Examining the Traditional Work Shift in the Fire Service

Joseph Vish

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Lawrence T. Bennett, Esq.

Authors Note

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TABLE OF CONTENTS

Contents

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: *Joseph E. Vish*

Date: October 10, 2018

"The funny thing about firemen is…Night and day, they are always firemen."

-Ronald Bartel (Backdraft, 1991)

Abstract

An emergency can strike at any time. Luckily for many people throughout the world, the fire department is prepared, willing and ready to respond at a moment's notice. When emergency services are needed, a quick response is necessary to ensure the best possible outcome for those affected. In many areas where the population is dense, firehouses across the United States are staffed with career firefighters and paramedics 24 hours a day. Many of these men and women staff emergency vehicles during their respective shifts for 24 hours. Upon completion of a 24-hour shift, many of them remain off-duty 24 to 96 hours afterward, dependent on their rotation. Although these schedules do have their benefits, they also present adverse effects on firefighters which can be overlooked. These negative effects have forced some to seek alternative scheduling options for career emergency responders.

Introduction

Firefighting is a career that is different from any other. Every day firefighters and paramedics respond to emergencies throughout the country. Unlike most other professions, emergency workers are exposed to human tragedy, disaster, and misfortune on a daily basis. To most emergency responders, days such as these are considered "just another day at the office". The difference is that their office does not close. Career firehouses in the United States are staffed with highly trained firefighters and EMS responders every hour of the day, every day of the year. No matter the time when a disaster strikes, the fire department is there to respond.

The difference between emergency response and other occupations does not end there. Many firefighters work shift hours that would be considered unconventional in nearly every other career field. Many of these full-time firefighters work 24-hour shifts. While most citizens work anywhere between 8 and 12-hour shifts, firefighters have traditionally worked a schedule that would not be ideal for any other job in modern society.

The majority of fire departments in the United States operate under scheduling in which the firefighter is on-duty for an entire day. During these 24-hour shifts, firefighters are allowed to sleep at certain times while on-duty. Very few occupations allow their employees to sleep while on the job. However, emergency response is very unique with the premise that responders will awake for an alarm to mitigate an incident or treat the injured. Although there are variants of the 24-hour shift, sleep deprivation often becomes an issue with firefighters during and after shifts in which they were not afforded the luxury of adequate rest. Firefighters receive an inadequate amount of sleep during 24-hour shifts. This lack of sleep has been found to be an influencing factor in firefighters' psychosocial well-being and fatigue and has been found to be a

major contributor to work stress (Lisa Caputo, 2015). Lack of sleep can have a negative effect on the mental well-being of the firefighter. This can also lead to the increased likelihood of mistakes and a decrease in cognitive function. The high level of care administered to patients by the emergency worker can suffer as well.

Time off and recovery for firefighters is imperative for their well-being and for the safety of those around them. Although the 24-hour shift may sound desirable, there are assorted schedule types which allow varying time off-duty for recovery. Over recent years, a number of different schedules have emerged to try and maximize firefighter productivity while still allowing sufficient rest for responders. One alternative that has gained popularity is the utilization of a schedule in which the firefighter is on-duty for 48 hours and off-duty for 96. This schedule also has advantages and disadvantages over the conventional 24-hour tour.

The 24-Hour Shift for Emergency Responders

For many in the fire service, the firehouse is a home away from home. During a 24-hour shift firefighters and paramedics take time to care for their firehouse and apparatus, share meals and comradery, and sleep whenever possible. These emergency responders spend an entire day away from their families and home life to share an entire day with their co-workers. It is because of this that most firefighters see their counterparts as family as well. The amount of time that firefighters can spend with each other can be much more than time spent with their loved ones at home.

History of the 24-Hour Shift

Working for a 24-hour tour can be considered "traditional" for many in the fire service. The 24-hour shift dates back to the 1800's and the birth of big-city fire departments in the United States (Gagliano, 2016). As compensation, firefighters in these days were allowed to live in the station in lieu of higher wages. Firefighting at this time was a relatively new profession in society. It had yet to be considered stable or financially profitable. For these reasons, it drew single young men who could survive on very low wages while also providing them a place to live (Gagliano, 2016). During this time, many of the steam engines were horse-drawn. These horses needed care around the clock.

In the early 1900's the need for larger fire departments began to grow. Population increases in major cities sparked the placement of more firehouses throughout the country. As the profession grew, so did the need for more firemen. As a result, days off were granted to those in the fire service to ensure that cities were covered by fully staffed firehouses at all times. This led to the creation of 24-hour shifts in the fire service.

Variances in Common 24-Hour Shift Schedules

The firefighter schedule has evolved since the days of the steam engine. Although some fire departments utilize a 10, 12 or 14-hour type of schedule, the majority of them use some sort of 24-hour shift. The difference in each 24-hour scheduling system is the time spent off-duty and the way it is distributed. Changes to the 24-hour shift schedule have evolved from the 24-on/ 24-off scheduling of the past to a variety of schedules today.

The Three Platoon System

One of the most common 24-hour shift schedules is the 3-platoon system (24/48). It consists of a 3-day cycle where each platoon works one 24-hour shift followed by two consecutive days (48 hours) off. Each platoon can be designated by a color (usually black, red & gold) or alphabetically (A-Shift, B-Shift, C-Shift). Firefighters are allotted two consecutive days of rest prior to the start of a new shift.

In order to limit the amount of overtime owed to the firefighter in this system, many cities offer paid days off. These days are commonly known as "Kelly" days. The term "Kelly" day is named after Chicago Mayor Edward J. Kelly. In 1936, Mayor Kelly and the Chicago Firefighters Union came to an agreement reducing work week of firefighters to 72 hours. This gave firefighters a day off for every seven on duty (Chicago Firefighters Local #2 History). The terminology for this type of day off is still used today. Paid Kelly days allow the firefighter to retain his or her full salary while staying within the FLSA hour requirements for hours worked before overtime is owed to them. Kelly days can be important when considering the amount of rest needed for a firefighter on this 3-platoon system.

The Kelly Schedule

Not to be confused with the Kelly days of the 3-platoon system, the Kelly Schedule system is another 24-hour shift schedule that is used in the fire service. Although less common than the standard 3-platoon system, it is still used in fire departments around the country. The Kelly Schedule also uses three teams which each work a 24-hour shift. It consists of a 9-day cycle where each team works one 24-hour shift, followed by 24 hours off duty, works another 24-hour shift, followed by 24 hours off duty, then works a final 24-hour shift, followed by four consecutive days off duty. While the four consecutive days off give ample time for recovery, the

firefighter will go four work days without consecutive rest days. This may become an issue to busier companies. Added FLSA days off may be offered under this plan to limit overtime costs. A small variety of modified Kelly schedules can also be found. They may vary somewhat in regards to time off. This is dependent on the municipalities and work agreements, though most are based on the aforementioned schedule.

Though there may be a mixture of different types of schedules involved with career fire departments, many of them are based on a 24-work schedule. These schedules may differ in terms of the number of consecutive days off within a rotation. Nonetheless, the traditional shift for firefighters in the United States is considered a 24-hour shift. When the dynamics of a 24-hour shift are examined, it is apparent that this type of work shift could have serious negative effects on the physical and mental well-being of the firefighter.

Adverse Health Effects on Sleep Deprived Responders

There are many elements of emergency services that can have a negative impact on the health and safety of responders. Obvious examples include an increased chance of injury due to accidents which may occur during events or exposure to disease in EMS. Although there are many inherent physical dangers responders face, none may be as dangerous as the long-term effects of working a career filled with 24-hour workdays.

Emergency calls for service can occur at any time of the day, including times when firefighters may be sleeping. When firefighters work a 24-hour shift, it is inevitable that they will be dispatched for emergencies that occur during the night. Sleep is not guaranteed for firefighters working a 24-hour shift as calls for service may interrupt sleep (Elliot, 2007).

Responding to calls during sleep times will cost the firefighter valuable hours of rest lost during these responses.

Adequate daily sleep is essential for humans to perform optimally and remain healthy (McCallion, 2012). Without the proper amount of rest, the health and safety of responders can suffer. Cognitive function, basic skills and even the mood of the firefighter can be impacted without adequate sleep. When people are overtired, compassion and empathy are often first to go (McCallion, 2012). Lack of sleep and fatigue contribute to making routine tasks more difficult and dangerous (Lockley, 2004). Chronic sleep loss results in a decreased ability to think clearly, handle complex mental tasks, form new memories and solve problems (Elliot, 2007). This can lead to increased chances of an accident occurring and mistakes being made. Not only can the safety of the tired firefighter be compromised, but so is the safety of other firefighters and patients in need of assistance.

Sleep pattern disruption will occur when firefighters are awoken for calls during sleep. Sleep pattern disturbances can be caused by sleep duration of fewer than six hours and efficiency less than 85% (Carey, 2011). In the short term, a 24-hour shift without sleep will have an immediate impact on the firefighter. Staying awake for 24 hours can cause the same impairments as a person with a blood alcohol concentration of 0.096%, which is over the legal limit in the United States (Falleti, 2003). The effects of this can be seen at the end of a firefighter's shift and into the following day. This could be compounded if the firefighter chooses to work overtime the following day. Even if the firefighter is off-duty shortly afterward, impairments can be noted if he or she decides not to sleep upon returning home.

Over an extended period of time, these disturbances can have a cumulative effect on the responder. This loss of sleep is known as *sleep debt.* Medical evidence suggests that for

optimum health and function, the average adult should get seven to nine hours of sleep daily (Publishing, 2018). When those hours of rest are not achieved, the body becomes lacking in the required amount of sleep needed. Without ample recovery time, signs and symptoms of sleep deprivation become more prevalent. Research shows that a firefighter who worked a 24-hour shift with no sleep would require two days of regular sleep to adequately recover (Cohen, 2012). As the firefighter's sleep debt increases, so does the impact it has on his or her health. This can become an issue with busier fire companies who respond to more calls during night hours. When this occurs, more hours of uninterrupted sleep are needed to recover. Time off-duty must be considered for these individuals.

Physical Effects of Sleep Deprivation

The effects of inadequate sleep can have a negative physical impact on the body. According to the Ontario Association of Fire Chiefs and Ontario Municipal Human Resources Association's 2011 report on health and safety related to 24-hour shifts, there is a number of very serious health problems associated with working rotating shifts or night shifts. These include cancer, gastrointestinal disorders, and increased risk for cardiovascular disease.

Chronic sleep deprivation may adversely impact metabolism, leading to impaired glucose tolerance (a risk for diabetes) and weight gain. In addition, there seems to be some evidence that sleep deprivation undermines immune function (Peters, 2017).

Included in this list is hypertension. Hypertension is a well-established risk factor for coronary heart disease, stroke and total mortality in both general populations and firefighters. About 1.2 million firefighters are among the occupational groups with high hypertension prevalence in the United States (BongKyoo Choi, 2016). Although job strain and work exertion can also be factors for firefighters with hypertension, sleep deprivation also plays a role in its

severity. Approximately 45% of all firefighter line-of-duty deaths (LODD) are direct results of cardiac events/arrest (NFPA, 2018). Changes must be made in an attempt to lower the blood pressure of firefighters to reduce the chance of a LODD, including the allowance of time for adequate sleep. Without a satisfactory amount of rest and recovery, the physical health of the firefighter can be greatly compromised.

Mental Health Consequences

Sleep deprivation can also have a negative impact on the mental health of first responders. The relationship between sleep and mood is complex because disrupted sleep can lead to emotional changes, clinical depression or anxiety (as well as other psychiatric conditions), but these conditions can also compound or further disrupt sleep. In fact, altered sleep patterns are a hallmark of many mental health issues (Foundation, 2018). For firefighters with an increased sleep debt, many mental health issues can arise.

Fatigue from shift work can contribute to higher levels of burnout, emotional exhaustion, job stress, headaches and upset stomachs (Cohen, 2012). These precursors can cause the firefighter to suffer from emotional withdrawal and lack of empathy toward patients. These symptoms can carry over into the personal lives of the responders and affect them socially as well.

Firefighters and paramedics can be exposed to many different types of emotional trauma due to the nature of their work. It is common for emergency responders to be in contact with people who are sick, injured or dying on any given workday. This type of work in itself can lead to struggles with mental health. First and foremost would be varying degrees of depression. For firefighters suffering from depression, symptoms may arise due to events witnesses or

experienced while on duty. If signs and symptoms are not treated early on, they can lead to more severe cases of mental health issues.

Lack of sleep can be a contributing factor for firefighters suffering from untreated forms of depression. As time goes on, this depression can progress into much more serious conditions including Compassion Fatigue, Compassion Avoidance and Complex Post-Traumatic Stress Disorder (C-PTSD). Compassion Fatigue can be defined as severe lack of empathy due to the constant emotional demands of others. Firefighters can become "tired" of dealing with the misfortunes of others. Compassion Avoidance occurs when the firefighter completely shuts off emotion toward others. This avoidance may come from the belief that having emotions displays weakness, having emotions will hinder their ability to perform their job or they will be rejected by their colleagues (Jackson, 2017). Complex-PTSD (C-PTSD) is another severe form of mental illness. C-PTSD may result when a person is exposed to sustained, repeated or multiple forms of trauma (Jackson, 2017). Symptoms of C-PTSD include lack of self-esteem and increased self-blame for negative events. Since firefighters are often exposed to many different types of trauma, they can become very susceptible to this.

Ultimately, if these conditions are not treated, the threat of suicide becomes a possibility. Firefighters are three times more likely to die from suicide than in the line of duty (IAFF, 2017). Firefighters represent an occupational group at elevated risk for suicide. One study found that firefighters reported notably high rates of suicidal ideation, plans, and attempts during their firefighting careers (46.8%, 19.2%, and 15.5%, respectively) (Stanley, 2015). Early treatment is important to ensure that mental health struggles do not reach this level of severity.

Although there are a number of different contributing factors to poor mental health for first responders, lack of adequate sleep can play a major role. For the firefighter who is fatigued

and exhausted, dealing with emotional issues associated with the job can become more difficult. It is imperative that firefighters get an adequate amount of rest and time off-duty. Working an entire career of 24-hour shifts can definitely make that goal difficult to achieve.

Exploring Alternative Shift Schedules

With the studies on the 24-hour shift with regards to health and safety, it is no surprise that some departments choose to get away from them. While much less common than the traditional 24-hour shift found in the fire service, scheduling does exist that utilize more or less consecutive hour rotations for duty.

Varied Hour Shifts

There are some fire departments which break up each calendar day into hourly shifts dependent on work agreements. These departments will break up days into 8-hour or 12-hour shifts. Although these schedules are mostly found in departments which rely on part-time firefighters, some do exist at the career level. Firefighters may either work the same shift each day or rotate throughout a schedule. These schedules may mimic those found in most civilian jobs where businesses are open 24-hours a day. These shifts may be broken into first, second and third shift or into day/night shift. Shifts consisting of 8 or 12-hour shifts also provide organizations with the flexibility needed to adjust staffing levels based on peak and non-peak call times (Picarello, 2016). Though this may help keep some firefighters from working night shifts, adequately staffed fire and EMS protection should be the goal for any hour of the day.

Other departments use a schedule that involves a 9-hour day shift and a 15-hour night shift. These tours are based on the firefighter working two consecutive day shifts followed by 48 hours off. They then return and work two consecutive night shifts followed by 72 hours off.

Schedules such as these can also make it difficult to keep sleep rhythms from being broken. This is not only due to the constant rotation of day/night shifts, but the possibility still remains where no sleep will be allowed during duty hours. The fact that the time off-duty for recovery is not always the same presents a problem with fatigue.

Shift schedules of less than 24-hours also provide a greater chance of overtime holdover due to call response. They also increase the amount of commuting the firefighter must do, which can be a hardship for those that do not live in or near the municipality they serve. Many union locals and cities tend to shy away from schedules involving <24-hour shifts for these reasons.

48/96

Another shift rotation that has been gaining popularity among fire departments is the 48/96. Firefighters working this schedule are on-duty for 48 consecutive hours and off-duty for 96 hours. Each 24-hour duty day is considered one shift in regards to sick usage and vacation time. Several advantages over other shift tours can be seen from studying this schedule.

The 48/96 schedule can significantly reduce long-term fatigue and sleep deprivation in some situations. Rest periods of four consecutive days off reach 60 per year. In a study done to explain and quantify the impact of switching from the Kelly schedule to the 48/96, it was found that participants reported increased feelings of refreshment on days off and decreased daytime sleepiness (Lisa Caputo, 2015). The study also noted improved perceptions of satisfaction, less shift interference with personal schedules and decreased feelings of burnout.

Firefighters also increase the number of days in which they wake up at home with family (and not go to work) by 50% over the 24/48 schedule. Firefighters will also have a majority of weekends off for family time as well. Although there will be instances where the firefighter will work both Saturday and Sunday consecutive, he or she will also enjoy 13 additional full weekends off per year over the 24/48 schedule.

With the consecutive time off with this schedule, firefighters will naturally spend less time commuting. This positive benefit will allow firefighters who may choose to live farther away from the firehouse to save money and time with travel to and from work. Some firefighters may prefer to live in rural areas which may be considered more peaceful and tranquil. By limiting the number of commute days, this will make it easier for firefighters to live in these areas and may help them recover more efficiently while off-duty.

In 2016, the Ottawa Fire Department in Illinois changed their work schedule from the traditional 24/48 in favor of the 48/96 schedule. Ottawa Fire Chief Andrew Borkowski states that he has seen some improvement in moral since making the change. He believes that this is due to the added time off his firefighters are spending consecutively at home. He also notes that his firefighters seem to enjoy the added time off included when using vacation or Kelly days. This extends the number of consecutive hours off-duty occasionally between shifts.

However, when asked about the use of this schedule with an increased call volume, Chief Borkowski is skeptical of the advantages. He states that he does not believe that the 48/96 schedule would be a benefit to fire stations which run a high amount of calls per day. He believes that the fatigue level, especially of paramedics on busy ambulances, would be significantly higher since on-duty personnel may go 48 hours without enough rest. Though this could happen at any slower station working 48/96, the chances of it occurring repeatedly over the

course of a year are much less. Firefighters at busy, mostly large-city stations that average three or more call-outs per on-duty night are likely to be severely sleep deprived at the end of their 24-hour workday (Koen, 2005). Amendments to this schedule would need to be made with shift crews to ensure that individuals were alternated between pieces of apparatus during those 48 hours. This would further lessen the chances of fatigue for each member during a rotation.

Although this scheduling option does have advantages of consecutive hours off when compared to 24/48 and the Kelly Schedule, it must be used with caution in busier departments. Recovery time is important to firefighters working during overnight shifts. This schedule may be appealing for the benefits of the extended periods of time off, though consideration must be made to the safety and mental acuity of the responders while on-duty with greater call volume.

Summary

Firefighters and paramedics are available 24 hours a day to respond to emergencies. They must be physically ready and mentally able to work safely and efficiently. Due to the nature of the job, career firefighters may become sleep deprived after working traditional 24-hour shifts. First responders working these shifts understand that adequate rest during work hours is not guaranteed. It is important to the mental well-being of first responders to allow for adequate rest during off-time. Firefighter fatigue can create a lapse in the safety of the responder and the safety of those around him or her. For responders who suffer from sleep deprivation and chronic fatigue, other factors may arise as a result. These factors included varying degrees of depression and other signs of poor mental health which can have a detrimental effect on the mind and emotional state of the firefighter and his or her family.

From administration to union bodies, exploring the schedules these brave men and women work should be a priority for everyone. Research concludes that recovery time, rather than shift length, is the most important factor in creating a firefighter work schedule (Smith, 2011). Shift schedules should be tailored to the workload of the department. The goal should be to give the community the best possible service and care needed during a crisis. The most important factor in achieving this goal is the mental well-being of those called upon to respond and mitigate each emergency.

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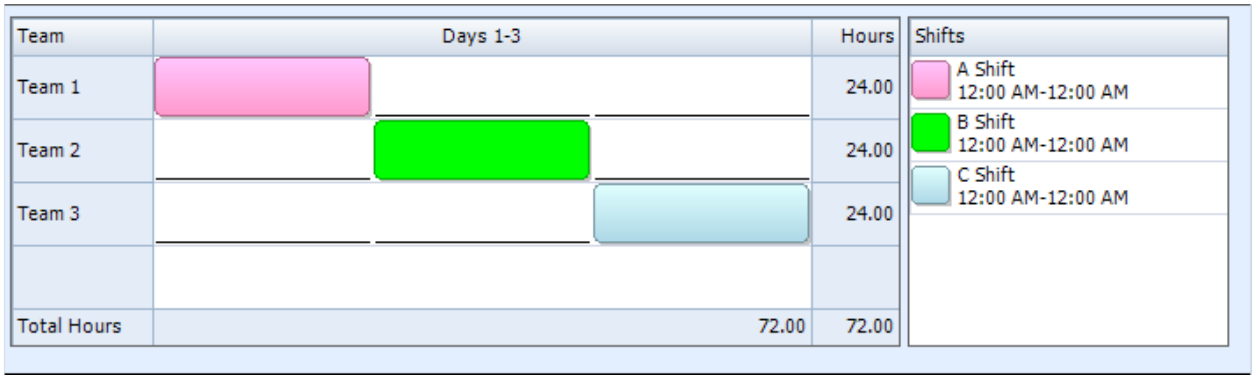
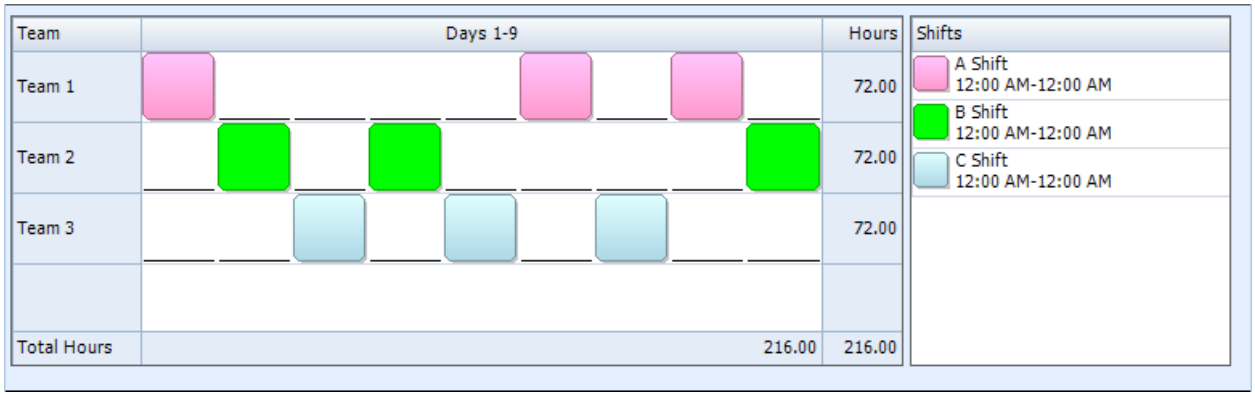
Appendix

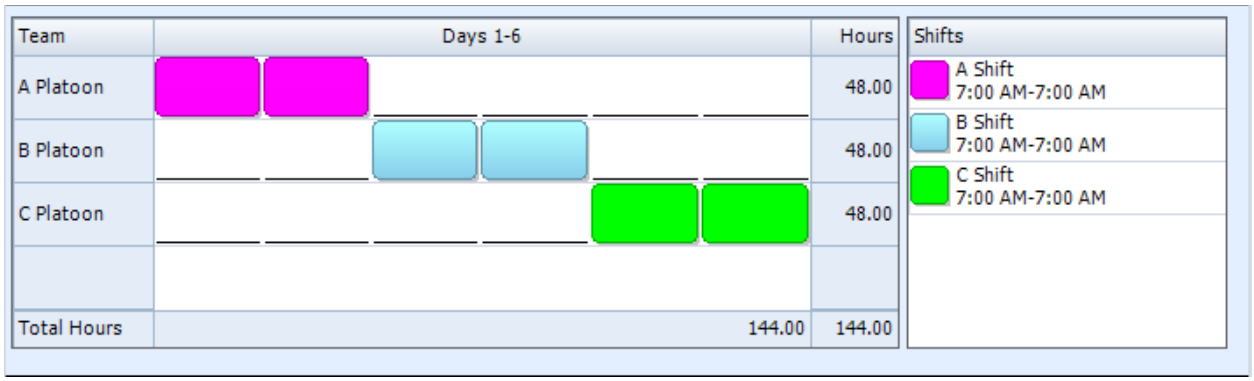
A. 24/48 Schedule



B. Kelly Schedule



C. 48/96 Schedule



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