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Value Engineering WSDOT

Making good Projects Great

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What is a Performance Attribute?

A Performance Attribute is a given set of characteristics that are essential in achieving a projects performance objectives. Performance attributes can posses s a range of values and can be measured either qualitatively or quantitatively.

Performance – the manner in which an action achieves its intended purpose; considers the accomplishment of the action in terms of completeness, accuracy, speed, and efficiency.

> ***Synonyms***: achieve, capability, carry out, conduct, discharge, effect, execute, fulfill, implement, potential power, run.

Attribute – a quality, feature or characteristic that is important to the project. It is relevant to the problem statement and meeting the purpose and need of the project. A piece of information that determines the properties of an idea; does idea the attribute have a positive or negative effect on the performance attribute under consideration?

> ***Synonyms***: aspect, characteristic, criteria, element, feature, measure, mark, parameter, property, trademark, trait.

Performance Attributes

FHWA annually reported attributes:

- ✓ **Safety**
- ✓ **Operations**
- ✓ **Environment**
- ✓ **Construction**
- ✓ **Right-Of-Way**

Examples of performance attributes and their definitions (general definitions, can be detailed for individual projects)

Safety	An assessment of the idea's contribution to safety.
Operations	An assessment of the idea's contribution to operations; this can include mainline operations, local operations, intersections, ramps, etc..
Environment	An assessment of the idea's contribution to the environment: includes noise, water, air, soil, impervious surface, etc.
Construction	An assessment of the idea's contribution to construction: includes, schedule, construction impacts, coordination, cost, etc.
Right-of-way	An assessment of the idea's contribution to right-of-way: amount of right-of-way required; difficulty in acquiring right-of-way; impacts, social justice concerns, etc.

Projects may have additional performance attributes, examples include:

- Maintainability
- Reduce Risk
- Schedule
- Multimodal connectivity
- Ferry operations
- Coordination between contracts
- Material Flow
- Transit operations
- Maintenance of traffic

Introduction to the Performance Attribute Matrix

The Performance Matrix is a technique which a paired comparison method to evaluate the importance of the specified performance attributes in meeting a projects purpose and need.

performance attribute matrix (example)

						total	%
A	maximize ROI (cost reduction)	**A**	A/B	C	D	1.5	15
B	considers all modes		**B**	C	D	1.5	15
C	safety is maintained			**C**	C	4	40
D	meets project specific needs				**D**	3	30
						10	100

How the performance attribute matrix works (using paired comparison)

The beauty of this technique is that it is intuitive and gets at the heart of the matter, with regard to what is important, fairly quickly. To use paired comparison simply start at the top of the list and as the question; "what is more important A or B? if they answer that they are equally important try and press them to make a choice – however if they are convinced that they are equally important you may use a split score in the most upper left green box of the example. Then go to the next (green) column and ask "what is more important A or C?" and so on until all of the green boxes are filled in with the responses from the VE team.

Next simply count up the totals for each performance attribute and fill that number in the **total box** to the right. Notice that "A" appears 1.5 times; "B" appears 1.5 times; "C" appears 4 times; and "D" appears 3 times. Then in the percent column to the far right you can calculate the % that each attribute was defined as being "more important". This example reveals that attributes "C" and "D" are the two most important performance marks that the project team is trying to reach and that together they represent 70% of the performance measures listed. Of course in this example it makes sense that "safety" and "project needs" are the most important features of any idea that is proposed. Hence when we evaluate ideas it is important that they contribute positively to these two performance attributes. This is not to say that the others are not important but clearly Safety and Project Needs top the list.

Performance Attribute Matrix (example)

Paired comparisons help us determine the most important measures (attributes) with respect to a project. This in turn allows us to evaluate the effectiveness of ideas developed during speculation.

The ability of an idea to achieve a desired level of performance must be discussed early in Value Engineering – it helps us understand that project and the problem that the project addresses. In addition it helps us develop a fuller understanding of the project purpose and need.

It is important to make the distinction between ***Performance Attributes*** and ***Performance Requirements***. Performance **requirements are mandatory** and must be met by the concept being considered. Performance **attributes possess a range of acceptable levels of performance**.

For example, if the project was the design and construction of a new bridge, a performance *requirement* might be that the bridge must meet all current seismic design criteria. In contrast, a performance *attribute* might be Environmental, which means that a wide range of alternatives could be acceptable with different varying degrees of impact.