/96 (United Firefighters of Los Angeles City Local 112 [UFLAC], 2007, p. 4).

This problem relates directly to the goals of the United States Fire Administration, more specifically two of their five goals: (a) “goal 2 is to improve local planning and preparedness”,

and (b) “goal 3 is to improve the fire and emergency services’ capability for response to and recovery from all hazards” (United States Fire Administration [USFA], 2010, p. 13). The problem of providing an optimal schedule for the best performance of our firefighters will fulfill these goals and help with the recovery from these events in the safest way possible.

This applied research project reflects the course description as outlined in the Executive Fire Officer Program operational policies and procedures for the Executive Development course. “This course is designed to assist fire service personnel in developing effective management and leadership skills as they make the transition from manager to senior executive.”(National Fire Academy, 2012b, p. I-4). This course prepares individuals to look at difficult problems and through research prepare reports with recommendations. This is also outlined in the Executive Development course goals to “lead effectively within a dynamic and complex organization by enhancing the development of teams and the application of research” (National Fire Academy, 2011, p. ix).

## Literature Review

“The 48/96 schedule is not a theoretical concept in the fire service but a proven and valid schedule option” (UFLAC, 2007, p. 3). Many agencies have invested significant time into the research of this topic. Some of the concerns focused on by many of these other reports included fatigue issues, family concerns, work productivity, morale issues, communication difficulties, and increased leave issues which could potentially have a financial impact on departments. Dr. Allison Hawkes (2006) used surveys, sleep diaries, and focus groups to analyze the effects of the 48/96 shift change on personnel of West Metro Fire Rescue located in a suburb of Denver, Colorado.

One area of concern with the 48/96 schedules was that 48 hours was too long for personnel to be at work and to respond safely on calls.

> West Metro managed the fatigue by rotating personnel from busier units to slower units when their first shift is overwhelming. In the first nine months of 2006 this was reported on only three occasions. Fatigue was considered significant when a member did not receive five hours of inactivity during the last 12 hours of the first shift (Hawkes, 2006, p. 5).

Key findings from the report included personnel reporting "they slept more on average post schedule change" and "that sleep was attributed to both on and off shifts" (Hawkes, 2006, p. 2). A big increase was due to the fact that members had reported fewer sleep hours the night before a shift in anticipation of getting up to go on shift. The new 48/96 rotation minimizes this by cutting the number of times someone wakes up at home to come to work in half (Hawkes, 2006).

In the Provo Fire and Rescue special report the committee noted that "the 48/96 schedule provides more recovery time than our current schedule or any other schedule, thus reducing long term fatigue" (Harris et al., 2004, p. 3). Although the study showed long term fatigue was reduced, it did show that short term fatigue could increase and noted that each individual should pay close attention to their fatigue level and get adequate rest with recommendations for retiring at 2200 hours instead of staying up (Harris et al., 2004).

Dr. Susan Koen has done extensive research on the topic of shift schedule design and did a comparative analysis of the 24/48 work schedule versus the 48/96 hour work schedule. "The key question to be answered here is this: does the benefit of more consecutive off days provided by the 48-96 schedule create any negative costs in safety, health, on-duty performance, family

distress or individual morale and job satisfaction?"(Koen, 2005, p. 1). Koen (2005) notes that both the 24/48 work schedule and the 48/96 schedule have 1:2 work rest ratio which is better than the recommended minimum of a 3:4 ratio. She goes on to look at the frequency of sleep disruptions in an average night:

> Firefighters who experience one call during their nighttime sleep period (e.g., 10:00 p.m.-6:00 a.m.) typically will complete their first 24-hour workday in a state of mild sleep deprivation, depending on their ease of returning to sleep and their total sleep length that night. With a 5-hour block of restful sleep and at least one 90-minute completion sleep, sleep deprivation can be avoided. Those firefighters who average two calls during a typical on-duty night will most likely be in a state of moderate sleep deprivation, where cognitive fatigue problems will begin surfacing. (Koen, 2005, p. 1-2)

Busier stations, as found in most large cities that have three or more call outs a night, should not consider the second consecutive 24 hour shift in the 48/96 design model (Koen, 2005). One such city, The Minneapolis Fire Department had a unique setting in 2001 and 2002 to evaluate the model. A trial period was run within the organization with a test and a control group, all from within the organization. "The Minneapolis Fire Department moved one-third of the suppression force (about 145 firefighters) to a 48-hour shift on January 1, 2001" (Clack, 2003, p. 16). Within the Minneapolis Fire Department many of the impacts were shown to have a negative effect on the overall organization. Clack noted that "Over the years 2001 and 2002, discipline problems, sick leave, work-related injuries, motor vehicle accidents and turn out time were all significantly and negatively affected by firefighters working a 48 hour shift" (Clack, 2003, p. 19). Impacts were noted as being even more negative when the data from the last 24 of

the 48 hour shift was evaluated independently. The article also suggests that a department with a smaller workload may not experience the same negative consequences.

Other research provided results where firefighters had answered questionnaires in regards to fatigue and stress and had found a great demand for individual rooms for sleeping among stations that did not have such rooms (Takeyama et al., 2005, p. 10). It went on to note that sleep was easily disturbed in stations without these rooms which could have contributed to the fatigue of the firefighters. The report also cited earlier reports that frequent ambulance calls at night lead to high stress and fatigue among ambulance paramedics. Limitations of this study noted that "it was impossible to estimate the effect of emergency calls on fatigue, because there were few such calls during the period studied" (Takeyama et al., 2005, p. 10).

Family concerns also appear as one of the larger topics discussed in regards to the 48/96 schedule. Research has shown, "that the availability of the firefighter at home and interacting with the spouse and children is the most significant determinant of family well-being" (Koen, 2005, p. 2). This can be seen when we look at the number of mornings a firefighter wakes up at home. Under the 24/48 schedule a firefighter is only at home to assist with the children two out of every six mornings. In the 48/96 schedule there is a 50% increase and the firefighter wakes up at home three out of every six mornings. This scheduling offers firefighters a better chance at obtaining balance in their lives (UFLAC, 2007).

That balance also includes more periods of time off with the family over traditional weekend days. On a 24/48 hour schedule an employee will have one full weekend off out of every three weeks which is 17 per year. On a 48/96 schedule an employee has three free weekends off out of every six weeks which is 26 per year or nine extra weekends at home with the family (Koen, 2005). Research by Todd Poole addressed these issues as well and found that

the increased opportunity for firefighters and their families to enjoy more weekend trips outweighs the challenge of being unavailable for 48 consecutive hours (Poole, 2012).

The following is from a six month study that was evaluated and documented in a report by the International Association of Fire Chiefs (IAFC):

> The majority of fire fighters and their families liked the 48-on/96-off schedule. Fire fighters felt that it interfered significantly less with family, leisure and social activities. And although fire fighters reported that their spouses were less supportive of the 48 hour schedule, when families directly were asked, they reported general satisfaction with the longer format. Findings from an internet survey of citizen feedback were positive concerning the fire department performance both before and after the change. Importantly, the percentage of fire fighters supporting the change went from 64 percent before the switch to 86 percent after the 6 month trial interval (Elliot & Kuehl, 2007, p. 49)

Productivity was looked at in many reports and cited as improved under the 48/96 hour shift schedule. Organizations experienced less duplication of efforts with routine tasks like morning checks and shopping for meals (UFLAC, 2007). Members also felt like a project could be started and completed over two consecutive days with no breakdown and setup that may be required in the 24/48 hour schedule. This also was advantageous in the scheduling of training over a two day period in case of interruptions from emergency responses as well as the ability to have crews out for night drills or early in the morning so as to beat the heat (Harris et al., 2004).

Communication at the shift level has been looked at in previous research and was noted in a previous report as:

> Administrative drawbacks were generally limited in number and nearly all resources described similar administrative drawbacks such as working a straight 48-hour shift resulting in fatigue and the lengthy time period between duty shifts whereby organizational communications might be hampered (Hall, 2007, p. 29).

Lack of communication and personnel unavailability was a concern because once every six weeks an individual would work both a Saturday and Sunday and would therefore be unavailable for a ten day period from administration personnel working a 40 hour work week (UFLAC, 2007). This report indicated it was not that much of a concern because off duty members are easily contacted via email and cell phones.

All potential impacts that were looked at by the research did share a common thread that at no point did anyone want to cause negative financial impacts on the organizations. A key component of costs in most organizations is the use and cost of overtime to cover shifts. Most studies tied this with sick leave and the reduction of sick leave would therefore reduce overtime costs. In a feasibility study prepared for the members of the Sacramento Area Firefighters Local 522, the report listed five departments which showed a reduction in sick leave usage by as little as 10 percent in the Half Moon Bay Fire Department and as high as 80 percent in the Manhattan Beach Fire Department (Johnson, Repetto, Law, & Valentine, 2006).

> The general belief is that switching to the 48/96 has had either a neutral or positive effect on reducing sick leave usage. Reasons for the reduction could be the result of many factors including some or all of the following; improved morale, decreases in long term fatigue or simply that the 48/96 schedule virtually eliminates the majority of sick leave abuse on the 2nd shift (which accounts for 50% of work days; San Jose local 230, 2003, p. 8-9).

"Whether reduced sick leave indicates improved health is unclear, as sick-time is known to be influenced by 'not-illness' factors, such as employee morale and seasonal variables" (Elliot & Kuehl, 2007, p. 48). This quote helped to direct the questioning in surveys for respondents to describe morale in our own organization as well as how it was described in the external organizations to aide in drawing conclusions for the research.

All of the literature review had commonality among it which definitely helped to guide the research and influence the surveys conducted. It is very evident that the concerns expressed by all members of any department to include both operational and administrative staff are similar across all sizes of departments and in all regions of the country. One website that is used as a gathering spot for all pertinent information related to this type of scheduling is www.48-96.com and it has proven as a vital ally in the project as a starting point for researching information (48-96.com, 2012).

## Procedures

This research project used descriptive research methodology to answer the following three questions: (a) What are the perceived impacts that members of our organization think may happen if we were to switch to the new 48/96 hour shift schedule? (b) For organizations of similar size and mission that have experienced this transition, what were the perceived challenges prior to implementation and did any of these challenges actually occur? (c) How did organizations that changed work schedules describe the effect on morale prior to implementation, during implementation and after the change had been done at the six month mark?

While attending the Executive Development class in June of 2012, the research began by asking those in the class that were currently using the 48/96 shift work schedule for feedback. I

spoke with Chief Terry Merrell from the Maplewood (MO) Fire Department and he indicated that they were on that system and he indicated that quite a few departments in his area had been working on the 48/96 hour shift schedule as well. Those discussions led to a literature search in the Learning Resource Center at the National Fire Academy where materials specific to this topic were located and used to direct the research further.

A list of the current departments using the 48/96 hour shift schedule was obtained from a website which is dedicated to providing information about this work shift schedule (48-96.com, 2012). This list was used to do additional research while at the National Fire Academy focusing on previous topics covered in relation to the schedule. Further literature research was done at the Sterling C. Evans library on the campus of Texas A&M University in College Station, Texas. Many of the fire departments currently utilizing the 48/96 hour shift schedule were located outside the State of Texas. In an attempt to find organizations of similar size and mission to the CSFD, a list of the top 200 departments in Texas was created from the Texas Commission on Fire Protection (TCFP) website (Texas Commission on Fire Protection website, n.d.). That list was then used to do internet searches to determine if any were currently utilizing the 48/96 hour shift schedule in the State of Texas. Internet searches of those departments revealed five of the top 200 fire departments in Texas were working on 48/96 hour shifts and those are highlighted in yellow (see Appendix A). Limitations may have been created due to a department not having any information linked to their work schedule from an internet search and therefore been overlooked when that list was compiled.

It was decided that the best way to obtain information for this research would be to create a questionnaire that would allow for feedback on the 48/96 hour shift schedule. Two separate questionnaires were created using the online survey program, Survey Monkey, to answer the

research questions from both within CSFD and from the external organizations. Survey Monkey can be found at http://www.surveymonkey.com and they have tools used to assist individuals in building questionnaires and compiling data in an online database.

The first questionnaire created was designed to obtain feedback to answer the first research question: (a) What are the perceived impacts that members of our organization think may happen if we were to switch to the new 48/96 hour shift schedule? This questionnaire (see Appendix B) consisted of ten questions and would be sent to internal members of CSFD. Due to political limitations that exist this questionnaire was not distributed to the entire fire department. The fact that it was required of the researcher to limit respondents could affect the completeness of the results. A valid attempt was made to include all ranks and both the known proponents and opponents to the proposed 48/96 hour shift schedule. The number of personnel selected was 15 of our 139 personnel (10.8%) and included seven firefighters, two driver/engineers, three lieutenants, one captain, one battalion chief, and one assistant chief.

Question one of the internal questionnaire asked for demographic information including rank and time in service. Question two asked for the average roundtrip commutes of personnel in time and mileage so a determination could be made on what reduction in employee costs could be determined by reducing the number of commutes to work in half. Questions three and four asked the individual to list three positives and three negatives about our current 24/48 hour shift schedule. Question five asked if the individual had ever heard about the option of a 48/96 hour shift schedule. Questions six and seven asked the individual to list three positive and negatives that they felt could occur if the department switched from a 24/48 hour shift schedule to a 48/96 hour shift schedule. Question eight asked the employee to categorize morale in our organization and was followed up with question nine asking what they felt would happen with morale after a

change to the 48/96 hour shift schedule. Question ten asked the employee about trial programs and how long they would be willing to try a shift change as well as threshold percentages they felt would be necessary in a department vote to try the new schedule and to retain the new schedule.

Additional limitations noted in the internal questionnaire occur from having "fill in the blank" text boxes which require some additional interpretations on the part of the researcher to draw similarities in responses for results compilation. Morale questions were included in the internal questionnaire although they were not directly related to answering the third research question dealing with morale in the external organizations. It was included for the purpose of drawing correlations between morale in CSFD and that as answered by the external organizations in their questionnaire.

The second questionnaire created was designed to obtain feedback to answer the second and third research questions: (b) For organizations of similar size and mission that have experienced this transition, what were the perceived challenges prior to implementation and did any of these challenges actually occur? (c) How did organizations that changed work schedules describe the effect on morale prior to implementation, during implementation and after the change had been done at the six month mark? This questionnaire (see Appendix C) consisted of ten questions and would be sent to external organizations currently operating on a 48/96 hour shift schedule.

Question one of the external questionnaire asked for demographic information including department background, rank and time in service, and average commutes of personnel. Question two asked for current and previous work schedules, as well as trial periods of the 48/96 hour shift schedule and threshold percentages they used in department votes to try the new schedule and to

retain the new schedule. Questions three asked the individual to list the top three reasons their department made the change to the 48/96 hour shift schedule. Question four asked what the top three perceived challenges were that their department felt like may occur prior to the change. Question five asked if any of those perceived challenges were ever realized. Questions six was a scale question to address morale before, during, and six months after implementation. Question seven asked the respondent to describe in their own words morale throughout the process to allow for them to expand on the scale answers from question six. Question eight asked if one group or type of employee was primarily for or against the change. Example groups were listed and those examples included: new hires, administration, and those close to retirement, so as to give respondents an idea of the type of answers the question was expecting. Question nine had four areas for them to discuss any organizational changes in regards to sick leave, overtime costs, unforeseen benefits, and other financial impacts. Question ten asked if the organizations stayed with the 48/96 schedule and for any final thoughts not already discussed. Limitations noted in the external questionnaire were similar to the internal questionnaire because “fill in the blank” text boxes require some additional interpretations on the part of the researcher to draw similarities in responses for results compilation.

Using the list of the departments in the State of Texas (Texas Commission on Fire Protection website, n.d.), contact was made with those departments determined to be on the 48/96 hour shift schedule by phone. A valid email address was obtained to send a short email stating my request for help with a questionnaire (see Appendix D). An email request was sent to the five in the top 200 as well as a sixth department located nearby to three of the others in the greater Houston, Texas area which are all within two hours of the CSFD.

Additional outside organizations were reached by sending a request to my fellow colleagues that attended the same Executive Development course at the National Fire Academy. Out of the 28 students in the class, six departments were operating on the 48/96 hour shift schedule or 21.4% of the class. In a class made up of traditionally random assignments at the National Fire Academy to have 21.4% of the participants involved in the 48/96 hour shift schedule made it seem like a good population to use for additional feedback on the topic. The total number of external organizations that were sent emails with the link to the questionnaires (see Appendix D) requesting help was thirteen. Those departments included the six from the list of departments in the State of Texas, six from fellow colleagues in the Executive Development course, and one additional department which received the email as a forward from one of those colleagues (see Appendix E). Limitations exist with the number of departments able to be contacted and researched in a timely manner due to the time constraints of this project. Finding departments of similar size and mission proved difficult as well because there were not many located in the State of Texas which could easily be matched up to the CSFD in regards to size and mission operating on the 48/96 hour shift schedule.

## Results

The results from the 48/96 internal questionnaire were compiled on survey monkey to answer the first research question: (a) What are the perceived impacts that members of our organization think may happen if we were to switch to the new 48/96 hour shift schedule? The number of personnel selected was 15 of CSFD's 139 personnel (10.8%) and included seven firefighters, two driver/engineers, three lieutenants, one captain, one battalion chief, and one assistant chief. All 15 of those selected responded to the survey (100%). The seven firefighters had between six months and eight years of service with the average time in the fire service for

the group was five and a half years. The two driver/engineers had six and seven years in the fire service and their average time was six and a half years. The three lieutenants had 14, 14, and 25 years respectively for an average time just under 18 years. The captain had 25 years, the battalion chief had 34 years, and the assistant chief had 31 years of service. The average years in the fire service among all respondents was 13 years.

The commute of all respondents was grouped into half hour increments based on the responses of their average roundtrip commutes as shown in Table 1.

Table 1

48/96 Internal Questionnaire – Employee Work Commutes

| Time for roundtrip commute | Total mileage - Average | Respondents (% of overall group) |
|---|---|---|
| < ½ hour | 15 miles | 8 (53.3%) |
| ½ hour – 1 hour | 33 miles | 1 (6.7%) |
| 1 hour – 1 ½ hours | 80 miles | 3 (20.0%) |
| 1 ½ hours – 2 hours | 100 miles | 3 (20.0%) |

The top reasons stated and how many times they were mentioned by respondents will be noted in parentheses. This will apply to all future compilations of results that are made regarding questionnaire responses. The number may exceed actual number of respondents due to the fact that some mentioned the same item more than once given the opportunity to list three items.

The question about the three positives of the current 24/48 hour shift schedule included many answers that were related and required grouping the answers together, and it yielded 44 responses out of a possible 45 answer blanks. All 15 of the respondents answered the question. The reasons mentioned were: easy schedule (23), only one shift away from family (6), ability to

work second job (5), reduced child care (3), only use one day of vacation for five days off (3), better sleep (2), and downtime after a busy night (2).

The question about the three negatives of the current 24/48 hour shift schedule included many answers that were related and required grouping the answers together, and it yielded 33 responses out of a possible 45 answer blanks. All 15 of the respondents answered the question. The reasons mentioned were: hard to be gone all day (8), no negatives with our current schedule (6), only get one weekend out of three with both days off (6), only one night at home to stay out late (3), travel time to work seems like always on road (3), spend first day off recovering from busy night at work (3), not enough time to start and finish projects (2), and having to work holidays (2).

All 15 of the respondents indicated that they have heard of the alternative 48/96 hour shift schedule. The responses to list three positives they think may occur if a switch was made from the 24/48 hour shift schedule to the 48/96 hour shift schedule yielded 42 responses out of a possible 45 answer blanks. All 15 of the respondents answered the question. The reasons mentioned were: less commute and fuel savings (11), better schedule and easier to socialize with other shifts (8), four days off in a row (7), no positives by switching (4), more time to complete projects on duty (4), reduction in sick leave usage (3), only one morning check of equipment every two days resulting in savings and a greener city (2), increased morale (1), better sleep (1), and easier to work a second job (1).

The responses to list three negatives they think may occur if a switch was made from the 24/48 hour shift schedule to the 48/96 hour shift schedule yielded 43 responses out of a possible 45 answer blanks. All 15 of the respondents answered the question. The reasons mentioned were: 48 hours too long to be away from family (9), stuck at work for two days (9), fatigue (7),

having to change work schedules (5), difficult to trade (4), call back during the 4 days off (2), affect second job (2), use two days of vacation or sick time if an event lands on work days (2), have to work both Christmas Eve and Christmas (1), communication between shifts and administration (1), and negative attitudes from those that did not want to change (1).

Respondents were asked to rate morale currently in the organization. They were given five scale options to include: low, below average, average, above average, and high. All 15 of the respondents answered the question. None responded low, two (13.3%) responded below average, six (40.0%) responded average, six (40%) responded above average, and one (6.7%) responded high. A follow up question was asked about what they thought would happen with morale if we were to switch to the 48/96 hour shift schedule. Three options were given to include: lower morale, no change, and improve morale. All 15 of the respondent answered the question. Four (26.7%) responded lower morale, four (26.7%) responded no change, and seven (46.7%) responded that it would improve morale.

All 15 of the respondents answered the following questions in regards to trial periods. The first question asked what percentage of the department they would want to see vote affirmative to be willing to have a trial period. This is best broke down in the average percent required to start the trial. Minimum required percentages and the times that they were stated in parentheses: 30% (1), 50% (6), 70% (1), 80% (3), 90% (3), and 100% (1). The length of the trial period they would be willing to try was reported next and responses included: none (2), one month (2), three months (3), six months (6), and one year (2). After the trial period ended they were asked what percentage of the department they would want to see vote affirmative to keep the new 48/96 hour shift schedule. Minimum required percentages and the times that they were stated in parentheses: 51% (5), 70% (2), 80% (4), 90% (2), and 100% (2).

Lastly respondents were given an opportunity to list any additional thoughts. Six people (40%) indicated that regardless of all of the pros and cons they wanted the opportunity to try the new schedule. One person (6.6%) stated that they did not want to try the program at all. One person (6.6%) mentioned they believed as call volume increased that productivity would decrease. One person (6.6%) was worried that call backs of personnel and mandatory holding of personnel would become an issue for the department.

The results from the 48/96 external questionnaire were compiled on survey monkey to answer the second and third research question: (b) For organizations of similar size and mission that have experienced this transition, what were the perceived challenges prior to implementation and did any of these challenges actually occur? (c) How did organizations that changed work schedules describe the effect on morale prior to implementation, during implementation and after the change had been done at the six month mark?

The 48/96 external questionnaire was sent to 13 organizations via email requesting multiple people from within each organization respond to a questionnaire regarding the 48/96 hour shift schedule. Multiple individuals were requested to hopefully get a viewpoint from a firefighter, an officer, and one administrative person. Only 12 of the 13 (92.3%) organizations responded to the survey. A total of 22 respondents replied with no more than three from any one agency. Departments varied in size from a single station department with 20 personnel serving 9,000 people to a 10 station department with 150 personnel serving 175,000 people.

Respondents included one firefighter, two driver/engineers, three lieutenants, five captains, four battalion chiefs, and three assistant chiefs, and four fire chiefs. The one firefighter had three years in the fire service. The two driver/engineers had four and five years in the fire service and their average time was four and a half years. The three lieutenants had eight, 11, and

16 years respectively for an average time just under 12 years. The five captains had 12, 12, 13, 17, and 18 years respectively for an average time just under 15 and a half years. The four battalion chiefs had five, 14, 17, and 22 years respectively for an average time of 14 and a half years. The three assistant chiefs had 16, 28, and 28 years respectively for an average time of 24 years. The four fire chiefs had 19, 20, 20, and 21 years respectively for an average time of 20 years. The average years in the fire service among all respondents was 15 years.

The respondents were asked to estimate the average commute for their entire department and the responses were grouped into half hour increments as shown in Table 2.

Table 2

48/96 External Questionnaire – Employee Work Commutes

| Time for roundtrip commute | Total mileage - Average | Respondents (% of overall group) |
|---|---|---|
| ½ hour – 1 hour | 48 miles | 15 (68.2%) |
| 1 hour – 1 ½ hours | 80 miles | 3 (13.6%) |
| 1 ½ hours – 2 hours | 120 miles | 2 (9.1%) |
| 2 hours – 2 ½ hours | 160 miles | 1 (4.5%) |
| 2 ½ hours – 3 hours | 200 miles | 1 (4.5%) |

The next question dealt with previous work schedules and how long they have been working the 48/96 hour shift schedule. All 22 respondents answered the questions. Previous work schedules were split between the 24/48 hour shift schedule (9) and the Kelly schedule (13). When asked how long they have been working the 48/96 hour shift schedule, the following were their responses: 0 to 6 months (4), 9 months to 1 year (6), 1 to 2 years (2), 2 to 3 years (1), 3 to 4 years (1), 5 years (6), and 7 years (2).

The next parts of the question dealt with the need to have a vote to try the 48/96 hour shift schedule and what was that percentage on initial vote. All 22 respondents answered these questions and all 22 indicated that a vote was required to enter a trial period. The following are the percentages obtained to start the trial and the times that they were stated in parentheses: 51% (2), 66% (3), 75% (6), 85% (9), 99% (1), and 100% (1). In addition they were asked for the trial period length and the vote necessary to keep it after the trial. Time frame for the trial was broken down at: 6 months (8), 1 year (13), and 3 years (1). The following are the percentages obtained to keep the 48/96 hour shift schedule after the trial period and the times that they were stated in parentheses: 51% (3), 61-75% (6), 80% (4), 90% (3), no vote it was just continued (4), and unsure (2).

The responses to list the top three reasons they went to the 48/96 hour shift schedule yielded 64 responses out of a possible 66 answer blanks. All 22 respondents answered the questions. The reasons mentioned were: less commute and fuel savings (24), prefer schedule (8), four days off in a row (6), improve morale (6), more time to complete projects on duty (4), reduction in sick leave usage (4), administration thought it would reduce overtime (3), none (3), only one morning check every two days resulting in less duplication of efforts (2), more recovery time with better sleep (2), perception employees were resting on days off was wrong (1), and to match up with mutual aid for training purposes (1).

Next departments were asked to list the top three perceived challenges they had prior to implementation of the 48/96 hour shift schedule and it yielded 61 responses out of a possible 66 answer blanks. All 22 respondents answered the questions. The concerns mentioned were: fatigue at a busy station (20), increased sick leave (9), reduced administration contact and those with projects would be gone too long (8), too much time away from family (6), overtime

concerns and having to force someone on mandatory after working 48 hours already (5), decreased morale for those that did not want to change (4), scheduling conflicts in regards to pay (3), financial impacts (3), not following work schedules on the second day of the 48 hour shift (2) , and call back issues from people living too far away (1).

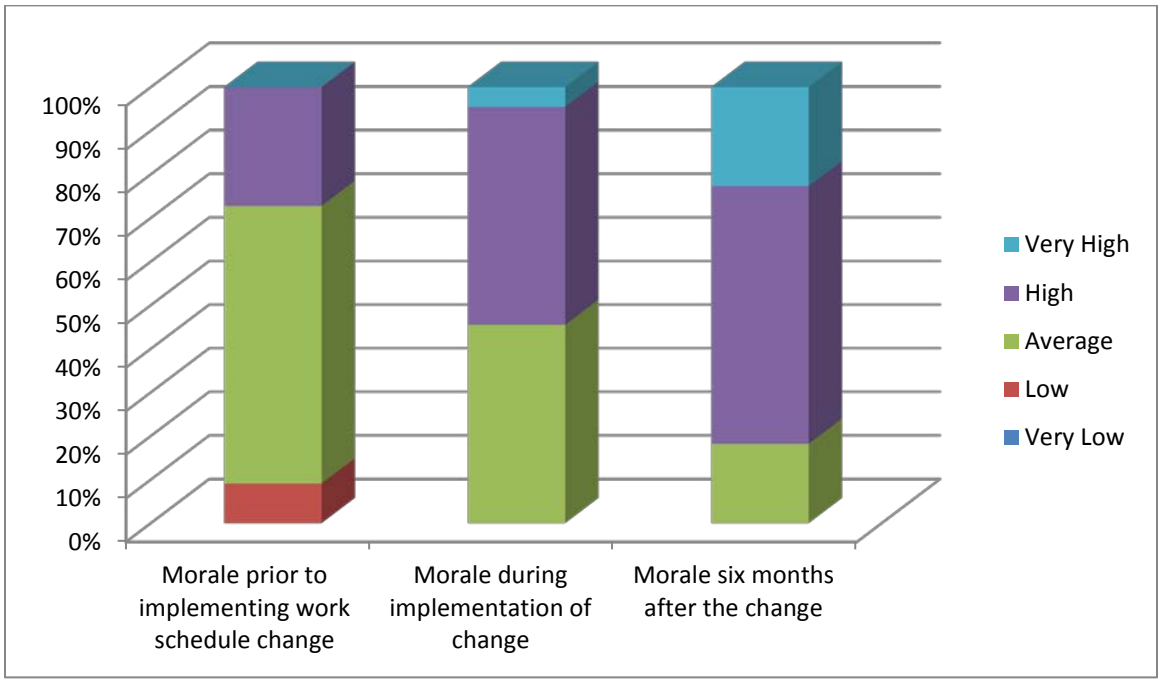
The next question asked if any of those perceived challenges actually occurred after changing to the 48/96 hour shift schedule and it yielded 45 responses out of a possible 66 answer blanks. All 22 respondents answered the questions. The following statements were compiled from the responses: no fatigue issues (12), pay cycle adjustments good (4), work projects were completed and project coordinators made themselves available as needed (4), family adjusted well (4), busy stations allowed rest periods (4), mandatory call backs were handled well on a rotating basis (3), sick leave was unchanged (3), schedule problems occurred on day two (2), had to adjust max allowable work hours to 96 (2), morale increased (2), those resistant before are still resistant (2), overtime unchanged (1), sick leave decreased (1), and time off is longer and enjoyed coming to work more now (1).

Respondents were asked to rank morale within their organizations at three different times in regards to the work schedule change to a 48/96 hour shift. All 22 respondents answered this question. They were given five options to describe morale: very low, low, average, high, and very high. For morale prior to the schedule change: none responded very low, two (9.1%) responded low, 14 (63.6%) responded average, six (27.3%) responded high, and none responded very high. For morale during the implementation of change: none responded very low, none responded low, 10 (45.5%) responded average, 11 (50%) responded high, and one (4.5%) responded very high. For morale six months after the change: none responded very low, none

responded low, 4 (18.2%) responded average, 13 (59.1%) responded high, and five (22.7%) responded very high. See Figure 1 for these numbers shown in bar graph format.

Figure 1

Morale in External Organizations




Respondents were asked in the next question to describe in their own words how morale was in their organization throughout the whole process. All 22 respondents answered this question. The following are the responses gathered: good move for the organization with higher morale (13), family ended up liking what seemed like more home time (9), fuel savings for members increased morale (2), and we had higher sick leave from those that did not want the change (1).

The next question wanted to know if any particular groups within the organization were a majority for the change or against the change. All 22 respondents answered this question. The breakdown of those for the change included: new hires (9), those with long commutes (7), operational personnel (5), and no particular group (1). The breakdown of those against the

change included: those close to retirement (7), no particular group (7), members with small children (3), shorter commutes (2), fire chief (2), and those heavily involved in a second job (1).

Respondents were then asked if they noticed changes in sick leave usage. All 22 respondents answered this question. The following are the responses: went down (10), no change (10), increased but not analyzed (1), and went down initially then resumed (1).

Respondents were then asked if they noticed a change in overtime costs. Only 21 of the 22 respondents answered this question. The following are the response: no change (11), went down (8), and it increased but it was for other known reasons (2).

Respondents were then asked if they had any other unforeseen benefits. Only 17 of the 22 respondents answered this question. The following are the response: none (9), increased morale (3), productivity was up (3), and more time for projects (2).

Respondents were then asked if they had any other financial impacts. Only 17 of the 22 respondents answered this question. The following are the response: none (11), have to use 48 hours of leave instead of just 24 (2), save on projects and maintenance (1), increased cost for laundry supplies (1), hard to get help on four days off (1), and additional costs to schedule instructors to stay to teach classes (1).

The last question had two parts and the first part asked if the organizations remained with the 48/96 hour shift schedule. All 22 respondents answered this question and all are still on the 48/96 hour shift schedule. Part two asked for any final thoughts not mentioned so far and only six of the 22 respondents answered the question. Answers included the following: favorable experience at all levels (1), increased productivity throughout (1), still concerned with crew safety (1), like having two days to work on projects (1), has created a greener city (1), people get together more off shift (1), and family trips are easier to plan without using vacation time (1).

## Discussion

"Most of the departments were motivated by the reduction in commuting and the fact that employees could spend more time at home with their families" (San Jose local 230, 2003, p. 10). This was corroborated with that being the top reason noted from the external questionnaire for organizations that made the switch to the 48/96 hour shift schedule. Internally, the members of the CSFD noted that as being the most positive reason to try the schedule change. This schedule reduced commuting from roughly 120 shifts per year on the 24/48 hour schedule to 60 shifts per year on the 48/96 hour schedule.

Looking at the commute times specifically related to the respondents from the CSFD (see Table 1) we can analyze the savings in time and money for the different groups. For 53.3% of the respondents that would be considered to live locally, they would see a minimal savings on fuel using conservative estimates of 20 miles per gallon and a $3.00 average price per gallon of fuel. On average those employees would save $139 per year on fuel alone and 30 hours of commuting drive time a year. Over a 30 year career that would equal $4170 saved and 900 hours in reduced commuting. For the top 20% of the respondents that would be coming from the furthest away, they would see significant savings. On average those employees would save $900 per year on fuel and 200 hours of commuting drive time a year. Over their 30 year career they would save $27,000 and 6000 hours commuting. While a majority might not see the drastic savings the top ones will, any increase in a household budget will likely be seen as a positive by the family. These results closely mirror those of the external organizations with some having even greater driving distances (see Table 2). The hours saved not driving to and from work can be better spent with family and helping out with the kids (Koen, 2005).

Additionally, safety comes in to play with the commutes driving to and from work. Shift work and the potential of being up all night are serious concerns in regards to fatigue. Long term fatigue has been shown to be higher in schedules other than the 48/96 (Harris et al., 2004) because there is less recovery time on the days off in those schedules. If we can reduce the number of times that a firefighter has to put themselves behind the wheel to drive to and from work by 50%, we have significantly reduced the opportunities for accidents to occur during their commute.

The preference in working the new schedule with the four days off consecutively was noted as the next best reason for the 48/96 hours schedule by both CSFD respondents and the external questionnaire. "In the 24/48 schedule, many firefighters report that they only have one evening out of every three to interact with family members, free of worries about preparing for the next on-duty day" (Koen, 2005, p. 2). This echoes the responses from employees who want more time off consecutively at home to feel like more a part of the family and Poole (2012) noted the opportunities for families to enjoy more out of town trips outweighs the challenges of being unavailable. This was evidenced by the increase in available weekends from 17 per year on the 24/48 schedule to 26 per year on the 48/96 schedule (Koen, 2005). That resulting 50% increase of nine additional weekends with the family on their traditional days off definitely made it seem like there was more family time on the 48/96 schedule (Koen, 2005).

The top perceived challenge that external organizations reported was fatigue at a busy station for 48 consecutive hours. This was listed as one of the top negatives that CSFD personnel felt may occur as well. In their responses to the question if any of the perceived challenges were ever realized, a majority of the responding agencies reported not having any fatigue issues and the few departments that did indicated that they allowed for rest periods as

needed. This is how things are currently handled during a busy day during a 24-hour shift. It is up to the company officer to understand if a busy night is planned with training or other events, and if so, to allow for some down periods during the day so the crew does not overextend themselves. This would be no different for a high call volume day. Each individual deals with fatigue differently and needs to be responsible that they get adequate rest (Harris et al., 2004). Other reports had concerns for heavy call volumes affecting personnel and felt like it was a valid point. "However, the majority of the members assigned to the busy station routinely work trades and overtime, often times working 48's and 72's" (UFLAC, 2007, p. 12). Concerns over the extended length may be unjustified since previous 48 and 72 hour shifts have been occurring without the documented benefit of the 96-hour off period to relieve long term fatigue.

The second highest perceived challenge from external organizations was the thought that they would see an increase in sick leave usage. In contrast, they reported 95.5% of the time that sick leave either went down or was unchanged from the previous schedule. This mirrored the results showing a reduction in sick leave in a few departments as high as 80% after switching to the 48/96 schedule (Johnson et al., 2006).

Increased morale was an additional item identified by both the internal and external questionnaires as a positive reason to switch schedules. "Increased morale was also commonly cited with seven of 14 organizations responding that firefighters considered the 48-hour shift a benefit to their careers" (Clack, 2003, p. 17). Looking at morale in external organizations (see Figure 1), it is evident that those organizations saw a substantial swing towards the positive with the implementation of the schedule change and it continued on at the six month mark after the change. Similar conclusions might be gathered for within the CSFD if the change was to occur

based on the responses by CSFD personnel to morale within the organization. "Departments that have gone to the 48/96 consistently state that morale has improved" (UFLAC, 2007, p. 9).

Within CSFD, 11 of the 15 (73.3%) respondents felt like the change would not affect morale or it would improve morale. The 4 of the 15 (26.7%) that felt like the change would negatively impact morale were categorized in similar groups to those who had been against the change in the external organizations. However, the initial disapproval by members with their concerns is usually overcome after a trial period of the new 48/96 hour shift schedule. "Evidence of the overall approval of the 48/96 by employees is the high percentage by which departments vote to permanently adopt the program at the end of the trial period" (UFLAC, 2007, p. 9). While some indicated a complete resistance to conduct a trial period it would be prudent to evaluate the new schedule to see if those concerns go unrealized during the trial.

## Recommendations

After researching the organizational impacts that may occur in the CSFD from a shift schedule change it is clear that more research and evaluation is necessary to make a more informed decision. The foremost item that needs to be done is a comprehensive questionnaire to the entire organization to get more accurate results without speculating based on results from a questionnaire that only included a percentage of the organization. This will need the support of both operational and administrative personnel equally.

Additionally it will need to be a more comprehensive study. The recommendation would be to conduct a more complete study of the impacts on the fire department plus the impacts it will have on other city departments focusing on human resources and payroll. An in depth analysis of any payroll impacts and a study of all applicable Fair Labor Standards Act (FLSA) laws should be completed as well. Focus of this research was never concerned with the best time

of year to implement a change, and the correct time could be driven by fiscal and budgetary concerns. A thorough analysis should be done to ensure that there will not be any financial complications that would affect the budget of either the fire department or the city.

It is also recommended that we closely follow those organizations nearby that have recently transitioned to the 48/96 hour schedule and monitor any successes or failures. We will certainly see more fire departments transition to this type of schedule as it has proven to be a viable schedule option. A more in depth discussion with the Bryan Fire Department, with which we share an automatic aid agreement, should be included as well in any future recommendations. Especially since there were responses in the external questionnaires that indicated part of the reasons for the shift schedule change was to facilitate mutual aid training among neighboring departments.

A key component will be if our area and the economy can sustain a sufficient work force that can afford to live in our community. If current salaries for fire department personnel do not keep pace with that of living expenses and the rising costs of fuel we should look at ways of relieving that discrepancy. As an organization we should try to stay proactive to the changes happening around us. If we recognize an adverse impact on our employees that can be remedied through change we owe it to them to be prudent and research all viable options.

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Appendix A: Texas Commission on Fire Protection – List of Top 200 Departments

| Rank | Department | FDID | |
|---|---|---|---|
| 1 | Houston Fire Department | 1110 | 3886 |
| 2 | Dallas Fire-Rescue Department | 610 | 1823 |
| 3 | San Antonio Fire Department | 1910 | 1641 |
| 4 | Austin Fire Department | 110 | 1055 |
| 5 | Fort Worth Fire Department | 820 | 905 |
| 6 | El Paso Fire Department | 760 | 861 |
| 7 | Corpus Christi Fire Department | 560 | 375 |
| 8 | Lubbock Fire Department | 1380 | 348 |
| 9 | Laredo Fire Department | 1300 | 327 |
| 10 | Plano Fire Department | 1780 | 317 |
| 11 | Arlington Fire Department | 80 | 309 |
| 12 | Irving Fire Department | 1150 | 299 |
| 13 | Garland Fire Department | 880 | 257 |
| 14 | Amarillo Fire Department | 50 | 252 |
| 15 | Beaumont Fire Department | 160 | 228 |
| 16 | Dallas/Ft Worth Airport | 613 | 226 |
| 17 | Grand Prairie Fire Department | 940 | 202 |
| 18 | Waco Fire Department | 2190 | 196 |
| 19 | Mesquite Fire Department | 1490 | 196 |
| 20 | Killeen Fire Department | 1210 | 188 |
| 21 | Brownsville Fire Department | 290 | 175 |
| 22 | Abilene Fire Department | 10 | 172 |
| 23 | Midland Fire Department | 1510 | 167 |
| 24 | Odessa Fire Department | 1620 | 166 |
| 25 | Frisco Fire Department | 848 | 164 |
| 26 | Denton Fire Department | 640 | 163 |
| 27 | San Angelo Fire Department | 1900 | 160 |
| 28 | McKinney Fire Department | 1450 | 156 |
| 29 | McAllen Fire Department | 1430 | 155 |
| 30 | Longview Fire Department | 1370 | 155 |
| 31 | Tyler Fire Department | 2130 | 154 |
| 32 | Wichita Falls Fire Department | 2260 | 146 |
| 33 | Richardson Fire Department | 1850 | 142 |
| 34 | Woodlands Fire Department | 2270 | 138 |
| 35 | Lewisville Fire Department | 1330 | 138 |
| 36 | Carrollton Fire Department | 360 | 136 |
| 37 | College Station Fire Department | 470 | 130 |

| | | | |
|---|---|---|---|
| 38 | New Braunfels Fire Department | 1590 | 129 |
| 39 | Round Rock Fire Department | 1885 | 122 |
| 40 | Victoria Fire Department | 2180 | 114 |
| 41 | Temple Fire Department | 2070 | 114 |
| 42 | Galveston Fire Department | 870 | 111 |
| 43 | Harlingen Fire Department | 1020 | 109 |
| 44 | Baytown Fire & Rescue | 150 | 108 |
| 45 | Bryan Fire Department | 310 | 105 |
| 46 | Grapevine Fire Department | 950 | 104 |
| 47 | Allen Fire Department | 45 | 104 |
| 48 | Port Arthur Fire Department | 1800 | 103 |
| 49 | Sugar Land Fire Department | 2035 | 101 |
| 50 | Flower Mound Fire Department | 810 | 95 |
| 51 | Georgetown Fire Department | 890 | 85 |
| 52 | North Richland Hills Fire Department | 1610 | 84 |
| 53 | Conroe Fire Department | 520 | 81 |
| 54 | Coppell Fire Department | 540 | 80 |
| 55 | Tarrant Co. College | 5100 | 79 |
| 56 | Lufkin Fire Department | 1390 | 78 |
| 57 | Sherman Fire Department | 1980 | 78 |
| 58 | Texarkana Fire Department | 2100 | 77 |
| 59 | Rowlett Fire Department | 1886 | 75 |
| 60 | Farmers Branch Fire Department | 800 | 75 |
| 61 | Travis County ESD #2 | 1745 | 74 |
| 62 | Del Rio Fire Department | 620 | 71 |
| 63 | Euless Fire Department | 780 | 71 |
| 64 | Harris County Fire Marshal Office | 3150 | 70 |
| 65 | Texas City Fire Department | 2110 | 70 |
| 66 | South Montgomery County Fire Department | 82 | 70 |
| 67 | Mission Fire Department | 1530 | 70 |
| 68 | Cedar Hill Fire Department | 382 | 66 |
| 69 | Mansfield Fire Department | 1408 | 66 |
| 70 | Kerrville Fire Department | 1190 | 66 |
| 71 | De Soto Fire Rescue | 650 | 65 |
| 72 | Bedford Fire Department | 165 | 64 |
| 73 | Travis County ESD #6 | 2123 | 63 |
| 74 | San Marcos Fire Department | 1940 | 63 |
| 75 | Missouri City Fire & Rescue Services | 1540 | 63 |
| 76 | Pearland Fire Department | 1730 | 63 |
| 77 | Pharr Fire Department | 1750 | 62 |

| | | | |
|---|---|---|---|
| 78 | Cedar Park Fire Department | 383 | 62 |
| 79 | Pantex Plant Fire Department | 1705 | 60 |
| 80 | Tx A & M Engr Ext Serv | 8010 | 60 |
| 81 | Southlake Fire Services | 2008 | 60 |
| 82 | Nacogdoches Fire Department | 1560 | 59 |
| 83 | Weslaco Fire Department | 2230 | 58 |
| 84 | Corsicana Fire Department | 570 | 58 |
| 85 | Lancaster Fire Department | 1280 | 56 |
| 86 | Denison Fire Department | 630 | 56 |
| 87 | Weatherford Fire Department | 2210 | 55 |
| 88 | Montgomery County ESD #1 | 3242 | 55 |
| 89 | Keller Fire-Rescue | 1185 | 55 |
| 90 | Seguin Fire Department | 1960 | 54 |
| 91 | Travis County ESD #3 | 10055 | 54 |
| 92 | Big Spring Fire Department | 210 | 53 |
| 93 | Hurst Fire Department | 1140 | 53 |
| 94 | Addison Fire Department | 20 | 53 |
| 95 | Eagle Pass Fire Department | 710 | 52 |
| 96 | Highland Park Fire Department | 1060 | 52 |
| 97 | Paris Fire Department | 1710 | 51 |
| 98 | Greenville Fire Department | 960 | 51 |
| 99 | Cleburne Fire Department | 450 | 50 |
| 100 | Wylie Fire Department | 2285 | 50 |
| 101 | The Colony Fire Department | 2120 | 50 |
| 102 | Argyle Vol. Fire Department | 142 | 50 |
| 103 | Waxahachie Fire Department | 2200 | 49 |
| 104 | Lockheed Martin Tactical | 8004 | 49 |
| 105 | Haltom City Fire / Rescue | 1000 | 49 |
| 106 | Collin Co. Comm. College | 5030 | 49 |
| 107 | Harris Co. ESD #50 | 73 | 48 |
| 108 | Harris County ESD #29 | 64 | 48 |
| 109 | Fort Bend County ESD #2 | 541 | 47 |
| 110 | Duncanville Fire Department | 690 | 46 |
| 111 | Marshall Fire Department | 1420 | 46 |
| 112 | Harker Heights Fire Department | 1010 | 43 |
| 113 | Village Fire Department | 2185 | 43 |
| 114 | Richmond Fire Department | 1862 | 43 |
| 115 | Copperas Cove Fire Department | 550 | 43 |
| 116 | Rosenberg Fire Department | 1880 | 43 |
| 117 | Midlothian Fire Department | 1512 | 42 |
| 118 | OL - Training Division.com | 151 | 42 |

| | | | |
|---|---|---|---|
| 119 | Gainesville Fire Department | 850 | 42 |
| 120 | Tx Dept. of Insurance | 2101 | 41 |
| 121 | Tomball Fire Department | 2117 | 41 |
| 122 | Montgomery County ESD #6 | 159 | 40 |
| 123 | Travis County ESD #4 | 3387 | 40 |
| 124 | Little Elm Fire Department | 1347 | 39 |
| 125 | Pt. Of Houston Auth Fire Department | 1805 | 39 |
| 126 | Kilgore Fire Department | 1200 | 39 |
| 127 | Lake Cities Fire Department | 1235 | 38 |
| 128 | Fairview Fire Department | 790 | 38 |
| 129 | Rockwall Vol. Fire Department | 1845 | 37 |
| 130 | Lake Conroe Vol. Fire Department | 1543 | 37 |
| 131 | Bonham Fire Department | 220 | 37 |
| 132 | Comal County ESD #3 | 351 | 37 |
| 133 | Humble Fire Department | 1120 | 37 |
| 134 | Katy Fire Department | 10041 | 36 |
| 135 | Palestine Fire Department | 1680 | 36 |
| 136 | Hillsboro Fire/Rescue | 1070 | 36 |
| 137 | Kennedale Fire Department | 1187 | 35 |
| 138 | University Park Fire Department | 2140 | 35 |
| 139 | Orange Fire Department | 1650 | 35 |
| 140 | Amarillo College | 5005 | 35 |
| 141 | Colleyville Fire Department | 472 | 35 |
| 142 | Little York Fire Department | 72 | 35 |
| 143 | Travis County ESD #9 | 3385 | 35 |
| 144 | Leander Fire Department | 1304 | 35 |
| 145 | Burnet Fire Department | 501 | 35 |
| 146 | Sam Bass Volunteer Fire Department | 1898 | 34 |
| 147 | Stafford Vol. Fire Department | 2018 | 34 |
| 148 | Red Oak Fire Department | 1842 | 33 |
| 149 | Burleson Fire Department | 8019 | 33 |
| 150 | El Paso Comm. College | 4050 | 33 |
| 151 | Brownwood Fire Department | 300 | 32 |
| 152 | Bexar Co. ESD #2 | 607 | 32 |
| 153 | Buda Fire Department | 266 | 32 |
| 154 | Hutto Fire Rescue | 223 | 32 |
| 155 | Travis County ESD #11 | 161 | 31 |
| 156 | OL - Lone Star College-Montgomery | 548 | 31 |
| 157 | North Hays County Fire/Rescue | 423 | 31 |
| 158 | Plainview Fire Department | 1770 | 31 |
| 159 | Balch Springs Fire Department | 115 | 31 |

| | | | |
|---|---|---|---|
| 160 | Belton Fire Department | 190 | 31 |
| 161 | Converse Fire Department. | 522 | 31 |
| 162 | Lone Star College-Montgomery | 473 | 31 |
| 163 | Schertz Fire Department | 1942 | 31 |
| 164 | Ennis Fire Department | 770 | 31 |
| 165 | Seagoville Fire Department | 1950 | 30 |
| 166 | San Jacinto College | 4074 | 30 |
| 167 | Dickinson Public Safety | 8041 | 30 |
| 168 | Westlake Dept. of Public Safety | 103 | 30 |
| 169 | Stephenville Fire Department | 2030 | 30 |
| 170 | Montgomery County ESD#2/MFD | 1545 | 30 |
| 171 | Alice Fire Department | 40 | 30 |
| 172 | Horseshoe Bay Fire Department | 1092 | 29 |
| 173 | Montgomery County ESD #7 | 254 | 29 |
| 174 | Sulphur Springs Fire Department | 2040 | 29 |
| 175 | Bellaire Fire Department | 170 | 28 |
| 176 | Aubrey Fire Department | 105 | 28 |
| 177 | Weatherford College | 5139 | 28 |
| 178 | Kingsville Fire Department | 1220 | 28 |
| 179 | Saginaw Fire Department | 1895 | 28 |
| 180 | Krum Volunteer Fire Department | 1234 | 28 |
| 181 | Comal County ESD #5 | 344 | 28 |
| 182 | Prosper Fire Department | 12 | 27 |
| 183 | Travis County ESD #1 | 3390 | 27 |
| 184 | Pampa Fire Department | 1690 | 27 |
| 185 | Manchaca Vol. Fire Department | 1415 | 27 |
| 186 | Sachse Fire Department | 1892 | 27 |
| 187 | Borger Fire Department | 230 | 27 |
| 188 | South Hays Fire Department, Inc. | 203 | 27 |
| 189 | Jacksonville Fire Department | 1180 | 27 |
| 190 | Terrell Fire Department | 2080 | 26 |
| 191 | Webster Fire Department | 2220 | 26 |
| 192 | Celina Fire Department | 83 | 26 |
| 193 | Ovilla Fire Department | 10047 | 26 |
| 194 | Woodway DPS | 2280 | 26 |
| 195 | South Plains College | 5023 | 26 |
| 196 | Leon Valley Fire Department | 1310 | 26 |
| 197 | Athens Fire Department | 90 | 26 |
| 198 | Decatur Fire Department | 106 | 26 |
| 199 | Azle Fire Department | 112 | 25 |
| 200 | Bexar-Bulverde Vol. Fire Department | 515 | 25 |

## Appendix B: 48/96 Internal Questionnaire

48/96 Internal Questionnaire Survey
http://www.surveymonkey.com/s/LNK5CJW[11/25/2012 7:58:12 PM]

1. How long have you worked for the College Station Fire Department? And what is your current rank?

2. On average how long does it take you to commute to work round trip? (Answer both time and mileage)

3. Name three positives about our current 24/48 hour work schedule?

1
2
3

4. Name three negatives about our current 24/48 hour work schedule?

1
2
3

5. Have you ever heard of a work schedule alternative of working 48/96 hours?

Yes
No

6. Name three positives you feel may occur when considering the change from a 24/48 hour work schedule to a 48/96 hour work schedule?

1
2
3

48/96 Internal Questionnaire Survey
http://www.surveymonkey.com/s/LNK5CJW[11/25/2012 7:58:12 PM]

7. Name three negatives you feel may occur when considering the change from a 24/48 hour work schedule to a 48/96 hour work schedule?

1
2
3

8. How would you categorize employee morale currently in our organization?

Low High

9. If the change were to occur to a 48/96 hour work schedule, how do you think it would affect morale in our organization?

Lower Morale No Change Improve Morale

10. Answer each of the following in regards to implementing the change?

For you to consider a change within the organization what percentage of employees would you want to see in favor of the change prior to implementation?

How long of a trial period would you be willing to try the 48/96 schedule?

After the trial period ended, what percentage of the department needs to be in favor to keep the 48/96 schedule?

Any final thoughts or comments on the topic not mentioned so far?

# Appendix C: 48/96 External Questionnaire

48/96 External Questionnaire Survey
http://www.surveymonkey.com/s/L9FZPD7[11/25/2012 7:35:20 PM]

## 1. The following are background and demographic questions:

Name/Location of organization?

Number of personnel?

Number of stations?

Type of service provided?

Population?

How long have you worked for your current department?

What is your current rank?

On average how long does it take your personnel to commute to work round trip (time& mileage roundtrip please)?

## 2. The following questions are in regards to current and previous work schedules:

How long has your department been working on the 48/96 schedule?

What type of schedule were you working prior to implementing the work schedule change?

Was there a vote to try the 48/96 program?

What was the percentage of the department willing to try the 48/96 program?

Did your organization set a specified time period for the trial? And if so, how long?

After the trial was there a vote to make the program permanent?

And if so, what percentage was needed to make the change permanent?

## 3. What were the top three reasons your department made the change to the 48/96 hour work schedule?

1
2
3

4. Name the top three perceived challenges your department had prior to the change to the 48/96 hour work schedule?

1
2
3

5. Of these three perceived challenges, did any of them actually occur after the change to a 48/96 hour work schedule?

1
2
3

6. How would you categorize employee morale in your organization at these three different time periods?

| | Very Low | Low | Average | High | Very High |
|---|---|---|---|---|---|
| Prior to considering change of work schedule? | | | | | |
| During implementation of change? | | | | | |
| Six months after the change? | | | | | |

7. In your own words, how would you describe morale throughout the entire process within your organization?

8. Did you notice a specific group within the organization which was a majority for the change as well as a group which was primarily against the change?
(Examples- new hires, administration or those close to retirement)

For the change?

Against the change?

9. Did you department see any changes in the following areas?

Sick leave usage?

Overtime costs?

Unforeseen benefits?

Other financial impacts?

10. Ultimately did your department stay with the program or return to the previous work schedule and why? As well as any final thoughts on the topic not mentioned so far?

# Appendix D: Email to External Organizations

Dear_____,

I am an Executive Fire Officer(EFO) student doing my applied research paper on the 48/96 work schedule. I have a short questionnaire which tries to identify some of the main topics about the 48/96 work schedule and I appreciate any help that you may be able to provide. When you get a chance can you look at this and complete it if you don't mind. If possible, could you ask for three people to complete from within your department? Maybe 1 firefighter and 1 officer as well as a point of view from 1 in fire administration. Thanks for the feedback.

http://www.surveymonkey.com/s/L9FZPD7

Thanks,
Chris

Christopher Kelly | Captain
College Station Fire Department | Station #2
300 Krenek Tap Road | College Station, TX 77842

ph: 979.764.3715 | mobile: 979.777.1035 | fax: 979.764.3719
- - - - - - - - - - - - - - - - - - - - - - -
ckelly@cstx.gov

Appendix E: List of External Organizations sent the 48/96 External Questionnaire

| Department Name | Location |
|---|---|
| Missouri City Fire & Rescue | Missouri City, TX |
| West University Place Fire Department | West University Place , TX |
| Rosenberg Fire Department | Rosenberg, TX |
| North Hays County Fire/Rescue | Dripping Springs, TX |
| Bellaire Fire Department | Bellaire, TX |
| Sugarland Fire Department | Sugarland, TX |
| Maryland Heights Fire District | Maryland Heights, MO |
| San Ramon Valley Fire Protection District | San Ramon, CA |
| Glenwood Springs Fire Department | Glenwood Springs, CO |
| Novato Fire District | Novato, CA |
| Brentwood Fire & Rescue | Brentwood, TN |
| Cathedral City Fire Department | Cathedral City, CA |
| Maplewood Fire Department | Maplewood, MO |