

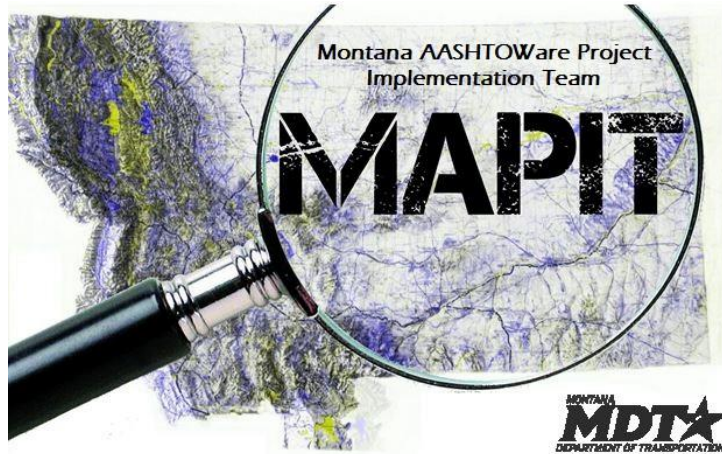


MONTANA DEPARTMENT OF TRANSPORTATION
AASHTOWare Project Construction and Materials



MDT Procedure
Process: Reference Item Material Sets

Date: November 20, 2017
Updated: August 26, 2019





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□ **Process Definition**

A material set is a grouping of materials on a reference item. Optional materials (e.g. Crushed Base Coarse Grade 5A, 6A or 7A) or combination of materials (e.g. conventional gradation or combined gradation for concrete) can be defined using multiple material sets. Material sets are an “or” condition. On the contract, as long as the requirements of one of the sets is met, no estimate exceptions will be generated.

The tests themselves are not added to the reference item. When the contract materials are generated, the tests are copied from the reference material and/or material category to the contract item.

After the materials are added to the set, the only data that gets entered is the conversion factor. This equals the number to get from the bid item unit of measure to the material unit of measure (what the material’s acceptance action is based on). For example, 1 square yard of 4” sidewalk = 0.111 cubic yards of concrete. The frequency on the acceptance action is 1 per 200 cubic yards of concrete. Therefore, the conversion factor is 0.111. If the bid item were based on cubic yards, the conversion factor would be 1.

When the bid item is recorded on a DWR, the system multiplies the reported quantity of the bid item by the conversion factor to get the quantity of the material used. That quantity is compared to the frequency defined on the acceptance action to see if the requirement has been satisfied. This allows the same frequency to be used for a material regardless of the bid item.

Note, items measured by the Lump Sum and Each would have a conversion factor of 1 since there is no way to determine what the actual number would be. Since the material quantity would always be a small number, the required number of samples would be 1.

□ **Acronyms and Definitions**

CAS – Construction Administration Services

DWR – Daily Work Report

ESS – Engineering Systems Section

MDT – Montana Department of Transportation

□ **MDT Procedure**

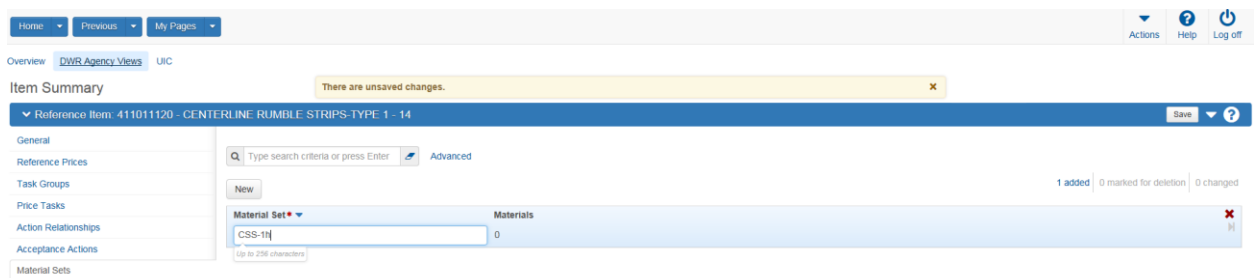
1. When a new item number is created in Preconstruction, a trigger sends an email to the Testing Engineer, CAS Engineer and others. If time allows, the material requirements that should be on the item may be determined at that time.
2. Before a contract’s material requirements are generated, ESS queries the contract items and what material set(s) and material(s) will be copied to the contract. That is reviewed to ensure that all of the items have a material set. If there is something missing, most likely it is a new item.
 - a. If the item is similar to an existing item (e.g. a new size of RCP), the existing item is used as a reference to create the material sets/materials on the new item.



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- b. If the item is not similar to an existing item, the requirements are defined.
 - i. ESS reviews the special provisions and plans for the contract to identify the material components.
 - ii. ESS sends the proposed material set(s) and material(s) to the Testing Engineer for review.
 - iii. The Testing Engineer sends any comments or changes back to ESS.
- 3. CSS creates the set(s) and adds the material(s) to the reference item.
 - a. Click New
 - b. Enter the Material Set description



General scenarios:

- Multiple sets because one or more materials in the set are optional: the set is named to indicate what is different

Example:

Bid item - RIPRAP REVEGETATION

Set – Reveg w/ Filter Matl 1

Material – Seed

Material – Topsoil

Material – Short-term Rolled Erosion Control

Material – Filter Material Number 1

Set – Reveg w/ Filter Matl 2

Material – Seed

Material – Topsoil

Material – Short-term Rolled Erosion Control

Material – Filter Material Number 2

- Multiple sets because of different material options: the set is named to indicate the material



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Example:

Bid item – RUMBLE STRIPS

Set – CSS-1h

Material – CSS-1h, Cationic Slow Set Emulsion

Set – SS-1h

Material – SS-1h, Anionic Slow Set Emulsion

- One material set: the set is named to indicate the material

Example:

Bid item – COVER-TYPE 1

Set – Cover Type 1

Material – Crushed Cover Aggregate Type 1

- One material set with multiple materials: the set is named similar to the bid item to indicate the “product”

Example:

Bid item - BASE-CEMENT TREATED

Set – CTB

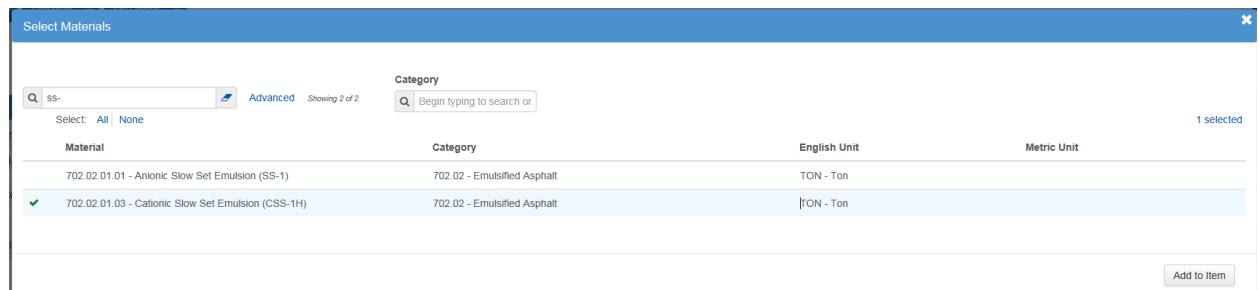
Material – Portland Cement

Material – Fly Ash

Material – Cement Treated Base

Material - Water

- Click Save
 - Click on the link under the word “Materials”
- Note, this is the number of materials currently on the set and will be 0 on a new set
- Click Select Materials
 - In the selection box, start typing the material code or description
 - Select the appropriate material





- h. Click Add to Item
- i. Enter the Conversion Factor

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Overview

Material Set Summary

Item: 411011135 - RUMBLE STRIPS - MILE - Mile

Material Set: CSS-1h

Materials

Select Materials...

Material	Conversion Factor	Unit
702.02.01.03 - Cationic Slow Set Emulsion (CSS-1H)	0.37400	TON - Ton

For the rumble strip item, 1 mile of rumble strip with an approximate width of 1 yard at an application rate of 0.05 gal/SY (undiluted):

$$1 \text{ mile} * 1 \text{ yard} * \frac{5280 \text{ feet}}{1 \text{ mile}} * \frac{1 \text{ yard}}{3 \text{ feet}} * \frac{0.05 \text{ gal}}{1 \text{ SY}} * \frac{8.5 \text{ pound}}{1 \text{ gallon}} * \frac{1 \text{ ton}}{2000 \text{ lb}} = 0.374$$

- j. Click Save
- ❑ **IT Systems Interfaces Outside of AASHTOWare Project**
- ❑ **Process Exceptions**
- ❑ **Business Change Summary**

The business change is minor. This will actually be a lot simpler than SiteManager. In SiteManager, all of the tests are added to the materials on each bid item. Since the tests are inherited in the new system, only the materials are added to the bid item. The tests are maintained at the material category/material level.

One feature that the new system does not have at this time is the ability to copy materials from one bid item to another. It will not be difficult since only the materials are added but care will be needed to ensure consistent set naming between similar bid items.

- ❑ **Comments**

A lot of the material sets will be defined using the information in the global sampling and testing in SiteManager.