



*Work Zone  
Safety  
Performance  
Measures  
Training Module*

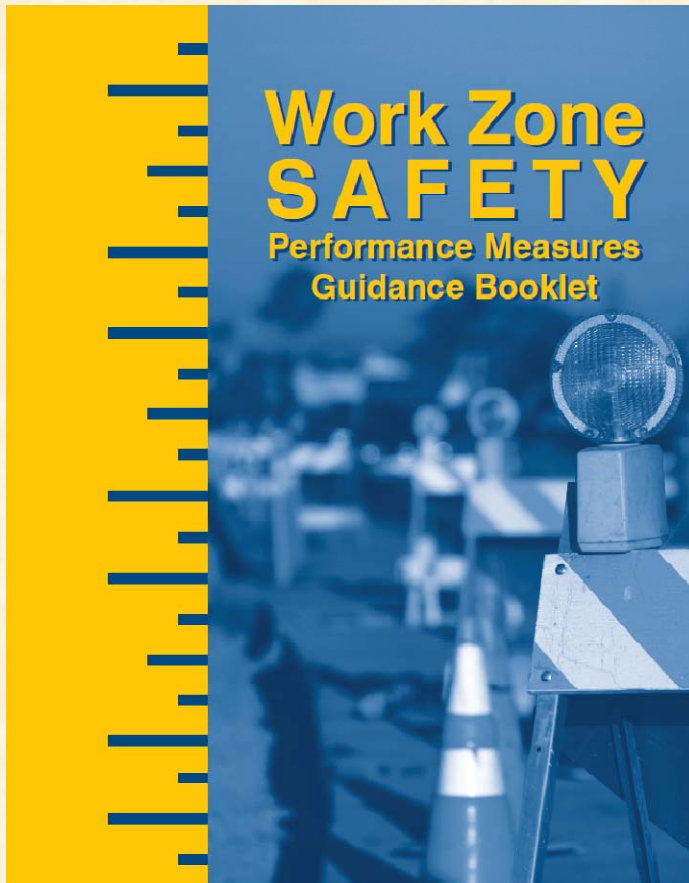
# *Module Objectives*

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- ◆ Define performance measures
- ◆ Understand the rationale for using performance measures for work zone safety
- ◆ Apply the process and test for developing good performance measures
- ◆ Identify when and how to measure performance and what to do with the resulting data

# *Work Zone Safety Performance Measures*



- ◆ *Work Zone Safety Performance Measures Guidance Booklet*
- ◆ Module is based on information in this booklet
- ◆ Available at [atssa.com](http://atssa.com)

# *What are Performance Measures?*

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- ◆ Performance measures are sets of defined, outcomes-based conditions or response times that are used to evaluate success
- ◆ Performance measures focus on what to achieve, not how to achieve it

# *Performance Measure Types/Formats*

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- ◆ Measures can be:
  - ◆ Objective or subjective
  - ◆ Detailed or high-level
  - ◆ Multi-level (multiple defined levels of performance) or pass/fail
  - ◆ Applied at the project level, the region/district level, the State/agency level, or at a policy level

# *Measures vs. Goals*

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- ◆ Performance Goal = the minimum acceptable level of performance for a particular performance measure
  - ◆ Pass/Fail measure: Goal is to "Pass."
  - ◆ Multi-level measure:
    - ◆ Several performance levels are defined
    - ◆ One of the levels is designated as the "performance goal"
- ◆ Performance Measure = the set of "levels of performance" including the designated "goal"

# Example Performance Measure

## Performance Measure

Performance Goal –  
“Pass”

▼

5 - Excellent	4 - Good	3 - Fair	2 - Poor	1 - Very Poor
Work zone crash rate 20% less than pre-construction crash rate	Work zone crash rate equal to pre-construction crash rate	Work zone crash rate 20% higher than pre-construction crash rate	Work zone crash rate 30% higher than pre-construction crash rate	Work zone crash rate more than 30% higher than pre-construction crash rate



Levels of Performance

# *Additional Examples of Performance Goals*

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- ◆ Pass/fail – Incident Rate (IR) for Worker injuries is less than 4.0
- ◆ Subjective – Drivers feel safe traveling through work zones
- ◆ Surrogate/Congestion – No stopped queues in the work zone longer than ¼ mile
- ◆ Policy – Respond to all customer complaints within 24 hours
- ◆ State/Agency Level – No construction-related fatalities in work zones State-wide in 2010



# *Why Use Performance Measures for Work Zone Safety?*

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- ◆ Utilize resources more effectively
- ◆ Improve the quality of service to the public
- ◆ Document and communicate agency goals, priorities, and objectives
- ◆ Assess, document, and communicate agency performance and efforts currently and over time
- ◆ Strengthen accountability and enhance decision-making

# *Why Use Performance Measures for Work Zone Safety?*

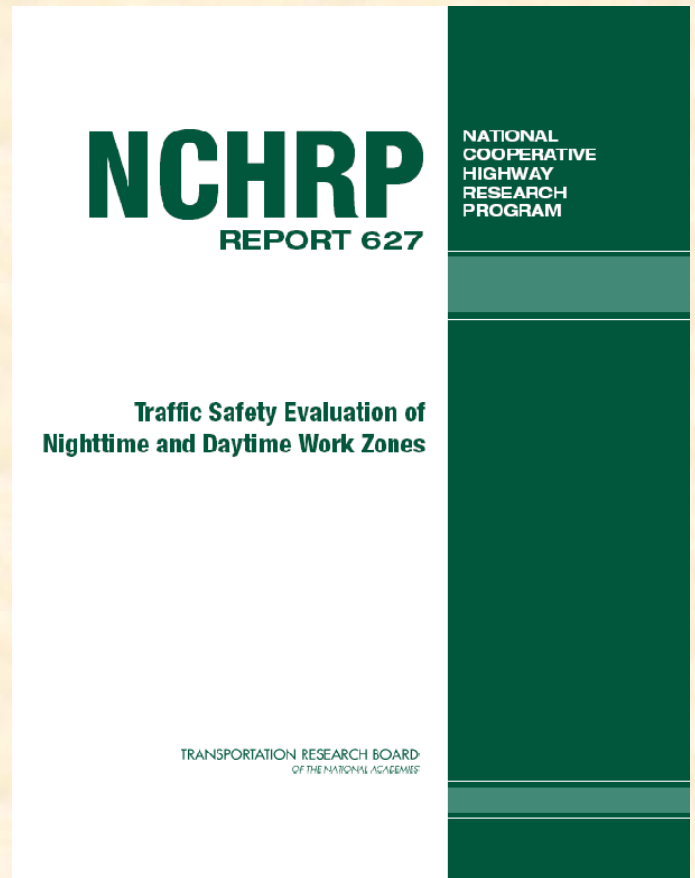
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- ◆ Assess the effectiveness of new and existing policies, practices, or procedures, allowing comparisons to agency benchmarks
- ◆ Identify unacceptable or unsafe situations that need to be corrected
- ◆ Justify incentive/disincentive payments or penalties
- ◆ Validate recognition and awards for employees

# *Sources for Performance Measures and Goals*

- ◆ Existing agency goals
- ◆ Brainstorming/working sessions
- ◆ Goals/measures from other agencies/contracts
- ◆ Common industry standards
- ◆ Subject matter experts
- ◆ Research (such as NCHRP Report 627)



# *To Develop Performance Measures...*

- ◆ Identify stakeholders and invite them to participate in the goal-setting exercise
- ◆ Identify any existing agency performance measures



# *To Develop Performance Measures...*

- ◆ Hold initial brainstorming session to define draft performance goals:
  - What are the stakeholders trying to achieve?
  - Focus on what to achieve not how to achieve it



# *To Develop Performance Measures...*

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- Craft each idea into a clear, well-written performance goal
- Consider surrogate measures when what you're really trying to measure is not available
- Make decisions on format—pass/fail or multi-level, detailed or high-level, subjective or objective—as you go
- Organize/categorize your measures
- Test, refine, and finalize your measures
- Keep asking, "What have we missed?"

# *What Makes a Good Performance Goal? – “Am I SMART”?*

- ◆ I – Is the goal under the Influence of the party responsible for meeting the performance goal?
- ◆ S – Is the performance goal Specific?
- ◆ M – Is the performance goal Measurable?
- ◆ A – Is the performance goal Achievable?
- ◆ R – Is the performance goal Results-oriented?
- ◆ T – Does the performance goal have a Time element as to when it needs to be met?

# *Example 1 – Project Level Goal*

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- ◆ You have assembled your stakeholders and have held your initial brainstorming session
- ◆ The project is a reconstruction of a 5.56 mile segment of rural highway
- ◆ One of the goals that the stakeholder group identified was, “Improve safety”
- ◆ The group also decided that they want to make their goals pass/fail, detailed, and objective



# Example 1 – Testing the Goal

- ◆ You lead the group through the ISMART test on “**Improve safety**”
  - ◆ I (Influence) – Maybe. It depends on to whom the goal is assigned
  - ◆ S (Specific) – No. More details are needed
  - ◆ M (Measurable) – Maybe. More details are needed
  - ◆ A (Achievable) – Maybe. More details are needed
  - ◆ R (Results-Oriented) – Yes
  - ◆ T (Time Element) – No
- ◆ It appears that more work is needed on this draft goal

# *Example 1 – Refining the Goal*

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- ◆ You lead the group through a discussion to refine the goal to make it pass “ISSMART”
- ◆ The resulting pass-fail, detailed, objective, SMART goal is:
  - ◆ **Maintain the pre-construction average crash rate of no more than 1.0 crashes per month on the 5.56 mile section of roadway for the duration for the project**
- ◆ The group feels that this goal is under the influence of the contractor and assigns it to the contractor through a performance contract

## *Example 2 – Agency Level Goal*

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- ◆ At a press-conference following a tragic work zone fatal crash, the Governor states, “We will be examining our processes and policies, and our goal will be to have zero work zone fatalities in 2011”
- ◆ As Chief Engineer, it has now become your responsibility to implement and achieve this goal

# *Example 2 – Testing the Goal*

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- ◆ You run through the ISMART test on **“Have zero work zone fatalities in 2011”**
  - ◆ I (Influence) – Maybe. Some fatalities are not preventable
  - ◆ S (Specific) – Yes
  - ◆ M (Measurable) – Yes
  - ◆ A (Achievable) – Maybe. Some fatalities are not preventable
  - ◆ R (Results-Oriented) – Yes
  - ◆ T (Time Element) – Yes

# *Example 2 – Refining the Goal*

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- ◆ Based on the “ISMART” test, you recommend to the Secretary that the goal be changed to “Have zero **construction-related** work zone fatalities in 2011” to improve the ability to influence the outcome
- ◆ The Secretary agrees, and proposes the change to the Governor, but the Governor rejects the change
- ◆ Thus, the goal stands as “**Have zero work zone fatalities in 2011**”

# *Performance Measurement Methodology*

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- ◆ Defines:
  - ◆ How to measure performance
  - ◆ When to measure performance
  - ◆ Who will measure performance
- ◆ Develop the methodology to suit your agency, project, and situation
- ◆ Develop the methodology up front and test it in the field for practicality before finalizing it and the performance measures/goals

# *The Performance Measurement Methodology Includes:*

1. Specific Measure of Effectiveness	How
2. Unit of Measure	
3. Measurement Method	
4. Frequency and Timing	When
5. Evaluator	Who

# *How To Measure Performance*

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- ◆ Develop a methodology for assessing each performance measure that defines:
  1. The specific measure of effectiveness

## **Example 1**

**Measure of effectiveness:**  
**Crash Rate on the 5.56 Mile Section**

## **Example 2**

**Measure of effectiveness:**  
**Number of work zone fatalities**



# *How To Measure Performance*

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- ◆ Develop a methodology for assessing each performance measure that defines:
  2. The unit of measure

## **Example 1**

**Unit of measure:**

**Average crashes per month from actual construction start date to project final acceptance date**

## **Example 2**

**Unit of measure:**

**Work zone fatalities statewide in 2011**

# How To Measure Performance

- ◆ Develop a methodology for assessing each performance measure that defines:
  3. Process or test for evaluating performance (measurement method)

## **Example 1:**

### **Measurement Method:**

Obtain number of crashes from the State crash database. Compute average monthly crash rate by dividing number of crashes by the construction duration in months

## **Example 2:**

### **Measurement Method:**

Obtain number of work zone fatalities from the State crash database

# *When to Measure Performance*

- ◆ Number of Options:
  - ◆ Continuously – Traffic Volumes and delays
  - ◆ Daily – Maximum queue buildups, compliance with traffic control plans
  - ◆ End of project – Crash frequencies
  - ◆ Annually – Policy/State-level goals



# *When To Measure Performance*

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- ◆ Develop a methodology for assessing each performance measure that defines:
  4. Frequency and timing

**Example 1:**

**Frequency and timing:**  
**Once at end of project**

**Example 2:**

**Frequency and timing:**  
**Once at end of 2011**

# *Who Will Measure Performance*

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- ◆ Number of Options:
  - ◆ Agency – Inspector, Project Engineer, Central Office
  - ◆ Contractor
  - ◆ Third Independent Party

# *Who Will Measure Performance*

- ◆ Develop a methodology for assessing each performance measure that defines:
  5. Responsible party for measuring performance (Evaluator)

## **Example 1**

**Evaluator:**

**State DOT Project Engineer**

## **Example 2**

**Evaluator:**

**State DOT Chief Engineer or Designee**

# Summary – Example 1

- ◆ Draft Goal: Improve Safety
- ◆ Final Goal: Maintain the pre-construction average crash rate of no more than 1.0 crashes per month on the 5.56 mile section of roadway for the duration for the project
- ◆ Measurement Methodology:

Measure of Effectiveness	Unit of Measure	Measurement Method	Frequency and Timing	Evaluator
Crash Rate on the 5.56 Mile Section	Average crashes per month from actual construction start date to project final acceptance date	Obtain number of crashes from the State crash database. Compute average monthly crash rate by dividing number of crashes by the construction duration in months	Once at end of project	State DOT Project Engineer

# Summary – Example 2

- ◆ Draft Goal: Have zero work zone fatalities in 2011
- ◆ Final Goal: Have zero work zone fatalities in 2011
- ◆ Measurement Methodology:

Measure of Effectiveness	Unit of Measure	Measurement Method	Frequency and Timing	Evaluator
Number of work zone fatalities	Work zone fatalities statewide in 2011	Obtain number of work zone fatalities from the State crash database	Once at end of 2011	State DOT Chief Engineer or Designee



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# *Data Considerations*

# *What Kind of Data to Collect*



- ◆ Safety – work zone crash rates, worker injury rates, subjective ratings, surrogate measures



- ◆ Construction congestion – queue length, incident clearance time, travel time/delay, subjective ratings



- ◆ Customer satisfaction – number/frequency of complaints, subjective ratings

# *Data Collection Techniques*

- ◆ Scale data collection efforts to relative size/impact of the project
- ◆ Use objective national standard methods and tests where appropriate, applicable, and available
- ◆ Use on-site inspectors/inspections as appropriate



# Data Collection Techniques

- ◆ When possible, use data that are already being collected and are readily available
  - ◆ Permanent count stations
  - ◆ Logs and observations from on-site personnel
- ◆ Use automated data collection where available



# *Data Collection Techniques*

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- ◆ Understand any potential issues with data reporting that might impact your results
- ◆ Ensure all data collected are tied to the measurement methodology
- ◆ Use statistical power analysis to determine the amount of data needed
- ◆ Investigate the availability of published statistics for baseline data
- ◆ Consider using surrogate measures if crash data is not readily available

# *Data Collection Considerations*

- ◆ Minimize interference with the construction contractor
- ◆ Work zones are dynamic environments; data collection techniques also may need to be dynamic



# *How the Data Can Be Used*

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- ◆ Project-level results may require immediate action by the responsible party
  - For example, if work is causing excessive delays on a particular day, the work may need to be shut down or altered immediately
  
- ◆ Agency-level results may demonstrate a need for proactive adjustments for future projects
  - For example, if construction-related work zone fatalities are occurring, a new policy may be needed for application on all future projects

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# *Lessons Learned and Review*



# *Lessons Learned*

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- ◆ The performance measures/goals **MUST** be under the influence of the party responsible for meeting them
- ◆ Don't start from scratch. Listen to others' experiences
- ◆ Make sure that you cover everything that you're trying to achieve
- ◆ Focus first on what to achieve, not how to achieve it

# *Lessons Learned*

- ◆ Include time-response performance goals as appropriate
- ◆ Multi-level measures are more informative than pass/fail measures (Did we just fail, or did we fail badly?)
- ◆ When nearing completion ask, "What have we missed?"
- ◆ Test your goals in the field



# *Lessons Learned*

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- ◆ Remember, this is an iterative process
- ◆ Get reviews/approval/buy-in from affected offices and stakeholders
- ◆ Clearly define what it means to meet the performance goals
- ◆ Consider how a performance goal will be measured or evaluated – define it up front
- ◆ Focus resources on fewer measures and data sources for better results

# *Review of Module Objectives*

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- ◆ Define performance measures
- ◆ Understand the rationale for using performance measures for work zone safety
- ◆ Apply the process and test for developing good performance measures
- ◆ Identify when and how to measure performance and what to do with the resulting data

# *Additional Resources*

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- ◆ *Performance Contracting Framework*
- ◆ The FHWA Work Zone Safety and Mobility Performance Measurement Website
- ◆ *Implementing the Rule on Work Zone Safety and Mobility*
- ◆ The National Work Zone Safety Information Clearinghouse

# *Questions?*

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