

**Corte Madera Fire Department**

**Standard of Coverage**

**PERFORMANCE RELIABILITY**

## **HISTORICAL RELIABILITY**

*This section defines the probability of personnel and apparatus responding to an emergency call based on the call volume and location that the call is originating from within the fire department's jurisdiction.*

Response reliability is defined as the probability that the required amount of staffing and apparatus will be available when a fire or emergency call is received. This process requires the department to analyze its response performance data to determine how many simultaneous calls for service are received or are occurring close together. A common term used is "back-to-back calls."

Another way of looking at historical reliability is if every piece of fire or EMS equipment were available at its desired location, every time a call for service was received, the department's reliability would be 100%. If, however, a call is received for a particular unit, but that unit is already committed to another incident, be it fire or EMS, and the next closest unit must respond from a different station, the substitute company may exceed the maximum prescribed travel time.

As the number of emergency calls per day increases, the probability increases that the primary unit needed for response is already committed and a backup or substitute unit will need to be dispatched. This, in turn, causes the department's reliability to decrease.

Another factor that must be considered is the "queuing factor." Queuing is defined as how many times multiple calls for service occur and whether or not they empty a particular area. When measuring queuing, all calls for service must be considered. EMS calls, due to their volume, will have the primary impact on a fire department's queuing issues. In the overall evaluation of queuing, it may be that additional units are needed not for fire but for EMS service.

Another factor that affects queuing is the physical area covered by a particular station. The larger the area the more likely the chances for simultaneous calls for service. As an example, consider a single-family dwelling, which is considered a moderate risk. The location of the dwelling is on Lakeside Drive. The normal assignment is two engines, a truck, a paramedic unit, and a chief. The maximum travel time for the first unit to arrive is three minutes. If the first engine is already busy on another call, the first units to arrive on the scene will exceed the first unit's travel time by several minutes.

Response reliability is derived from a department's historical data, and is usually expressed by individual companies and department wide.

*Mean Service Time* is another measurement of reliability, and is defined as the average time it takes a company to service a call. Mean service time or average mean service time may be projected, but is not a valid comparison. Even similar

calls have a variation in mean service time. The average provides an indication of what a call may require time-wise, and may assist the department in balancing the various time allotted to each program, but it is not a definitive number.

Mean service time for fires varies depending on the size of the structure and the area of involvement at the point of arrival of the first arriving units. It would be natural to expect a commercial structure fire to require more time than a single-family dwelling. EMS emergencies can vary from a single-car accident to a multiple-vehicle accident involving extrication.

An advantage of the queuing theory and mean service time is that they provide a simple method of predicting the reliability of a company's availability. With that information, the probability of a call occurring and how long the call may take, one can estimate the reliability of a company as a function of call volume.

## **DRAWDOWN**

Drawdown is defined as the resource level an agency will go to before initiating mutual aid. Corte Madera's drawdown is integrated with the rest of the Ross Valley departments through our automatic aid agreement. Corte Madera will initially commit one engine and one medic unit, along with a battalion chief. The objective is to maintain one or two engines in the lower Ross Valley. To provide additional engines or trucks requires like cover-in by mutual aid companies. Due to the number of requests for medical service, our paramedic unit is released for mutual aid. In a major medical mutual aid emergency involving multiple victims or of a catastrophic nature, we certainly require the release of an additional paramedic unit. The downside of cross-staffing engines with paramedic ambulances is that when releasing our paramedic unit, it places a fire engine out of service.

The automatic aid agreement with surrounding departments requires that we cover their fire station if they are unable to recall off-duty firefighters. On first alarm and larger incidents, Corte Madera begins the call back of off-duty personnel for staffing the reserve apparatus, and to relieve the on-scene personnel.

## **RESOURCE EXHAUSTION**

Resource exhaustion is the last factor influencing response reliability. Resource exhaustion occurs when a system is out of resources for both initial response and/or area wide effective response force. When analyzing how to handle resource exhaustion, queuing frequency, availability of local mutual aid, and call back of off-duty personnel must be considered.

Corte Madera is an active participant in the County of Marin Fire Service Operational Mutual Aid Plan. The department is also a participant in the State Fire & Rescue Annex of the California Emergency Plan and the California Master Mutual Aid Agreement.

Local mutual aid is coordinated through the Operational Area Fire and Rescue Coordinator, which is currently the chief of the Marin County Fire Department. Tracking the resources committed at the county level, the area coordinator, through a defined drawdown level, will request regional support, and, if needed, activate an inter-regional fire and rescue request.

Historical evidence suggests that sufficient resources exist locally throughout Marin County to sustain a single department through a major structural incident. Major fires support this over the years, where resources were available and adequate coverage remained in individual jurisdictions.

Major structure fires occurring simultaneously in different jurisdictions may exhaust available resources and would require regional support. A major wildland interface fire will quickly cause resource exhaustion on an individual department and countywide basis. This scenario would require regional support and specialized resources from California Department of Forestry. During major incidents, the calls for service still remain, and if there was a queuing issue prior to the incident, it will remain during the incident.

### **RESPONSE RELIABILITY**

Response reliability, or queuing, is the amount of time usually expressed in a percentage, that a company is in the station available to handle a call within its response area. The standard of coverage study requires a department to determine if its response performance is hampered by two or more emergency service calls. Are these service calls occurring simultaneously or back-to-back for a particular engine company?

This situation occurs when the fire engine is dispatched, for example, to a medical emergency typically lasting 20-30 minutes. During this period, the engine is unavailable for response, and if another call in their response area occurs another engine is dispatched. This engine is further away and the response time is longer, thus the customer is waiting a longer period of time for service. Longer response times erode the performance measurements established by the department, and are usually expressed, as in our department, as 90% of requests for service. This performance measure allows some flexibility for the effects of simultaneous calls.

Response data for the year 2004 was analyzed to determine the affects of simultaneous calls for service. We received a total of 16 mutual aid calls for

service, which were typically for reported fires. We also received 49 automatic aid responses, which reflects a very low occurrence of our units not being available, based on the fact that many of the 49 calls were EMS in nature, meaning our medic unit was not available

Queuing can be disrupted, not only for emergency response activity but also from department activities, if fire engines are pulled from training to handle simultaneous calls for service.