

ARC Database: Overview & Updates

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Overall Introduction



- **ARC work element TT1d and TT1e: Development of materials and research database**
 - *Store information* related to *sources* & *properties* of materials used in various consortium research activities.
 - Includes results update in form of *reports*, *white papers* or *any other type of documents* for each research task...



Overall Introduction



- **Challenges:**

- No software installation
- Flexibility (new tests, procedures...)
- central database
- Multiple users
 - Retrieve information (Public interface)
 - Add/Delete/Edit materials information
- Different users' roles
- Common materials use
- Multiple measures for the same material
- Ability to relate material(s) to validation sections
- ...



Main Key Design Goals



- Create the *most flexible* system possible eliminating “hard-coded” data types
- Create a *role-based infrastructure* granting privileges to categories of users
- Create an entirely *Web-based* system
 - No software installed on client computers



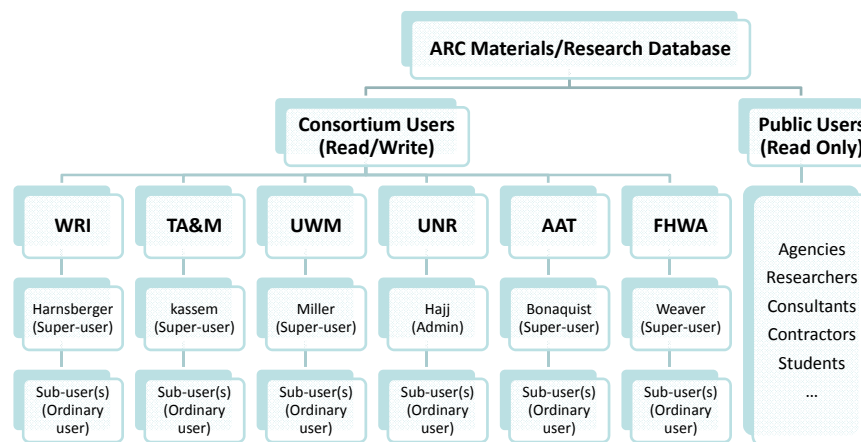
Technologies Used



- Database backend is **SQL Server 2008**
- **ASP.NET** was chosen as the Web development platform
- Hardware and software platforms were chosen based on well-known and supported technologies



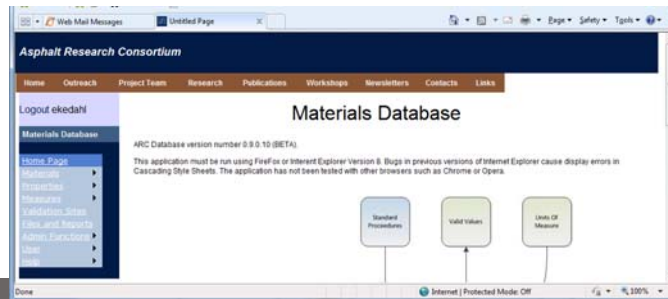
Role Management Infrastructure *General Users' Diagram*



Getting to the Application



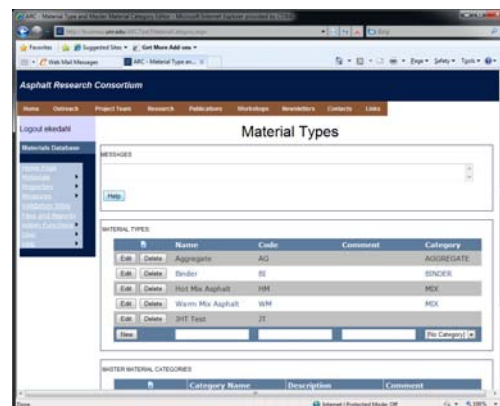
- Using Internet Explorer, visit <http://www.business.unr.edu/arc>
- Click the **Login** button and enter credentials



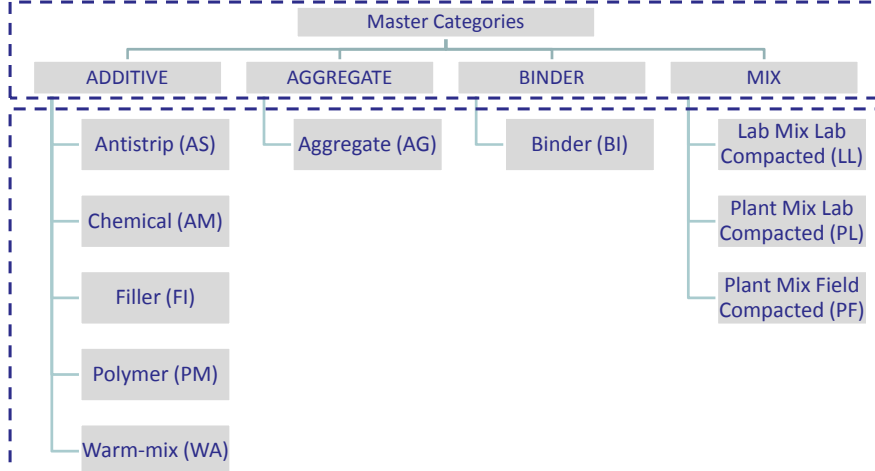
Software Model (Materials)



- All materials have a type
 - (Aggregate, binder, etc.)
 - Material types belong to a category
- Materials have a supplier
- Materials can be created from other materials (Components)
- Materials associated with
 - work tasks
 - validation sections
 - other component materials



Materials Material Types

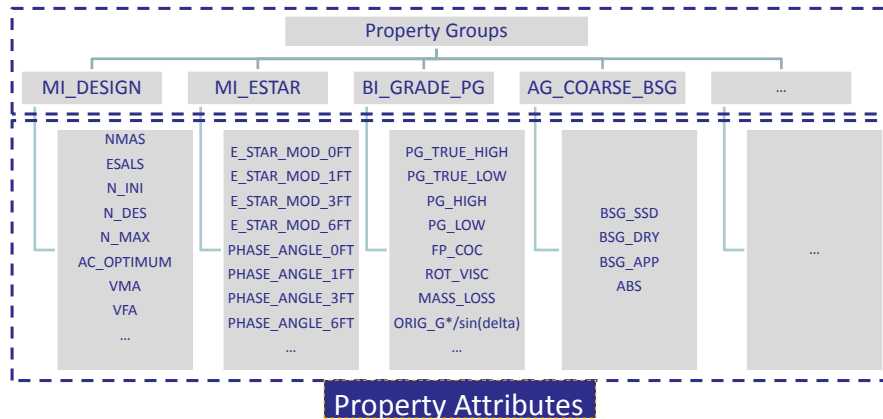


Software Model (Properties)



- Materials have properties
 - Properties are categorized into groups
 - Properties can be configured to have a valid range of values
 - Hard and soft limits are supported
 - Properties are categorized as qualitative or quantitative

Property Property Groups and Attributes



Software Model (Validation Sites)



- Validation sites are used for material field tests
 - Validation sites are divided into validation sections, which are further divided into validation layers
- Ability to assign Material(s) to one or more validation layer(s)



Support Files (Introduction)



- Support files are uploaded to a user-defined hierarchical file system
- Support files can include
 - reports,
 - scanned document,
 - picture,
 - just about anything related to the ARC project
- Support files can be filtered by work items (program area, category, work element, subtask)



Final Reports



- Follow FHWA Research Report Format
<http://www.fhwa.dot.gov/publications/research/general/03074/index.cfm>
- Compliant with section 508
- Owned by FHWA.
 - With the permission of FHWA final reports can be uploaded to the ARC site otherwise
 - have a link referring to the publication



Selection and Filtering Feature



- Materials (and other elements) can be selected and filtered by
 - Material type
 - Material category
 - Organization
 - Supplier
 - Work tasks
 - Validation section
 - Component materials



Selection and Filtering



The screenshot displays the 'ARC - Materials Editor' web application. The main content area is titled 'Select Material To Edit From Tree:'. It features a 'Filters' section with four dropdown menus: 'Material Type' (set to [ALL]), 'Material Category' (set to [ALL]), 'Primary Organization' (set to [ALL]), and 'Supplier' (set to [ALL]). Below these are three checkboxes: 'Work Tasks' (checked), 'Validation Sections' (checked), and 'Component Material' (unchecked). The 'Program Area' dropdown is set to 'Validation (V)'. The 'Category' dropdown is set to 'V1: Field Validation'. The 'Work Element' dropdown is set to 'V1b: Construction and Monitoring of Additional Comparative Pavement Valida'. The 'Subtask' dropdown is set to 'V1b-1: Construction and Monitoring of Additional Comparative Pavement Vali'. There is a 'Show Detail' checkbox which is unchecked. Below this are three input fields: 'Select Validation Site: PTH9-RAP Project', 'Select Validation Section: 63R107', and 'Select Layer: 1'. At the bottom left, there is a 'Filter By:' section with radio buttons for 'Site', 'Section', and 'Layer', with 'Layer' selected.

Selection and Filtering



Deployment of the ARC Database to Other Servers



- Two software requirements to run the system:
 - Microsoft SQL Server 2008.
 - Windows Server 2003 or 2008 with Internet Information Server.
- Microsoft Visual Studio 2008 or later will be required to continue development of the software or customize it.
- System designed such that SQL Server can be running on the same computer as the Web server.
- Size & scalability of the hardware dictated by the expected usage patterns.



Work in Progress



- Update final *Help system* items to reflect changes.
- Continue *bug fixes* resulting from broad user testing.
- Develop read-only *user interface* for non-consortium users.
 - Define public user authentication requirements
- Plan for *deployment* to other server(s)

