

## **Participant Submitted Questions for December 16, 2013, CMF Clearinghouse Webinar with responses supplied by the CMF Clearinghouse team**

**Q: How would you compare a ""5 star"" to ""4 star"" vs an ""all"" versus ""rural/urban"" as most appropriate to use?**

A: Selecting the most appropriate CMF from a list of CMFs is certainly an important step in the process of using CMFs. The goal of the CMF Clearinghouse is to provide all possible information about the applicability of the CMF, such as area type, road type, crash severity, and crash type, and also to provide an indication of the statistical reliability of the CMF via the star quality rating. This information is provided to the user to allow him or her to select the most appropriate CMF for the situation at hand. The user should strive to select a CMF that:

1. matches the application scenario exactly (i.e., urban CMF for an urban application, fixed object crash CMF for analyzing fixed object crash effects, etc.) OR matches the application scenario as close as possible (e.g., urban CMF for a suburban application if no suburban CMFs are available, single vehicle crash CMF for analyzing fixed object crash effects if no fixed object CMFs are available, etc.), and
2. has the highest possible reliability (i.e., star quality rating).

The decision of how to compare and weigh these factors will depend on the availability of CMFs, the application to which the user want to apply the CMFs, and the user's particular priorities and objectives.

**Q: While using CMFs (single or multiple) in performing B/C analysis at the project level, there may be a situation where ROW acquisition cost may be significantly higher than the actual cost of safety improvement. HSIP funding being limited, it may not be practical to spend a huge amount on ROW, but safety need may be crucial. What is more logical -- to include or exclude such costs like ROW acquisition?**

A: When conducting a benefit-cost analysis, it would be reasonable to include all potential costs if they are necessary for the project, such as right-of-way acquisition if it is needed for a left turn lane installation. However, due to the high cost of right-of-way, it would be best to use a long time period for the benefit-cost calculation in order to realistically contrast the high initial cost with a long term benefit. It may be possible to exclude the ROW cost if the funds for that cost may be available from other means outside of the HSIP funding structure (e.g., matching funds from local agency when in an urban area, etc.).

**Q: The cost of the crash is for damages to what? And who bears the cost of the damages?**

A: The cost of a crash is a value that is calculated to compare one crash severity level to another. Many agencies, both state and federal, as well as private organizations, develop their own estimates of crash costs based on certain assumptions and factors. The general idea is to estimate what is the cost to society. Factors might include actual damage to the property involved in the crash, medical services provided, loss of working time due to injury, rehabilitation services, and other more qualitative costs of decreased quality of life (in severe injuries) or the loss of life in fatal crashes.

**Q: In economic analysis do you factor in AADT possible increase/decrease during countermeasure service life?**

A: Ideally, yes. A simplistic economic analysis would calculate the average number of annual crashes at a site (based on past history) and apply a CMF to estimate the number of crashes that would be prevented each year (e.g., six fewer crashes per year). This simplistic analysis would produce this estimate at a set point in time and assume that crash savings is true for each year of the analysis (perhaps a 5 or 10 year time period).

A more complex but better analysis would use detailed information about the site and account for the fact that AADT is expected to increase (or decrease) and calculate the expected crash savings for each individual year of the analysis time period. This may be based on the use of a Safety Performance Function (SPF, essentially a crash prediction model that factors in traffic volume and other characteristics). This would yield a more accurate economic analysis.

**Q: is it possible to import data in accdb or xml format?**

A: When a user arrives at a page of search results, there is an option to export the results into an Excel spreadsheet. Currently that is the only format available.

**Q: How can you apply an assumption of independence formula in case of 3 countermeasures considered for implementation?**

A: CMFs are assumed to be multiplicative factors and the formula for combining multiple CMFs remains the same whether for two or three countermeasures. The current formula (i.e., multiplicative formula) shown in the Highway Safety Manual and elsewhere, also assumes that the countermeasures are independent. As such, it is up to the analyst to determine whether or not the assumption of independence holds for the given combination of countermeasures. If the countermeasures are assumed to be independent, then the CMFs for two or three countermeasures can simply be multiplied to estimate the combined effect (also assuming that the CMFs apply to the same crash type and

severity). If the countermeasures are not independent, there is not a good answer to date on how best to estimate the combined effect. This is the subject of ongoing research. A white paper is available on the CMF Clearinghouse to provide thoughts on this subject.

[http://www.cmfclearinghouse.org/collateral/Combining\\_Multiple\\_CMFs\\_Final.pdf](http://www.cmfclearinghouse.org/collateral/Combining_Multiple_CMFs_Final.pdf)

**Q: A CMF has 4 stars for both 0.80 and also 0.20? How is that possible and who assigns these stars and what is rationale for this?**

A: The star rating is not based on the CMF value (0.80 or 0.20). Those values are a reflection of how effective the countermeasure is. The star rating is an indication of the reliability of that CMF value – essentially how much you trust that number. It is based on how the researchers arrived at that value and takes into account the sample size, standard error, study design, geographic diversity, and other biases. The difference in CMFs for the same treatment may be related to different applications or different effects based on the geographic region or driver population in which the treatment was applied. The difference in CMFs across sites for the same treatment is the subject of ongoing research.

**Q: Can CMFs be searched by collision type, for example, as an initial search?**

A: No. However, once you have produced a set of search results for a particular countermeasure, you can use the left-side filters to display only CMFs for particular collision types. If your objective is simply to see what the CMF Clearinghouse has available for run-off-road crashes, you can conduct a blank search (enter nothing in the search box). This will produce the entire Clearinghouse in the search results, and you can use the left-side filter to show only those CMFs addressing run-off-road crashes.

**Q: Hi, I noticed from the presentations that there are some diverse practices with regards to using just observed crashes as basis for current safety situation, or using SPFs from HSM, but not seeing any EB-approach that makes use of both. Do you know what the wider practice around states is regarding this? This is not a 'pure' CMF question, but vital in the application.**

A: State agencies are in various stages of safety analysis practices. We do not currently have data on how many states are using a simple observed crash history as opposed to those using more robust practices of safety performance functions or Empirical Bayesian estimates. When comparing the potential value of multiple treatments, it is important to use a consistent method to ensure a fair comparison.

**Q: Is there a specific sorting heirarchy for a countermeasure with multiple CMFs?**

A: When a countermeasure has more than one CMF in the Clearinghouse, the search results will be sorted by star rating. Within the same star rating, they are sorted by the CMF entry number in the Clearinghouse.