



Improved Information Management Processes for the FDOT Dispute Review Board System

Yimin Zhu, Mehmet Bayraktar and Shu-Ching Chen
Department of Construction Management
School of Computing and Information Science
Florida International University, Miami, FL

Construction Conference
February 24, 2010



Problems

- The current FDOT dispute review board (DRB) website shows flat statements of board decisions and recommendations in portable document format (PDF). Major problems of such a system include:
 - Reusability – The reports are unusable for construction engineers looking for some guidance in the resolution of similar problems in other projects.
 - Integration – DRB reports are not linked to specifications, procedures, and other relevant documents or data.



Objectives

- To develop an online system that supports better information retrieval in a usable format.
- To facilitate the selection of DRB members.
- To develop a tool for construction engineers to track lessons learnt based on DRB recommendations.



The DRB System

- Three Modules
 - Information Input: capturing metadata associated with each DRB report
 - Report & Member Analysis: providing analysis of DRB reports and review of members
 - Maintenance: providing system maintenance.



The DRB System

Main Page - FDOT DRB System - Windows Internet Explorer

http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/default.aspx

Live Search

Main Page - FDOT DRB System

Dispute Review Board System

Please select one of the modules...

<u>Information Input</u>	<u>Report & Member Analysis</u>	<u>Maintenance</u>
--	---	------------------------------------

Local intranet 120%

start exp ... Wek... Wek... New... Calc... Mic... Rem... text... p1-s... Main... EN 4:17 PM



The Information Input Module

- This is a process to capture key descriptive data (metadata) about a DRB report.
 - Basic information
 - Issue description
 - Lessons learnt
 - Dispute position description
 - Recommendation
 - Upload reports

Basic Information

[Basic Information](#)
[Issue Information](#)
[Lessons Learned](#)
[Position Information](#)
[Recommendation](#)
[Upload Report](#)

How To: Enter any available meta-data associated with the report being input.

Report Creation Date:

Project District:

County:

Project FIN Number:

Contract Number:

Project Description:

Contractor:

Sub-Contractor:

Road Number:

Member Information:
Chairman Info:
Member Info:

Item
<input type="button" value="Select"/> Lee
<input type="button" value="Select"/> Polk
<input type="button" value="Select"/> Sarasota
<input type="button" value="Select"/> Hardee
<input type="button" value="Select"/> Glades
<input type="button" value="Select"/> Bartow
<input type="button" value="Select"/> Manatee



Basic Information

- The basic information of a DRB report includes report creation date, project district, project FIN number, contract number, contractor, subcontractor, subject and review board members.



Basic Information

Input Report - Windows Internet Explorer
http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Input/InputWizard.aspx

[Basic Information](#)
[Issue Information](#)
[Lessons Learned](#)
[Position Information](#)
[Recommendation](#)
[Upload Report](#)

Basic Information

How To: Enter any available meta-data associated with the report being input.

Report Creation Date:

Project District:

County:

Project FIN Number:

Contract Number:

Project Description:

Contractor:

Sub-Contractor:

Road Number:

Member Information:
Chairman Info:

Done Local intranet 130% 4:22 PM



Issue Description

- One of the keys to facilitate information retrieval is to classify DRB reports based on the type of issues, which is modeled according to
 - Claim Type (e.g., excusable delay, compensation delay or breach of contract)
 - Causation (e.g., defective plan/specification/design, rework, or different site conditions)
 - Related Highway Component (e.g., site work, pavement, or bridge structure)



Issue Description

Input Report - Windows Internet Explorer
http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Input/InputWizard.aspx

[Basic Information](#)
[Issue Information](#)
[Lessons Learned](#)
[Position Information](#)
[Recommendation](#)
[Upload Report](#)

Issue Information

Please add related issues:

How To: Choose a claim, causes, and a highway component. An optional description can also be entered. To add an issue, click the "Add Issue" button. Select an issue from the list of issues to view its details, or click "Delete" to remove the selected issue.

Note: An issue's description must be entered *before* adding the issue.

Claim Type: Additional Work/Days
Causation: Defective Designs/Specs/Plan
Additional Causation: --None--
Related Highway Component: Asphalt Pavement

Issue Detail: Select an issue to see its details.

Issue Description:

Issues:

Local intranet 120% 4:24 PM



Lessons Learned

- Allow FDOT engineers to keep track of lessons learned associated with each issue.



Lessons Learned

Input Report - Windows Internet Explorer

http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Input/InputWizard.aspx

Input Report

[Basic Information](#)
[Issue Information](#)
[Lessons Learned](#)
[Position Information](#)
[Recommendation](#)
[Upload Report](#)

Lessons Learned

Select an Issue and enter a Lesson Learned:

How To: In order for a lesson to be added to an issue, you must click the "Set Lesson" button. To clear the lesson of an issue click the "Set Lesson" button with no lesson in the text field.

Associated Issue:

Issue Description: Claim: Additional Work/Days
Causation: Defective Designs/Specs/Plan
Highway Component: Asphalt Pavement

Lesson Learned:

Done Local intranet 120% 4:26 PM



Position Information

- All DRB reports contain a contractor position and a FDOT position. The text describing the positions often makes references to FDOT standard documents such as specifications.
- This step is to record the link to FDOT standard documents. In this study, a mechanism linking the standard specifications or the construction project administration manual (CPAM) with DRB reports is implemented.



Position Information

Input Report - Windows Internet Explorer
http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Input/InputWizard.aspx

[Basic Information](#)
[Issue Information](#)
[Lessons Learned](#)
[Position Information](#)
[Recommendation](#)
[Upload Report](#)

Position Information

Fill the Position Reference Information if available:

Specification Document Year: 2007

Associated Issue: Issue: 1

Issue Description: Claim: Additional Work/Days
Causation: Defective Designs/Specs/Plan
Highway Component: Asphalt Pavement

Associated with: FDOT

How To: Standard Specification references must be inserted in the following format: X-Y.Z, where X = Section Number; Y = Sub-Section Number; and Z = Sub-Section of Y. As many sub-sections as necessary may be added.

Specification Section: Add

(Ex. 556-4.5)

Delete

Done Local intranet 120%

start ex... W... W... Ne... Cal... Mic... te... p1... In... Mic... 4.b... EN 4:27 PM



Recommendation

- This portion of a DRB report contains recommendations of a DRB board.
- Recommendations often contain references to FDOT standard documents.
- In addition, this portion of metadata also captures the acceptance to the recommendations by FDOT and contractors, with some explanations.



Recommendation

Input Report - Windows Internet Explorer
http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Input/InputWizard.aspx

[Basic Information](#)
[Issue Information](#)
[Lessons Learned](#)
[Position Information](#)
[Recommendation](#)
[Upload Report](#)

Recommendation

Fill Recommendation Reference Information:

How To: After selecting an issue, enter available information for its recommendation.
To add a recommendation, click the "Add Recommendation" button. To delete a recommendation, enter the recommendation number into the lower textbox, and click "Delete". To add a recommendation, click the "Add Recommendation" button. To delete a recommendation, enter the recommendation number into the lower textbox, and click "Delete".

Associated Issue: Issue: 1

Issue Description: Claim: Additional Work/Days
Causation: Defective Designs/Specs/Plan
Highway Component: Asphalt Pavement

Letting Date:

Rule in favor of: FDOT

Recommendation Result:
 FDOT Accepts FDOT Rejects
 Partial Acceptance N/A

Explanation:

Recommendations

No recommendations have been added

Done Local intranet 120% 4:28 PM



Uploading DRB Reports

- Once abovementioned metadata are captured, the associated DRB report in PDF format is loaded into the database.



Uploading DRB Reports

Input Report - Windows Internet Explorer

http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Input/InputWizard.aspx

Input Report

[Basic Information](#)
[Issue Information](#)
[Lessons Learned](#)
[Position Information](#)
[Recommendation](#)
[Upload Report](#)

Upload Report

Select Report:

Choose file

Look in: Scannable

1.pdf	4.pdf	8.pdf	9.pdf
10.pdf	11.pdf	12.pdf	13.pdf
14.pdf	15.pdf	17.pdf	18.pdf

File name:

Files of type: All Files (*.*)

Done

Local intranet 120%

start ex... W... W... Ne... Cal... Mic... te... p1... In... Mic... 6.b... EN 4:29 PM



Report and Member Analysis

- Analysis Module
 - Structured analysis: search DRB reports based on metadata captured by information input
 - Unstructured analysis: keyword-based search



Structured Analysis

- In structure analysis, users may search the DRB system based on different combinations of metadata. For example, a user may issue a search based on the FIN number and a period of time, or the district and a certain type of dispute.
- The structured analysis is roughly classified into basic analysis and advanced analysis.
 - The basic analysis uses document data such as FIN number, district, time period and issue category to search.
 - The advanced analysis allows users to refine searches using DRB member data.



Basic Analysis

Report Search - FDOT DRB System - Windows Internet Explorer

http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Analysis/adSearch.aspx?type=bsc

Report Search - FDOT DRB System

Basic Analysis

[[Home](#)] [[Basic Analysis](#)] [[Advance Analysis](#)] [[Logout](#)]

Search Reports:

Search Type: Select search type to be used.

Regular: If any of the options selected are present in a report, that report will be added to the results.

Restrictive: All options selected must be in a report in order for it to be in the results.

Regular Strict

Choose Districts:

District 1 District 2 District 3 District 4 District 5 District 6 District 7 Turnpike All Districts

Project FIN Number:

Contract Number:

Report Creation Date Range: Dates are in the format MM/DD/YYYY.

From: **To:**

Issue Category:

Select Issue Relationship:

AND: All given issues must be present in the report

OR: One or more of the issues should be present in the report

AND OR

Done Local intranet 120%

start ex... W... W... Ne... Cal... Mic... te... p1... Re... Mic... 7.b... EN 4:30 PM



Advanced Analysis

Report Search - FDOT DRB System - Windows Internet Explorer

http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Analysis/adSearch.aspx?type=adv

Report Search - FDOT DRB System

Advanced Analysis

[[Home](#)] [[Basic Analysis](#)] [[Advance Analysis](#)] [[Logout](#)]

Search Reports:

Search Type: Select search type to be used.

Regular: If any of the options selected are present in a report, that report will be added to the results.

Restrictive: All options selected must be in a report in order for it to be in the results.

Regular Strict

Choose Districts:

District 1 District 2 District 3 District 4 District 5 District 6 District 7 Turnpike All Districts

Project FIN Number: ...

Contract Number: ...

County: ...

Contractor:

SubContractor:

Road Number:

Report Creation Date Range: Dates are in the format MM/DD/YYYY.

From: **To:**

Done Local intranet 120%

start ex... W... W... Ne... Cal... Mic... te... p1... Re... Mic... 8.b... EN 4:31 PM



Unstructured Analysis

- The unstructured analysis, or text analysis, offers a direct search to DRB reports based on keywords.



Unstructured Analysis

Text Search - FDOT DRB System - Windows Internet Explorer

http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Analysis/TextSearch2.aspx

Text Search - FDOT DRB System

Text Analysis

[[Home](#)] [[Text Analysis](#)] [[Structured Analysis](#)] [[Logout](#)]

The Text Analysis section allows a user to enter different terms, which will be searched for in all the reports. The best matches will be displayed first. The "an along with quotations can be used in the search to make it more specific or more broad. The wild card character can also be used in searches.

Here are some examples using the keywords:

- Ex. Concrete or Asphalt.
- Ex. Compensation and Payment
- Ex. "Work delay"
- Ex. Comp*

Done Local intranet 120%

start ex... W... W... Ne... Cal... Mic... te... p1... Te... Mic... 9.b... EN 4:32 PM



Search Results

Search Results - FDOT DRB System - Windows Internet Explorer

http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Analysis/textResults.aspx

Search Results - FDOT DRB System

Text Search Results

Select the number of reports per page: 5 Items

Showing reports 1 through 5 out of 30

Report ID	Report Name	Issues
20	194.PDF	Claim: Additional Work/Days Issue: Causation: Defective Designs/Specs/Plan Contractor specified location: 8-7.3.2 from Specification document Highway Component: Intelligent Traffic Systems Contractor specified location: 5-12.1 from Specification document Lessons Learned Meta-Data
2	1.PDF	Claim: Additional Work/Days Issue: Causation: Rework Contractor specified location: 4-3.2 from Specification document Highway Component: Bridge/Structure Lessons Learned Meta-Data
23	233.PDF	Claim: Additional Work/Days Contractor specified location: 8-7.3.2 from Specification document Issue: Causation: Pay Items & Quantity Contractor specified location: 5-10.2 from Specification document Highway Component: Asphalt Pavement Lessons Learned Meta-Data
27	124.PDF	Claim: Delays Contractor specified location: 8-7.3.2 from Specification document Issue: Causation: Defective Designs/Specs/Plan Contractor specified location: 2-5.1 from Specification document Highway Component: Bridge/Structure Lessons Learned Meta-Data

start | Local intranet | 120% | 4:33 PM



Maintenance

- Maintenance
 - DRB Member
 - Report Information



DRB Member

- This module allows a power user (e.g., system administrator) to create, modify and delete information related to a DRB member.
- Once a member is created, the member information can be used in the information input module.



Create a Member

Create Member - FDOT DRB System - Windows Internet Explorer

http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Maintenance/createMember.aspx

Create Member - FDOT DRB System

Create a Member

[[Home](#)] [[Create Member](#)] [[Edit Member Information](#)] [[Remove Member](#)] [[Logout](#)]

How To: Enter necessary information for the new account. Set proper Access Role, and click "Create Account" button.
Note: Accounts are given a default password. It is necessary to change this password in the "Edit Member Information" section.

First Name

Middle Initial

Last Name

Expertise

Resume

Access Role

Done Local intranet 120%

start ex... W... W... Ne... Cal... Mic... te... p1... Cr... Mic... 11... EN 4:35 PM



Remove a Member

Delete Member - FDOT DRB System - Windows Internet Explorer

http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Maintenance/deleteMember.aspx

Live Search

Delete Member - FDOT DRB System

Remove Member

[[Home](#)] [[Create Member](#)] [[Edit Member Information](#)] [[Remove Member](#)] [[Logout](#)]

How To: Click the Delete button next to a members name to make his or her account inactive.
If "Full Delete" is selected, the account will be removed permanently.

Full Delete

	ID	First Name	MI	Last Name	Username
Delete	194	Alan		Autry	AAutr194

Back

Local intranet 120%

start ex... W... W... Ne... Cal... Mic... te... p1... Del... Mic... 12... EN 4:36 PM



Modify Member Information

Edit Member - FDOT DRB System - Windows Internet Explorer

http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Maintenance/editMember.aspx

Live Search

Edit Member - FDOT DRB System

Modify Member Information

[[Home](#)] [[Create Member](#)] [[Edit Member Information](#)] [[Remove Member](#)] [[Logout](#)]

How To: Select a Member account to edit. Any previously entered information will appear. Make any necessary changes and then click the "Edit Account" button.

Note: To active an account, first select that account, check the "Set Account to Active" box, and finally click the "Edit Account" button.

First Name:

Middle Initial:

Last Name:

Expertise:

- Civil Engineer
- Civil Engineer
- Construction Manager
- Design Engineer
- Estimator
- Project Engineer
- Researcher
- Residential Engineer

Resume:

Access Role:

New Password:

Confirm Password:

	First Name	MI	Last Name	Username
<input type="button" value="Select"/>	Alan		Autry	AAutr194
<input type="button" value="Select"/>	John	S	Doe	DRB
<input type="button" value="Select"/>	Test		Test	TTest192

Done Local intranet 120%

start ex... W... W... Ne... Cal... Mic... te... p1... Edi... Mic... 13... EN 4:36 PM



Report Information Maintenance

- The report information maintenance allows a power user to
 - Maintain keywords used in the information input module such as the issue type,
 - Create an index for linking sections of standard documents such as an index for the 2007 standard specifications,
 - Edit metadata of a report that have been already created.



Keywords

Keywords - Windows Internet Explorer
http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Maintenance/Keywords.aspx

Keywords

[[Home](#)] [[Keywords](#)] [[Tree Index](#)] [[Edit Report](#)] [[Logout](#)]

How to:

Delete: Select the keyword you want to delete, then click the delete button.
When a keyword is deleted, you may be asked to select a keyword still available, in order to correct all reports that used the deleted keyword.

Revise: Select the keyword you want to revise, then click the revise button.
When a keyword is revised, you will be asked for the replacement keyword.
All reports using the old keyword will be corrected.

Add: Click the add button. You will be prompted for a new keyword to add.
It will be added to the list, and can be used by all new reports.

Member Expertise Keywords:

Civil Engineer	▲
Construction Manager	▾
Design Engineer	▾
Estimator	▾

Cause of Issue Keywords:

Defective Designs/Specs/Plan	▲
Different Site Condition	▾
Fuel Adjustments	▾
General Contract Interpretation	▾

Claim Type Keywords:

Additional Work/Days	▲
Constructive Change	▾
Delays	▾
Entitlement Issues	▾

Local intranet 120% 4:38 PM



Report Selection

Edit Report Wizard - FDOT DRB System - Windows Internet Explorer

http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Maintenance/EditReportWizard.aspx

Edit Report Wizard - FDOT DRB System

[Report Selection](#)
[Basic Information](#)
[Issue Information](#)
[Lessons Learned](#)
[Position Information](#)
[Recommendation](#)
[Upload Report](#)

Report Selection

Please select a report to edit and then click Next:

Report Name: ...

	Item
Select	10_6.PDF
Select	112_16.PDF
Select	113_31.PDF
Select	118_26.PDF
Select	11_38.PDF
Select	11_7.PDF
Select	124_27.PDF
Select	12_8.PDF
Select	134_17.PDF
Select	136_18.PDF

1 2 3 4

Done Local intranet 120%

start ex... W... W... Ne... Cal... Mic... te... p1... Edi... Mic... 15... EN 4:38 PM



Tree Index

Index Tables - Windows Internet Explorer

http://userappsunit.dot.state.fl.us/Construction/DisputeReviewBoard/Maintenance/createIndex.aspx

Index Tables

Tree Index

[Home] [Keywords] [Tree Index] [Edit Report] [Logout]

Previous Document Version:

Document Type: Standard Specification CPAM

Document:

Document Year:

Section (Format: D.X-X.X.X.X.X):

Section Section Title:

- [-] 1 General Requirements and Covenants
 - [+] 1.1 DEFINITIONS AND TERMS
 - [+] 1.2 PROPOSAL REQUIREMENTS AND CONDITIONS
 - [+] 1.3 AWARD AND EXECUTION OF CONTRACT
 - [+] 1.4 SCOPE OF THE WORK
 - [+] 1.5 CONTROL OF THE WORK
 - [+] 1.6 CONTROL OF MATERIALS
 - [+] 1.7 LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC
 - [+] 1.8 PROSECUTION AND PROGRESS
 - [+] 1.9 MEASUREMENT AND PAYMENT
- [-] 2 Construction Details
 - [+] 2.100 CONSTRUCTION EQUIPMENT-GENERAL REQUIREMENTS
 - [+] 2.101 MOBILIZATION
 - [+] 2.102 MAINTENANCE OF TRAFFIC
 - [+] 2.103 TEMPORARY WORK STRUCTURES
 - [+] 2.104 PREVENTION, CONTROL, AND ABATEMENT OF EROSION AND WATER POLLUTION
 - [+] 2.105 CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS
 - [+] 2.110 CLEARING AND GRUBBING
 - [+] 2.120 EXCAVATION AND EMBANKMENT
 - [+] 2.121 FLOWABLE FILL
 - [+] 2.125 EXCAVATION FOR STRUCTURES AND PIPE
 - [+] 2.145 GEOSYNTHETIC REINFORCEMENT
 - [+] 2.160 STABILIZING
 - [+] 2.162 PREPARED SOIL LAYER
 - [+] 2.175 CRACKING AND RESEATING EXISTING CONCRETE PAVEMENT
 - [+] 2.200 ROCK BASE
 - [+] 2.204 GRADED AGGREGATE BASE
 - [+] 2.210 REWORKING LIMEROCK BASE

Local intranet 100%

start ex... W... W... Ne... Cal... Mic... te... p1... Mic... 16... Ind... EN 4:42 PM



Questions?