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BEST MANAGEMENT PRACTICES USED BY KYTC FOR ON-SITE EROSION CONTROL



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Research Report
KTC-06-35/SPR 311,312-06-1F

**Best Management Practices Used by KYTC For
On-Site Erosion Control**

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Commonwealth of Kentucky

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16. Abstract <p>New erosion control procedures (ECP) have recently been implemented by the Kentucky Transportation Cabinet (KYTC). Previously, consultants and designers developed the ECP as a part of the design plans. In many cases these did not work in the field. The new procedures allow construction personnel to develop and implement their own ECPs on site.</p> <p>This study conducted a survey of construction personnel in the KYTC to determine their level of familiarity with the new ECPs and to determine any issues that may have developed with the new procedures. The results of the survey concluded that most KYTC construction personnel were somewhat familiar with the new ECPs. Most respondents to the survey did not indicate any major issues with the ECPs. However, most respondents indicated they would like to have more training.</p> <p>It was recommended that an additional survey be conducted, in the future, two or three years after implementation of these new ECPs to determine if additional changes need to be made. It was further recommended that all new construction personnel be required to be trained in the new ECPs.</p>					
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EXECUTIVE SUMMARY

New erosion control procedures (ECP) have recently been implemented by the Kentucky Transportation Cabinet (KYTC). Previously, consultants and designers developed the ECP as a part of the design plans. In many cases these did not work in the field. The new procedures allow construction personnel to develop and implement their own ECPs on site.

This study conducted a survey of construction personnel in the KYTC to determine their level of familiarity with the new ECPs and to determine any issues that may have developed with the new procedures. The results of the survey concluded that most KYTC construction personnel were somewhat familiar with the new ECPs. Most respondents to the survey did not indicate any major issues with the ECPs. However, most respondents indicated they would like to have more training.

It was recommended that an additional survey be conducted, in the future, two or three years after implementation of these new ECPs to determine if additional changes need to be made. It was further recommended that all new construction personnel be required to be trained in the new ECPs.

1.0 INTRODUCTION

1.1 BACKGROUND

The Kentucky Transportation Cabinet (KYTC) has the responsibility to the Department of Water Resources to implement and maintain best management practices (BMP) for erosion control when it is performing construction operations for building highways. The current practice is to produce a BMP Manual with the plan of attack on how erosion control will be done, and document routine or event driven inspections with reports. These reports are not sufficient documentation to demonstrate to the Department of Water (DOW) inspectors that erosion control is being accomplished to the desired standards. There is also difficulty being able to communicate the desired levels of erosion control with the changing responsibility of contractors performing the on-site erosion control. Additionally, each DOW inspector also has his/her own unique standards of implementation. What is needed is to be able to have a documentation tool to be able to track implementation of the BMP and to demonstrate it to all interested parties as required.

Although most inspectors are able to do a good job at establishing and maintaining a good, environmentally-friendly jobsite, it would be more effective to establish specific guidelines and procedures to ensure that newer, less experienced inspectors would have the benefit of the more experienced inspectors. Additionally, new and alternative information may be implemented to broaden the horizons of delivery of environmental friendliness.

To assist construction personnel and contractors in making decisions on the job site concerning how to implement erosion, new BMPs for erosion control (ECP) have been developed (included in Appendix A). These are now being used on new construction projects. The KYTC indicated the need to determine if construction personnel and contractors were familiar with these procedures and what problems were encountered when using these procedures. This study was initiated to attempt to answer these questions.

1.2 STUDY OBJECTIVES

The following tasks were determined to be the original objectives for this study.

Task 1. Conduct literature reviews of current KyTC erosion control best management practices in use for highway construction projects. Work will include developing a survey to be sent out to resident engineers, district construction personnel, central office personnel, grade level II certified personnel and pre-qualified contractors.

Task 2. Based upon the work performed in Task 1, prepare a compendium of issues related to BMPs for erosion control. Work will include summarizing the survey results for KyTC central office personnel that will help in developing a better tracking program.

Task 3. Prepare a final report. Provide KYTC with a summary of survey results, and aid them in developing a tracking system for BMPs.

2.0 SURVEY

2.1 SURVEY

A literature search was initiated to list all the current KYTC erosion control management practices in use for highway construction projects and how they were being implemented. This included developing a survey that was sent out to all resident engineers, district construction personnel, central office personnel, Grade Level II certified personnel in all twelve districts and pre-qualified contractors. A copy of the Survey is listed in Appendix A. The questions in the survey were compiled by members of the Study Advisory Committee and the research team.

2.2 SURVEY RESULTS

The survey results were presented to Study Advisory Committee members on February 3, 2006. Since only KYTC employees responded to the survey when it was sent out first time, it was resent to all the contractors working for KYTC. No responses were received from any contractors. Survey results are summarized in Appendix B. The following statements are highlights of the responses from the survey.

- There were a total of 22 responses from construction personnel. District 11 had the most responses with five.
- Most respondents (13) indicated they were somewhat familiar with the new design procedures for developing ECP for construction projects.
- Most respondents (13) had used the new procedures.
- Only 50 percent of respondents were familiar with site-specific solutions (such as slope drains, sediment ponds, etc.).
- Most respondents (18) were at least *somewhat* comfortable with using the new procedures for developing ECP.
- Fourteen respondents indicated the need for more training in the new procedures.
- Some questions were raised by the respondents on specific issues such as –

How to handle erosion during major flood events,

Include wetland information on current projects,

Include drainage areas, peak discharges, or contours/elevations on construction plans to determine point discharges.

- Most respondents (16) felt that the new procedures have been effective in controlling erosion; however, one respondent indicated that the new ECPs are not applied consistently. It was not immediately clear what was meant by that comment.

3.0 CONCLUSIONS AND RECOMMENDATIONS

- The survey results provided good information that may be used in future Erosion Control Design Procedures and in-house implementation of ways and means for making decisions in the field.
- There exists a need for a detailed survey that includes all the contractors associated with KYTC and consultants/contract personnel involved in designing erosion control procedures.
- After the new ECPs have been implemented for two or three years another survey should be conducted to determine if further changes are necessary, or if updating of the procedures would be required.
- Current and future personnel should be trained and updated regularly on these ECP procedures.

4.0 APPENDICIES

APPENDIX A – New Erosion Control Design Procedure Survey Form

1. Which category do you belong to? (Underline One)
- i) District Office Personnel
 - ii) Central Office Personnel
 - iii) Consultant
 - iv) Contractor
 - v) FHWA
 - vi) Other (Please List) _____

2. How much experience do you have in developing ECPs?

	Total No. of Employees Involved in Developing ECPs and BMPs	Combined Experience
As a Firm		
As an Individual		

3. What references are used when ECPs are developed or designed? Please explain.
4. What type of training (certification) do you have and where did you get the training for developing ECPs?
5. Are you familiar with current design procedures for developing ECP for roadway projects? (See Attachment) (Underline one number)

Very Familiar **Somewhat** **Not Familiar**
5 **4** **3** **2** **1**

6. Have you used the current design procedures? (Underline one)

Yes **No**

7. Are you familiar with any site-specific solution (erosion/sediment control feature) that has been developed? (Underline one)

Yes **No**

If yes, explain what types were used? Please list.

8. Are you comfortable with using this type of ECP to develop your BMP?
(Underline one number)

Yes		Somewhat		No
5	4	3	2	1

9. Do you need training to know how to use this type of ECP to develop your BMP?
(Underline one)

Yes	No
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If yes, what type of training? Please list.

10. What questions do you have pertaining to the listed design procedures?

11. If training is required, should it be included as a part of the environmental content for construction inspection training, or should it be a separate training session?
(Underline one)

Part of Current Training

Separate Training

12. Are the suggested ranges for estimating quantities of probable erosion control features, methods, or practices close enough for bid purposes (see attachment)?
(Underline one)

Yes	No
------------	-----------

If not, please list any suggested changes.

13. What is your opinion of the portion of Section 213.03.02 which states in part, “*Upon failure to coordinate the erosion control measures with the grading operations in a manner to effectively control erosion and to prevent water pollution, the engineer will grading operations and withhold monies due on current estimates until all aspects of the work are coordinated in an acceptable manner. Additionally the department will apply a penalty equal to the liquidated damages when all aspects of the work are not coordinated in an acceptable manner within 5 days after written notification.*” (Underline one)

Agree

5

4

3

Disagree

2

1

Please list your reasons for your answer.

14. Were you aware of this section of the Standard Specification? (Underline one)

Yes

No

15. In your opinion, has the note been effective in controlling erosion and/or sediment on the project? (Underline one)

Yes

No

16. If you are a contractor, has your company ever received a written notification of non-compliance due to standard specification and/or KPDES permit?
(Underline one)

Yes

No

If yes, what was the outcome of this written notice?

17. Please list any other comments or suggestions you may have.

New Design Procedures For Developing ECP For Roadway Projects

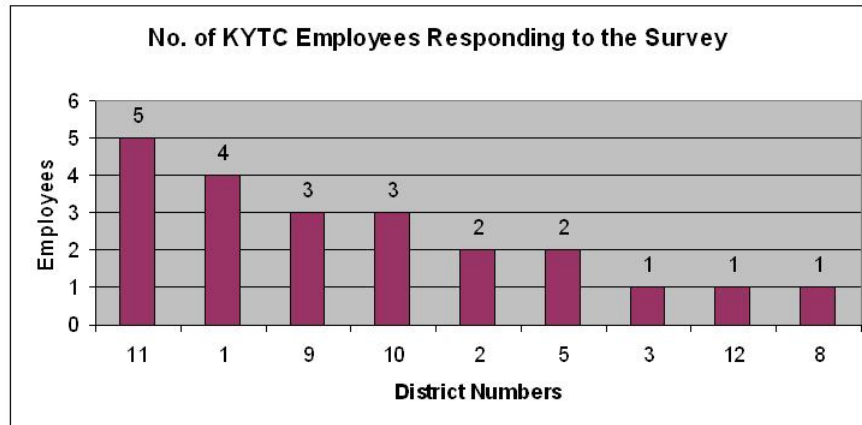
1. Determine the area to be disturbed in each drainage area. Show the limits of these disturbed areas on the erosion control plans. Break these areas down such that each area has a single point or overland flow discharge. Label each disturbed area with a unique identifier.
2. Develop table on each erosion control sheet that lists the disturbed drainage area in acres and the required sediment volume in cubic feet for each of the disturbed drainage areas.
3. Use symbols to label areas of concern; i.e. point discharges, areas of sheet runoff blue-line streams, wetlands, etc.
4. For point discharges with contributing drainage areas of 10 acres or more, note the 10 year peak discharge and the contributing drainage area.
5. Determine if there are site specific solutions such as a silt basin for point discharge from an area of 10 or more acres. This may include other erosion control features, methods or practices that are deemed critical in the development of the BMP. Be sure there is sufficient area (R/W or Drainage Easement) to construct the site specific solution.
6. Estimate reasonable quantities of each probable erosion control feature, method or practice for bid purposes. Remember that in most areas there is one problem (erosion prevention/sediment control) but there are usually several possible solutions----be sure the Contractor has flexibility.

Unless the Design Engineer has knowledge of factors which indicate other values should be used, the estimated quantities should be in the range of the following:

- 1) Temporary mulch---Sq. Yds. to cover the entire disturbed area once.
- 2) Silt Trap Type A --- One per acre disturbed
- 3) Silt Trap Type B --- One per acre disturbed
- 4) Silt Trap Type C --- One per acre disturbed
- 5) Clean Silt Traps (A,B&C) ---- Three times per construction season per trap
- 6) Silt Basin Sufficient cubic yards for site specific solutions if appropriate.
- 7) Silt Fence Linear feet equal to length of project
- 8) Temporary Silt Ditches --- Linear feet equal to one half length of project
- 9) Temporary Drainageways --- Linear feet equal to one half length of project
- 10) Erosion Control Blanket --- Sq. Yds. to line permanent ditches plus areas recommended by the Project Team.
- 11) Permanent Seed and Mulch --- Sq. Yds. to cover entire disturbed area minus areas which are permanently stabilized, i.e. pavement etc.
- 12) Sod --- Square yards for site specific solutions

APPENDIX B – Survey Results

1. Which Category do you belong to?



2. How much experience do you have in developing ECPs?

Total Experience = 111 Years

3. What references are used when ECPs are developed or designed?

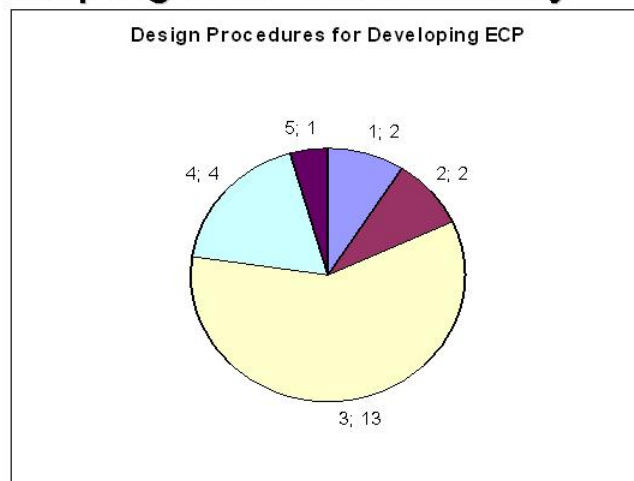
- KY Erosion Prevention and Sediment Control Field Guide.
- KYTC Drainage Manuals and Standard Drawings.
- KYTC Standard Specifications for Road and Bridge Construction.
- On Job Training and Erosion Control Plans in roadway plans.

4. What type or training (certification) do you have and where did you get the training for developing ECPs?

- No certification = 22
 - Erosion Control Class = 2
- FHWA and KYTC Training
- KY BMP for Construction prepared by KY Division of Conservation and Water.

5. Are you familiar with current design procedures for developing ECP for roadway projects?

1 Not Familiar
3 Somewhat
5 Very Familiar



6. Have you used the current design procedures?

Yes = 13

No = 9

7. Are you familiar with any site specific solution (erosion/sediment control feature) that has been developed?

Yes = 11 ■ Existing ponds within disturbed areas

No = 11 ■ Sediment Ponds

■ Silt Checks and Traps

■ Slope Drains

■ Erosion Blanket

■ Temporary Mulch

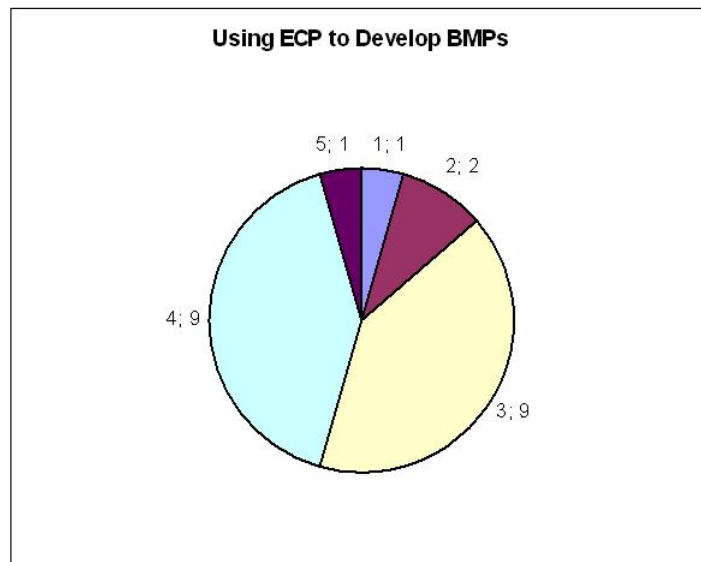
■ Diversion Ditches

8. Are you comfortable with using this type of ECP to develop your BMP?

1 Not Familiar

3 Somewhat

5 Very Familiar



9. Do you need training to know how to use this type of ECP to develop your BMP?

- Yes = 14
- No = 8

Suggestions Include

Training both KYTC employees and contractors in all aspects of erosion control.

Basic guidelines, application and various devices to be used.

Good examples of BMPs that have worked around the state.

10. What questions do you have pertaining to the listed design procedures?

- How to handle erosion during major flood events?
- Including wetland information on current projects!
- Include drainage areas, peak discharges, or contours/elevations on construction plans to determine point discharges.

11. If training is required, should it be included as a part of the environmental content for construction inspection training, or should it be a separate training session?

- Part of current training = 11
- Separate training = 9
- Both = 2

Comment-

Both the designer and constructor needs to be aware of both sides of situations

12. Are the suggested ranges for estimating quantities of probable erosion control features, methods, or practices close enough for bid purposes?

- Yes = 15
- No = 7

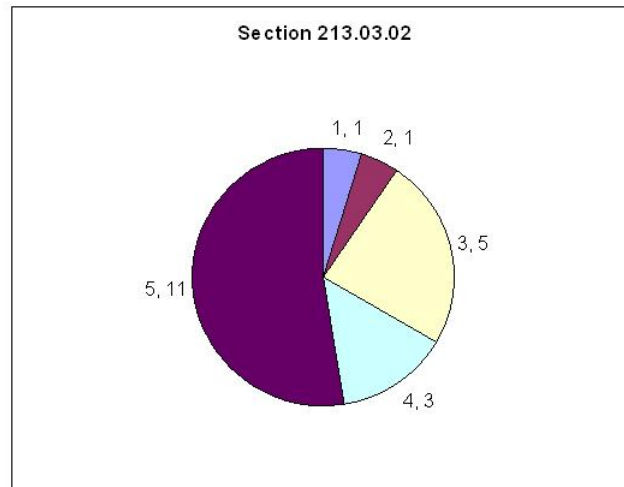
Comments

Quantities should be site specific.

Need to discuss/address construction entrances-
paid for by owner or contractor.

13. What is your opinion of the portion of section 213.03.02 ?

- 1 Not Familiar
- 3 Somewhat
- 5 Very Familiar



14. Were you aware of this section of the Standard Specification?

- Yes = 19
- No = 3

15. In your opinion, has the note been effective in controlling erosion and/or sediment on the project?

- Yes = 16
- No = 6

Comment – Not applied consistently

17. Please list any other comments or suggestions you may have.

- Take erosion control aspect out of the hands of small DBE's and make prime more responsible.
- Don't over design for nature, just give it the tools and materials to heal itself in a short time.
- Training required for DO personnel involved in ECP.

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