

1-2011

Design Mentoring Tool

Bob McCullouch
Purdue University

Walter Land
Indiana Department of Transportation

Recommended Citation

McCullouch, B., and W. Land. *Design Mentoring Tool*. Publication FHWA/IN/JTRP-2011/02. Joint Transportation Research Program, Indiana Department of Transportation and Purdue University, West Lafayette, Indiana, 2011. doi: 10.5703/1288284314243

JOINT TRANSPORTATION RESEARCH PROGRAM

INDIANA DEPARTMENT OF TRANSPORTATION
AND PURDUE UNIVERSITY



DESIGN MENTORING TOOL

Bob McCullouch
School of Civil Engineering
Purdue University
Corresponding Author

SPR-3421
Report Number: FHWA/IN/JTRP-2011/02
DOI: 10.5703/1288284314243

This page intentionally left blank.

RECOMMENDED CITATION

McCullouch, B. *Design Mentoring Tool*. Publication FHWA/IN/JTRP-2011/02. Joint Transportation Research Program, Indiana Department of Transportation and Purdue University, West Lafayette, Indiana, 2011. doi: 10.5703/1288284314243

CORRESPONDING AUTHOR

Bob McCullouch
School of Civil Engineering
Purdue University
(765) 494-0643
bgm@purdue.edu

JOINT TRANSPORTATION RESEARCH PROGRAM

The Joint Transportation Research Program serves as a vehicle for INDOT collaboration with higher education institutions and industry in Indiana to facilitate innovation that results in continuous improvement in the planning, design, construction, operation, management and economic efficiency of the Indiana transportation infrastructure.
https://engineering.purdue.edu/JTRP/index_html

Published reports of the Joint Transportation Research Program are available at: <http://docs.lib.purdue.edu/jtrp/>

NOTICE

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views and policies of the Indiana Department of Transportation or the Federal Highway Administration. The report does not constitute a standard, specification or regulation.

This page intentionally left blank.

1. Report No. FHWA/IN/JTRP- 2011/02		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Design Mentoring Tool				5. Report Date 2011	
				6. Performing Organization Code	
7. Author(s) Bob McCullouch, Walter Land				8. Performing Organization Report No. FHWA/IN/JTRP-2011/02	
9. Performing Organization Name and Address Joint Transportation Research Program 550 Stadium Mall Drive Purdue University West Lafayette, IN 47907-1284				10. Work Unit No.	
				11. Contract or Grant No. SPR-3421	
12. Sponsoring Agency Name and Address Indiana Department of Transportation State Office Building 100 North Senate Avenue Indianapolis, IN 46204				13. Type of Report and Period Covered Final Report	
				14. Sponsoring Agency Code	
15. Supplementary Notes Prepared in cooperation with the Indiana Department of Transportation and Federal Highway Administration.					
16. Abstract <p>In 2004 a design engineer on-line mentoring tool was developed and implemented The purpose of the tool was to assist senior engineers mentoring new engineers to the INDOT design process and improve their technical competency. This approach saves senior engineers time while developing a consistent mentoring approach and standardizing technical knowledge in road and bridge design. It is a self-guided tool that utilizes multi-media and web-based technologies, trains engineers in the design process and provides resources to use for developing plans and specifications. Available resources include INDOT design practices, design standards, design memos, specification and construction standards, procedures, and check lists.</p> <p>When this tool was developed the Design Manual was under development. Therefore, the tool could not link to the Design Manual but to excerpted sections extracted from the Manual. Now active linking to this Manual is possible. Additionally other resources used in the design process: design standards, design memos, design procedures and checklists should be accessible in the various topics. These current resources have also influenced the technical content for the current 12 topics. An upgrade was performed to deal with these needs and to make the tool a living one, that is where future revisions in resources can be incorporated without a major overhaul to the application.</p>					
17. Key Words Mentoring, design, road, bridge, drawings			18. Distribution Statement No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22161		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages	22. Price

This page intentionally left blank.

EXECUTIVE SUMMARY

DESIGN MENTORING TOOL

Introduction

In 2004, an on-line mentoring tool for design engineers was developed and implemented. The purpose of the tool was to assist senior engineers in mentoring new engineers learning the INDOT design process and to improve their technical competency. This approach saves senior engineers time, provides a consistent mentoring approach, and helps standardize technical knowledge in road and bridge design.

It is a self-guided tool that utilizes multi-media and web-based technologies, trains engineers in the design process, and provides resources for them to use.

When this tool was created, the Design Manual was under development. Therefore, the tool could not link to the Design Manual itself, but to excerpted sections extracted from the Manual. Active linking to the Manual is now possible. Additional resources used in the design process included design standards, design memos, design procedures, and checklists, which should be accessible in the various topics. These current resources have also influenced the technical content for the current 12 topics. An upgrade was performed to deal with these needs and to

make the tool a living one where future revisions in resources can be incorporated without a major overhaul to the application.

For developing plans and specifications, available resources include INDOT design practices, design standards, design memos, specification and construction standards, procedures, and check lists.

Findings

This project upgraded the tool and its content. It eliminated some of the functions that were not used (e.g. backpack) and reevaluated the other functions. The site appearance was updated as well. A new resource is the addition of model bridge and road plans. These two plan sets show the drawing types and their content. This will help guide engineers as they develop a project's drawings. This upgrade provides new engineers with an on-line training source that facilitates consistency and uniformity in technical competency while improving the productivity for these engineers and their mentors.

Implementation

Since the project developed the online site, it serves as the completed body of work and the final report. The address is http://rebar.ecn.purdue.edu/indot_mentoring/

INTRODUCTION

In 2004, a design engineer on-line mentoring tool was developed and implemented. The purpose of the tool was to assist senior engineers mentoring new engineers to the INDOT design process and to improve their technical competency. This approach saves senior engineers time while developing a consistent mentoring approach and standardizing technical knowledge in road and bridge design.

It is a self-guided tool that utilizes multi-media and web-based technologies, trains engineers in the design process and provides resources to use for developing plans and specifications. Available resources include INDOT design practices, design standards, design memos, specification and construction standards, procedures, and check lists.

When this tool was created, the Design Manual was under development. Therefore, the tool could not link to the Design Manual, but to excerpted sections extracted from the Manual. Now active linking to this Manual is possible. Additionally, other resources used in the design process (design standards, design memos, design procedures, and checklists) should be accessible in the various topics. These current resources have also influenced the technical content for the current 12 topics. An upgrade was performed to deal with these needs and to make the tool a living one so that future revisions in resources can be incorporated without a major overhaul to the application.

ACTIVITIES

This project upgraded the tool and its content. It eliminated some of the functions that were not used (e.g. backpack) and reevaluated the other functions. The site appearance was updated as well. A new resource was the addition of model bridge and road plans. These two plan sets show the drawing types and

their content. This will help guide engineers as they develop a project's drawings. This upgrade provides new engineers an on-line training source that provides consistency and uniformity in technical competency while improving the productivity for these engineers and their mentors. This upgrade performed the following:

1. Updated technical content for correctness.
2. Applied appropriate Design Manual links and made them live and updateable. Since the Design Manual is currently going through a major revision with a scheduled completion in April 2011; the links will be to the appropriate sections which will have some consistency.
3. Established correct standard drawing links.
4. From past projects, select a bridge designs (concrete and steel), and road design, and develop model drawing sets. These will be excellent resources that new engineers can consult.
5. Included appropriate design memos.
6. Incorporated design checklists used in the design process.
7. The application is hosted and maintained on the JTRP server.

The site address is http://rebar.ecn.purdue.edu/indot_mentoring/. The home page is shown below.

Access is through login and password which can be applied for at the login button located at top of the home page. All INDOT employees have free access and other organizations have paid access.

The application features eleven technical topics and corresponding resources: Bridge plans, road plans, calculator, glossary, design resources, and project development guidelines. A portion of the main page is shown below.

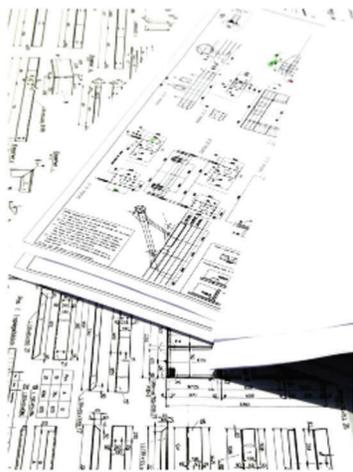
PROJECT SUMMARY

Since the project developed the online site, it serves as the completed body of work and the final report.

Design Engineer Training

ONLINE DESIGN TRAINING SERVICE

Student Login ▾



Welcome!

This site is an online training service on Road and Bridge design practices developed by Indiana Department of Transportation (INDOT) and Joint Transportation Research Program (JTRP) at Purdue University.

This site is paid access for organizations other than INDOT. The annual cost is \$100 per organization for one license (Login). Additional licenses are \$10 each. To obtain access please click on the Create New Account button.

PURDUE
UNIVERSITY



Search

[Contact](#) | [Sitemap](#) | [Privacy Statement](#)

Design Engineer Training

ONLINE DESIGN TRAINING SERVICE

bgm's Account ▾

Topic:

Tools:



Welcome, bgm !

1. Scope & Controlling Criteria

Most projects for construction throughout the state are initially identified by the INDOT District Offices. The purpose and need of a project must be identified by the District. A clear purpose and need statement is required to explain why this course of action is necessary in light of other alternatives. The needs are the specific deficiencies identified in a facility.

The Engineer's Report (Scope) will outline the proposed project. The designer is responsible for designing the project to comply with the intent of the Scope and the Design Manual. The designer is not to decrease any of the design criteria stated in the Scope, even though the Design Manual would permit a lesser value. Any proposed variances from level one design criteria shown in the Scope should be discussed immediately with your Section Manager as a proposed change in scope.

2. Horizontal Alignment

This section describes horizontal alignment issues of existing and new roadways. Horizontal curves, superelevation, horizontal site distance are the topics covered in this lesson.

7. Guardrail & Barriers

This topic explains when guardrails and barriers are needed. Provides examples of various end treatments, contains design references and requirements, and a design example.

8. Maintenance of Traffic

For most 3R type projects traffic will be traveling through the construction area. The designer will be required to provide details and special provisions in the plans and contract documents regarding maintenance of traffic. The designer should reference the following:

- Chapter 82 – Plan development and geometric design requirements.
- Chapter 83 - Taper rates, spacing of signage and barrels, and pavement marking requirements.
- Standard Drawings Section 801 – Advance construction signage.
- Standard Drawings Section 713 – Temporary Runarounds.

9. Right of Way