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**Process Review of the Final Acceptance
for Federal-Aid Highway Projects in
Kentucky**

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Executive Summary

Federal funds for highway construction projects must comply with federal and state regulations. In Kentucky, the Kentucky Transportation Cabinet (KYTC) with the assistance of the Federal Highway Administration (FHWA) administers the federal-aid highway program. FHWA and KYTC ensure quality of highway projects by inspections of activities conforming to plans, specifications and cost estimates; as well as with the testing of materials used in the project.

During the last five years, an emphasis stemming from reports of the US DOT Office of Inspector General (OIG) and US General Accountability Office (GAO) related to the financial processes in place to administer the federal-aid highway program has led to an agencywide review of all processes related to the finance program area. Inactive projects is one of several items that the recent FHWA FIRE Order require both FHWA and KYTC to review and improve processes enabling a better and expedited delivery of funds, as well as enhanced documenting techniques of administrative decisions. One of those processes with inactive projects is the closeout of projects, termed “*Final Acceptance Process*”, required per federal requirements included in the 23 Code of Federal Regulations and the 2004 Kentucky Standard Specifications for Road and Bridge Construction.

This research intends to address three questions: (1) how does the *Final Acceptance Process* work in Kentucky, related to its timeliness and completion of all requirements; (2) if the process does not work as designed, why does it take so long and why it is not completed with all requirements; and (3) whether the process works differently depending on whether it is state or federal and non-interstate or interstate. A process review was conducted to assess the requirements, steps and stakeholders involved in the *Final Acceptance Process*. Interviews and statistical analysis using an historical database of construction projects with both timeframes and funding information were used to achieve this process review. The literature review provided insight of the importance of processes and its relationship with total quality management and performance measures.

Among the findings of this report include the diagramming of the process based on the requirements per federal and state regulations and specifications, as well as the way it is being currently used. The lack of completion of required documents, such as the *FHWA-47* and *Materials Certificate* were found to be the major reasons why FHWA has been unable to complete their *FHWA Final Acceptance Report*, the final step in the *Final Acceptance Process*. Statistical analysis showed that there was not much of a difference in the management of the process for interstate and non-interstate projects. A key finding from this analysis was that approximately 30% of all completed projects were found to be finally paid by KYTC without having the *FHWA Final Acceptance Report* completed, an item intended to assure quality from both federal and state requirements, due primarily to missing the *Materials Certificate* and *FHWA-47* forms.

A series of recommendations were provided to improve the *Final Acceptance Process*, including (1) FHWA and KYTC’s stakeholders need to engage themselves to learn, use

and improve the *Final Acceptance Process* to their agreement, (2) development of performance goals and measures, (3) definition of roles for stakeholders and users of the process, (4) rollout of guidance provided by the top management from both agencies, as well as (5) training relating the requirements, steps and accountable parties.

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Problem Statement

Highway projects in Kentucky that use federal funds must comply with both federal and state regulations, which require the State Transportation Agency in Kentucky – the Kentucky Transportation Cabinet (KYTC) – to perform activities ensuring both quality in the construction of projects and efficient management of authorized federal-aid funds. Federal-aid highway funds are used to reimburse KYTC’s eligible programs and projects, and are administered by the Federal Highway Administration (FHWA), an agency under the U.S. Department of Transportation.

During recent years, the financial management of federal-aid highway projects has become an important aspect of oversight, as it is evidenced with the emphasis of performing reviews in the financial area of the federal-aid highway program, as well as US DOT Office of Inspector General (OIG) and US General Accountability Office (GAO) reports. State certifications from both engineering and financial program areas are required for federal-aid highway reimbursement of funds paid by the States. Based on KYTC requests to close several federal-aid projects that are financially inactive or completed, and the inability for FHWA to ensure that the project meets its engineering acceptance requirements, has led both agencies to look at whether the process devised is working effectively and whether improvements can be made.

FHWA and KYTC ensure quality of highway projects by inspections of activities conforming to plans, specifications and estimate (PS&E), as well as with the testing of

materials used in the project. Two separate engineering divisions within KYTC lead these two distinct processes: the Division of Construction (inspections) and the Division of Materials (materials testing and acceptance). Work performed and materials used by the contractor in each project are inspected and accounted for in a bi-weekly estimate by Resident Engineers, who are assigned to the KYTC District Office. The bi-weekly estimate is then reviewed and certified by construction management personnel at the District office, and then submitted to the Central Office of the Division of Construction (which performs a final review and certification), which then submits it to the Division of Accounts to finally pay the contractor. These bi-weekly payments, called “progress payments”, are then sent as requested reimbursement to the FHWA in what are termed as “vouchers”.

The average time it takes from awarding the contract to calling a project complete is about 3 years. Based on the Kentucky 2004 Standard Specifications for Road and Bridge Construction, a *Final Inspection* by both FHWA and KYTC must be conducted within 90 days of a project being called complete. Typically, the results of these final inspections require the contractor to perform corrective work. At this stage, projects are almost paid-up to the contractor, with the exception of a percentage left in an item called “demobilization”, which accounts for 1.5% of the total bid of the contract.

When corrective work has been completed, a subsequent inspection is performed by KYTC (i.e., *Formal Acceptance*). By this time, typically a project is in its 4th year and the contractor is normally released of its contractual obligations and paid all outstanding

costs by KYTC, including demobilization. Corrective work includes the completion of the federal form *FHWA-47* (i.e., Statement of Materials and Labor), a requirement specified in both the Kentucky Standard Specifications and the contract documentation. Projects under \$1 million dollars are exempt of this requirement.

For KYTC to submit a “final voucher” to FHWA (effectively closing the project in financial and contractual terms), *Final Acceptance* by FHWA is required to certify that the project conforms to plans and specifications. *Final Acceptance* by FHWA requires both the *FHWA-47* form completed by KYTC and its contractor, as well as certification of testing and acceptance of materials used by the contractor to accomplish the work required (i.e., *Materials Certificate*). The processing and coordination of these two items take considerable time after the project has been finally inspected. Based in a recent project file review of two KYTC Districts, it takes between 2 and 4 additional years after performing the *Formal Acceptance* by KYTC to get these documents for FHWA to perform its *Final Acceptance*. That means that a project could theoretically be authorized federal-aid funds during its 1st year, but not closed until its 8th year after its award.

By its minimum amount of 1.5% of the project total cost, “demo” funds remaining in a project may not appear to be a significant amount for KYTC nor its contractors to be concerned. When 10 projects with an average cost of \$10 million are completed and formally accepted by KYTC and are not federally closed, funds not yet reimbursed could add up to \$1.5 million dollars. If we have similar situation happening for three consecutive fiscal years, it could amount to \$4.5 million dollars not being reimbursed and

unused by KYTC. This hypothetical situation appears to have been happening in Kentucky. In fact, the sum of authorized funds for interstate projects yet to be reimbursed during fiscal years 2003, 2004 and 2005 is claimed to be approximately \$22 million. This has heightened the concerns from the OIG and the GAO regarding the reasons why these federal-aid funds are not being reimbursed nor processed for a considerable amount of time after being authorized.

Literature Review

Organizations, such as government agencies, have developed systematic approaches to manage their limited resources of time, personnel and costs. This organizational system follows a coordinated methodology based on its strategic planning, from its mission to its impact in the organization's delivery, while keeping focus in quality and efficiency. An understanding of management concepts such as policies, programs, projects and processes is essential in the effective administration of public organizations.

Organizations develop plans of action to guide and administer their decisions. These plans of action, also referred as *policies*, are general principles by which an organization is guided in its management of public affairs.¹ Policies may not necessarily require a sequential approach of actions; rather, they establish strategies to manage and address a certain subject, such as contract time for highway projects. The Kentucky Transportation Cabinet's Design Memo 08-05 is an example of a policy requiring projects to have established either fixed completion date or maximum working days.²

Government agencies deliver their products and services through *programs* designed to achieve their mission and goals.³ A program is essentially a group of projects that are directed toward a common goal, such as improving highway safety. Programs have the distinction to be geographical in nature, by encompassing large jurisdictions such as state, regional, county or city. They also often have certain requirements and/or conditions that set eligibility criteria for these projects. For example, to be a participant of the federal-aid highway bridge replacement and rehabilitation program, bridge replacement projects must be included in the National Bridge Inventory and National Bridge Inspection Standards database system. This database establishes a ranking of projects based in their sufficiency ratings, which is a composite index in terms of structural stability and durability of its members based on known facts of the materials and maintenance performed by the transportation agency.⁴

Organizations perform work, which generally involves *projects* and *processes*. Although projects and processes are performed by people, constrained by limited resources, and are planned, executed and controlled, they are both differentiated by the fact that projects are temporary and unique while processes are ongoing and repetitive.⁵ *Projects* are a group of activities to develop a specific product or service, while having specific time periods, such as a beginning and an end. An example of a project is the widening of I-64 between Lexington and Winchester, which would add capacity and minimize traffic congestion to that section of interstate highway.

Different from projects, *processes* are a designed sequence of events, taking up time, space, expertise and/or other resources, to produce an outcome (Wikipedia, 2006). Processes control characteristics and behaviors that create consistency in the delivery of programs and projects. They can detect the need for change and even act as indication for the replacement of unprofitable methodologies or practices.⁷ Processes can be evaluated as part of an assessment of whether necessary changes are warranted to assist organizations in their continuous improvement to achieve and improve their quality and productivity. An example of a process is the Plans, Specifications and Estimate (PS&E) process required for all projects. Different divisions of the Kentucky Transportation Cabinet's central office and district personnel help assemble the PS&E package, a requirement for projects to be funded with federal-aid funds.

The importance of process relies on two key issues: efficiency and scalability.⁸ Documenting the steps needed to perform activities repeatedly saves time, energy and resources, which ultimately leads to higher efficiencies at the individual and institutional level. As for scalability, the means of documenting the process not only allows it to be improved by current users, but also it could be provided for future users and other stakeholders to learn what is needed to be done in an organization. In that sense, quality is enhanced, as activities are documented and able to be transferred to other parties within and outside the organization.

Process, quality and their relationship with highways

Since 1893, United States involved itself in a dramatic and dynamic era of changes. Gathering agricultural and mineral resources from the rural areas of the country to the cities and ports was becoming more difficult and costly to prospective buyers.⁹ Federal, state and local governments used their financing tools to connect and improve existing commercial routes via water and rail. The automobile boom made government agencies focus on capital programs to reconstruct or build new roads. It was during the first part of the 20th century that the federal government took the lead in helping create the organization of State Departments of Transportation, which consequently formed the American Association of State Highway and Transportation Officials (AASHTO).

Efforts to incorporate total quality management (TQM) in not only technical but also administrative areas were being pursued within the federal government in the late 1970's, when several large American corporations adopted the techniques that enabled the Japanese to be so successful.¹¹ The Federal Quality Institute defines TQM as “a comprehensive customer-focused system...to improve the quality of products and services. It is a way of managing the organization at all levels, top management to front-line to achieve customer satisfaction by involving all employees and continuously improving the work processes of the organization.”¹² The federal government formally became a participant in TQM with a presidential executive order in February 1986. That order established a government-wide effort to improve the productivity, quality, and timeliness of government products and services.

To transportation officials, quality typically relates to pavement smoothness and durability, adherence to budget and schedules, and improved road safety.¹¹ In 1990, FHWA sponsored a quality management workshop under Demonstration Project 89 to develop recommendations for future construction quality management activities. This forum stemmed from the development of the Baldrige National Quality Program, which is the basis for the Federal Highway Administration's Strategic Plan to measure performance.¹⁴ The group recommended development of a national initiative on quality, including a national statement of policy, developed jointly by FHWA, AASHTO, industry and academia. The National Quality Initiative was instituted in 1992, evolving to the National Partnership for Highway Quality (NPHQ) in 2000. NPHQ's chief mission is to advocate for the roadway customer's demands -- for practices and programs that ensure our highways operate at peak performance now and into the nation's bright future.¹³ These have been the principles of continuous process improvement that FHWA has pursued since the development of its National Strategic Plan¹⁵ to manage its programs and processes used in federal-aid projects.

Two other events influenced the States to adopt quality management in the 1990s. One was the completion of the interstate highway system in 1990.¹⁷ This, along with the passage of the federal transportation acts in 1991 and 1998, required FHWA and the State Transportation Agencies to develop a new policy on stewardship and oversight of the federal-aid highway program. Increased knowledge of effective highway management programs and funding levels, while reduction in size of the public sector staff caused a rethinking in the way agencies would administer their programs and projects.¹⁸ Quality

assessment tools were developed, such as program and process reviews, to evaluate stewardship and oversight activities.

One of the processes that FHWA and KYTC have been closely monitoring during the last couple of years has been the closing of projects, referred as *Final Acceptance Process*. *Final Acceptance processes* are required for all federal-aid highway projects in the United States.²⁴ Kentucky, as many other States such as Alaska, North Carolina and Washington, seems to have difficulties in the administration of this process.^{31, 32, 33}

Although the *Final Acceptance Process* has a technical quality component, it is the efficiency of the management of funds authorized to build the project which has been the factor that has prompted both FHWA and KYTC, as well as other independent agencies such as the General Accountability Office (GAO) and the U.S. Department of Transportation's Office of Inspector General (OIG), to review and investigate whether processes are in place and adequate administration of federal-aid funds is provided.¹⁶

Of a primary concern for both GAO and the OIG are federal funds that are authorized but for some reason they are not spent or billed within a certain period of time, such as within a fiscal year. This situation results in a project becoming financially "inactive", defined as no costs billed to FHWA during the past 12 months. To support its annual certification of internal and financial statements, the FHWA issued the Order 4560.1, establishing the Financial Integrity Review and Evaluation (FIRE) Program.¹⁹ FIRE is intended to review

several financial elements, including inactive projects. This project intends to provide insight with issues of inactive projects from the construction program perspective.

Research Design

The following are the research questions for this capstone project:

1. *How does the process work, related to its timeliness and completion of all requirements?*
2. *If the process does not work, why does it take so long and why it is not completed with all requirements?*
3. *Does the process work differently depending on whether it is non-interstate or interstate project?*

To answer the research questions, we must understand the requirements and processes. An implementation analysis of the time it takes both FHWA and KYTC to perform individual final inspections and acceptance must be performed, to observe not only potential similarities and/or differences between the timeline of the two agencies' processes, but to also identify trends that could lead to learn its historical context with the changes in each organization as well as the fiscal conditions per fiscal year. A review of project data, including both FHWA and KYTC reports and the dates when those reports are completed, must be done to assess time between each of these reports and seek for areas of improvement. Descriptive analysis could be performed to assess criticality of data, time and/or other issues.

Therefore, a sample of federal-aid highway projects (with its timelines) during the last 20 years performed in the Commonwealth of Kentucky should provide the information necessary to perform these analyses. Time will be measured in periods within FHWA and KYTC engineering processes (days and years). Money will also be measured from the standpoint of quantities of federal-aid funds authorized, obligated and withheld in State fiscal year basis.

Data of approximately 1,600 federal-aid projects that KYTC has awarded during the last 20 years are available for this project, and this encompasses both interstate and non-interstate projects. To be able to manage the volume of this data, an aggregate analysis was used to combine project data (i.e., time and costs) in annual basis.

This data was gathered using the following sources:

- ✓ Administrative data showing federal-aid project identification attributes and dates of its corresponding inspections, acceptances and final payments are readily available through KYTC.
- ✓ Engineering process and its requirements are available through federal regulations (23 CFR), guidance and technical memoranda, as well as through the 2004 Kentucky Standard Specifications for Road and Bridge Construction.
- ✓ Interviews with FHWA and KYTC officials which provided additional information regarding both organizational and procedural analysis, as well as

addressing knowledge of process and contract requirements to determine whether training is needed and what would be the extent of it.

Data Analysis

Process Diagramming

In September of 2005, FHWA and KYTC personnel involved in tasks related to construction management from central and district offices were asked to review the requirements for *Final Acceptance*, as specified in the Code of Federal Regulations (23 CFR) as well as the Kentucky Standard Specifications for Road and Bridge Construction. The KYTC *Final Acceptance Process* was diagrammed and documented with its corresponding requirements based on the two policy documents, as well as current administrative practices.

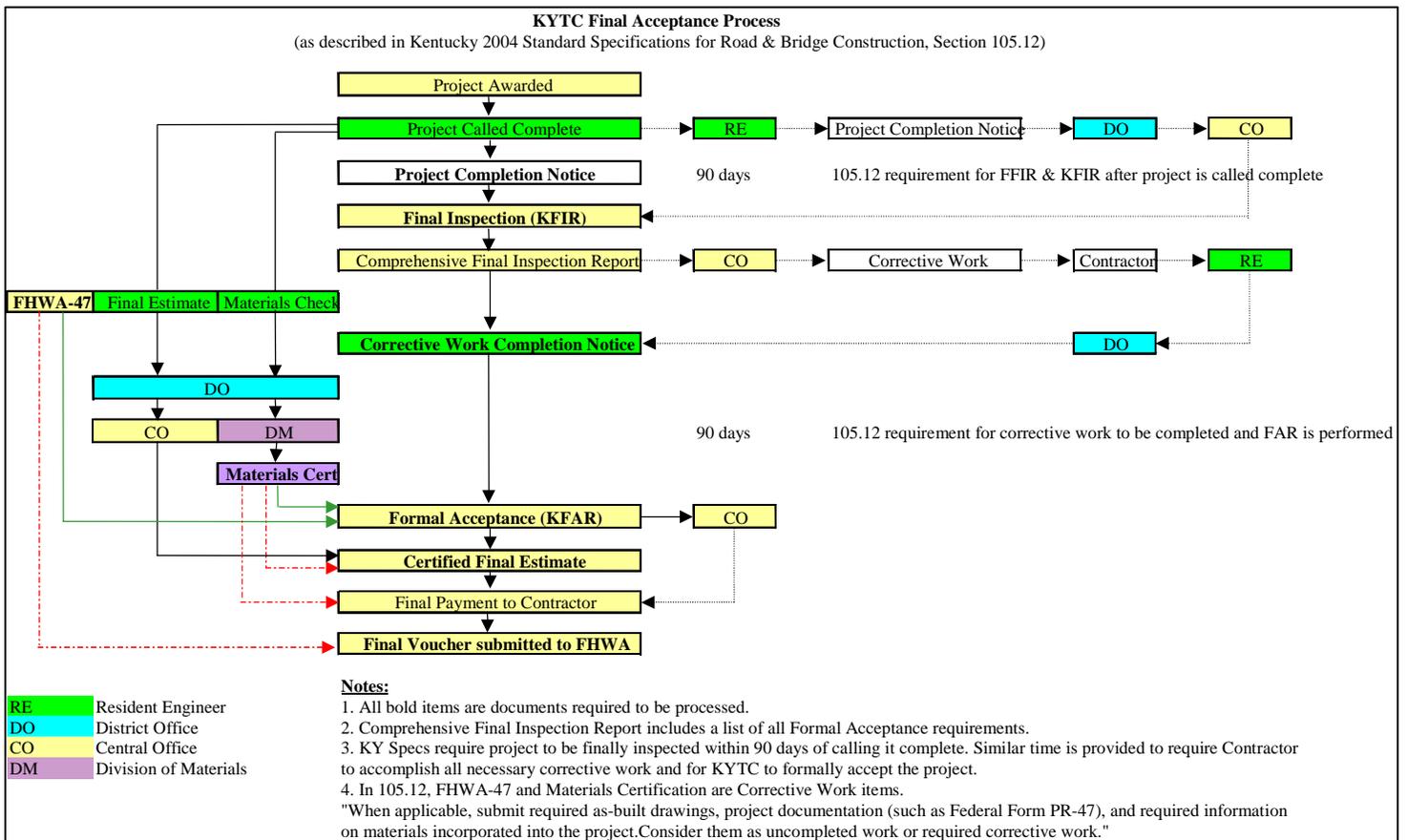


Figure 1. KYTC Final Acceptance Process

The *Final Acceptance Process*, as shown in Figure 1, consists of several steps led by different groups. The beginning of this process is when a project is awarded by the Division of Construction Procurement, housed in the Central Office (CO) at the Transportation Cabinet Office Building in Frankfort. Depending of the time stipulated in the contract, the project is finished and *called complete* by the Resident Engineer (RE). The RE will issue a *Project Completion Notice* and submit it to the District Office (DO), which is forwarded to the Division of Construction (CO). This notice will effectively start the process set up in Section 105.12 of the Kentucky Standard Specifications for Road and Bridge Construction. This section requires for the CO personnel assigned to conduct

Final Inspections in the items requested within the *Project Completion Notice*, such as structures and traffic control devices, within 90 days after the project is called complete. This 90-day rule is also intended for FHWA to follow on “full oversight projects” (i.e., interstate and any new Ohio River crossing), although federal regulations do not establish a limit in the time after a project is called complete.

When the project is called complete, it also initiates the materials sub-process that involves the RE’s crew, District Materials personnel and the Division of Materials at the Central Office (DM); as well as the final estimate of the quantities paid to the contractor. The materials sub-process allows for review of the testing and acceptance of materials that has occurred at both the field and at the Central Office, merging it all together for the District Materials Engineer, and subsequently the DM Director in Central Office, to certify the acceptance of the materials used in the project. Although no time limits have been devised for this sub-process to complete these tasks in neither the federal regulations nor the Kentucky Standard Specifications, it is intended for the *Materials Certificate* to be submitted to the Division of Construction (CO) just prior to the formal acceptance of the project. A copy of the *Materials Certificate* must also be submitted to FHWA on projects with full oversight.

After KYTC performs its *Kentucky Final Inspection Report (KFIR)*, a *Comprehensive Final Inspection Report* is prepared by the CO personnel and sent to the DO personnel and RE. Typically, corrective work is required to formally accept the project, and this report describes the deficiencies that must be corrected by the contractor. If no corrective

work is warranted or needed, CO issues its *Kentucky Formal Acceptance Report (KFAR)*, which releases the contractor of their responsibilities with their contract, and prepares the stage for its final payment.

The *FHWA Final Inspection Report (FFIR)* is performed on full-oversight projects normally within the same timeframe or after the *Kentucky Final Inspection Report (KFIR)* is conducted. Among the common observations provided in the *FHWA Final Inspection Report (FFIR)* is the need for KYTC to complete the form *FHWA-47*, along with the *Kentucky Formal Acceptance Report (KFAR)*, the *Materials Certificate* and the *Liquidated Damages Report* (if warranted). The Kentucky Standard Specifications details that "[w]hen applicable, submit required as-built drawings, project documentation (such as Federal Form PR-47), and required information on materials incorporated into the project. Consider them as uncompleted work or required corrective work." Therefore, these documents, including the *FHWA-47* form, should be completed prior to the *Kentucky Formal Acceptance Report (KFAR)*, which is delineated in Figure 1 as green solid lines.

If corrective work was required, the RE prepares the *Corrective Work Completion Notice* when the contractor finishes warranted corrective work. This form is routed to the DO construction personnel, and then to the Division of Construction (CO). The Kentucky Standard Specifications requires for the contractor to perform corrective work within 90 days when the RE issues the report on or between March 1st and September 30th of the current year, or by June 1st of the later year when the RE issues the comprehensive final

inspection report on or between October 1st of one year and February 28th of the next year. Therefore, another 90-day rule is also intended, in this case for the contractor, to perform corrective work.

When all incomplete and required corrective work is finished, the Division of Construction (CO) will prepare the *Kentucky Formal Acceptance Report (KFAR)* of the project and take responsibility for the project. This notice is sent to the Final Estimate Branch (CO), Division of Accounts (CO) and to the FHWA (only on full-oversight projects). The Final Estimate Branch will receive the draft Final Estimate from the DO, and their review and certification that quantities and payments are correct (i.e., *Certified Final Payment*) is then sent to the Division of Accounts (CO) to process the *Final Payment to the Contractor*. The Division of Accounts finally prepares and submits the *Final Voucher to FHWA* for its fiscal management section to process payment to KYTC, as originally authorized prior to the project being let.

The *FHWA Final Acceptance Report (FFAR)* is prepared on full-oversight projects after the *Kentucky Formal Acceptance Report (KFAR)* is received. The *FHWA Final Acceptance Report (FFAR)* is then sent to the Division of Construction (CO), Division of Accounts (CO) and the FHWA fiscal management section to assert federal acceptance of the project and require KYTC to submit their *Final Voucher*.

This process is also valid for non-interstate federal-aid projects, per the FHWA/KYTC Stewardship and Oversight Agreement requirements.²²

Methodology of the Descriptive Analysis

The analysis for this process review was performed based on data obtained from the KYTC CPES (Construction Project Estimate System), which was exported to Microsoft Excel format. CPES data contained 1,682 federal-aid projects awarded between 1981 and 2005, including the following contract and performance data.

| <i>Contract Data</i> | <i>Performance Data</i> |
|-----------------------------------|--|
| District | Project completion date |
| Project construction number (PCN) | Date of Final Inspection Report performed by KYTC |
| Federal-aid project number | Date of Final Inspection Report performed by FHWA |
| Route | Date of Formal Acceptance Report performed by KYTC |
| Contractor | Date of Final Acceptance Report performed by FHWA |
| Letting date | Final Payment performed by KYTC |
| Project beginning date | Date of Final Payment performed by KYTC |

To assess effectiveness of the process for both interstate and non-interstate projects, as well as to ensure homogeneity in the data sampling, projects let in 2005 were not included in the analysis. Analysis of the data obtained for the 2005 projects showed that all of these projects did not include data for the performance data column; hence, showing that the project has not being completed within that year. This reduced the total number of federal-aid projects sampled to 1,635.

Under the current FHWA/KYTC Stewardship and Oversight Agreement²² some project approval and oversight activities were delegated to the KYTC. Primarily, all non-

interstate project final design and construction activities were delegated, while FHWA kept “full oversight” (i.e., planning, design, utilities, right-of way and construction) of interstate projects and any new Ohio River crossings. Therefore, as projects were distributed in two separate sample groups (i.e., interstate and non-interstate), further data review and reduction were required to achieve simplicity in the analysis. Data review included the identifying and coding of data cells, which originally did not have any data incorporated in them. These data cells were further excluded from the reduction analysis.

Individual project data from 287 interstate (18% out of 1,635) and 1,348 non-interstate (82% out of 1,635) projects was then reduced to the following data attributes (code names in parenthesis):

| <i>Reduced Contract Data</i> | <i>Reduced Performance Data</i> |
|---|---|
| District | Date of Final Inspection Report performed by KYTC (KYTC FIR) |
| Project construction number (PCN) | Date of Final Inspection Report performed by FHWA (FHWA FIR) |
| Federal-aid project number (Fed Proj No.) | Date of Formal Acceptance Report performed by KYTC (KYTC FAR) |
| Letting date (Letting) | Date of Final Acceptance Report performed by FHWA (FHWA FAR) |
| Project beginning date (Proj Began) | Date of Final Payment performed by KYTC (Fin Pay) |
| Project completion date (Proj Compl) | |

Analysis of selected attributes of the data led to an even more simplified approach of managing the entire individual project data and allowed it to be aggregated into annual averages for each of the two sample groups. Quantity of projects that completed required administrative construction tasks and the average times it took for either KYTC and

FHWA to complete such tasks were assessed. The following are analytical attributes obtained through this process:

| | |
|----------------|---|
| KFIR | Number of projects with KYTC Final Inspection Report completed |
| KFIR % | Percentage of projects with K FIR completed |
| KFIR Avg T | Average time between Project Completion and K FIR (days) |
| KFAR | Number of projects with KYTC Final Acceptance Report completed |
| KFAR % | Percentage of projects with K FAR completed |
| KFAR Avg T | Average time between K FIR and K FAR (days) |
| FFIR | Number of projects with FHWA Final Inspection Report completed |
| FFIR % | Percentage of projects with F FIR completed |
| FFIR Avg T | Average time between Project Completion and F FIR (days) |
| FFAR | Number of projects with FHWA Final Acceptance Report completed |
| FFAR % | Percentage of projects with F FAR completed |
| FFAR Avg T | Average time between F FIR and F FAR (days) |
| K Pay T | Average time between KYTC Final Pay and K FAR |
| F Pay T | Average time between KYTC Final Pay and F FAR |
| Paid in Adv | Number of projects that have been finally paid without a FFAR |
| % Paid in Adv | Percentage of projects that have been finally paid without a FFAR |
| Compl to Pay | Average time between Project Completion & Fin Pay (days) |
| T KFAR (years) | Average time between KFAR & Fin Pay (years) |
| T FFAR (years) | Average time between FFAR & Fin Pay (years) |

To focus in the entire process, two additional analytical data attributes were obtained:

| | |
|----------------|--|
| T KFAR (years) | Average time between Proj Compl & KYTC FAR (days, years) |
| T FFAR (years) | Average time between Proj Compl & FHWA FAR (days, years) |

Along with its initial meeting, the *Joint Process Review Team* held two additional meetings to review findings from the process diagramming and descriptive statistical analysis, as well as to address the reasons why *Final Acceptance* was not being conducted as devised in the Kentucky Standard Specifications. Specific recommendations stemmed from these two meetings.

Informal interviews were conducted with KYTC Resident Engineers during project intermediate inspections and other FHWA Transportation Engineers while conducting routine office activities, such as design and/or construction project reviews. These interviews were intended to ascertain the level of knowledge and involvement of the Resident Engineers and Transportation Engineers. Four (4) KYTC Resident Engineers, two (2) FHWA Transportation Engineers, two (2) management employees from the KYTC *Division of Materials* and one Section supervisor from the Division of Accounts who is involved with *Final Vouchers* were asked similar questions as the ones discussed by the process review team.

Results and Findings

Research Question 1: How does the process work, related to its timeliness and completion of all requirements?

Current practices managing these two required documents are shown in dashed-red lines in Figure 1, while green solid lines show how the process ought to be. It can be observed that the process differs in the latter steps and in relationship to selected steps to document and/or certify materials.

Although the Kentucky Standard Specifications recognizes two 90-day periods it should take for both the FHWA and KYTC to conduct the *Final Inspection Reports* after completing a project, as well as to complete the *Formal Acceptance Reports* after

receiving notification that all corrective work has been completed and certified, certainly these time periods are more of a guide than a requirement. As shown in the descriptive analysis, *Final Inspection Reports* are normally completed within the first 90-day period, but the *Formal Acceptance Reports* usually are not completed within the second 90-day period. The latter is primarily due to the unavailability of the *Materials Certificate* and the *FHWA-47* for FHWA to conduct their *Final Acceptance Reports*.

While the *Materials Certificate* is often finished and submitted after the *Kentucky Formal Acceptance Report (KFAR)* is completed (i.e., either by the time the *Certified Final Estimate* or the *Final Payment to the Contractor* is performed), the *FHWA-47* form is usually sent to the FHWA by the time the *Final Voucher* is submitted to the FHWA fiscal management section. A review of project records, supplemented by informal interviews with FHWA and KYTC construction personnel, confirms that this situation is occurring statewide and is not a localized issue. Interviewed personnel mentioned several reasons for this practice, such as the lack of knowledge of the process and its requirements, staffing turnover, personnel accountability requirements, and focus in processing the final payments to contractors rather than following the established process.

This latter reason is reinforced with the implementation of the FHWA FIRE Order, requiring projects that have been completed to be closed within a fiscal year. The effect of this order has been of effectively bypassing assurance of the quality in construction by ascertaining that authorized funds have been spent.

Comparing with the goals described above, descriptive analysis show that it takes approximately 1 year after the project is called complete for the *Kentucky Formal Acceptance Report (KFAR)* to be completed for all federal-aid projects, while it takes approximately 5 years for the *FHWA Final Acceptance Report (FFAR)* to be accomplished after the project is completed.

Research Question 2: If the process does not work, why does it take so long and why it is not completed with all requirements?

Although both FHWA and KYTC primary users of the *Final Acceptance Process* (i.e., construction personnel at KYTC; project delivery personnel at FHWA) are familiar with the documentation requirements for each agency, in practice each agency's portion of the process is kept separate from the other agency.

Federal requirements are included in the Kentucky Standard Specifications; however, they are often overlooked. For instance, the majority of the interviewed KYTC personnel acknowledged not knowing the value or importance of the *FHWA-47* form. The results from the *FHWA-47* are compiled for every federal-aid project with costs over \$1 million and it is a key input to develop price trend and usage indexes for highway construction.²⁸ This form, which would only detail a statement of materials and labor used in the project, is for the contractor to complete after the project is called complete and before it is formally accepted, with the assistance of KYTC.

Another way this process is kept separate between agencies is when the *Materials Certificate* is made available by the Division of Materials either after certifying the final estimate (performed by the Division of Construction) or when the final payment to the contractor is being completed (performed by the Division of Accounts). In this case, a necessary document by both KYTC construction and FHWA project delivery personnel is not being produced at the time the Kentucky Standard Specifications requires it to be available.

To simplify the overall process for the fiscal management section of the FHWA to reimburse final payment of a project, this section only requires the Division of Accounts to submit their *Final Voucher* and does not feel they need the *FHWA Final Acceptance*, primarily because of the premise that the project not only has been completed but accepted by the State. Traditionally, the *Final Voucher* is submitted after the Division of Construction completes the *Formal Acceptance Report*. This same report is sent to the project delivery section of the FHWA, often without the *FHWA-47* and *Materials Certificate*. The net effect of this is that the fiscal management section of FHWA will close the project, releasing final payments and effectively making the project accepted, while releasing KYTC of any further responsibility with the project. This premise is proved wrong by having FHWA lacking the ability of completing its engineering project review and acceptance, prior to consider it accepted solely on fiscal basis.

Interviewed personnel agreed that the priority of Resident Engineers, which is to complete the project within the contract time and assure it was performed per plans and

specifications, makes the unfamiliarity and confusion with requirements and the steps in the process even larger. As the number of projects under their management increases while their crew of inspectors diminishes due to regular turnover year after year, it makes final acceptance a tedious administrative exercise. Not only they are dealing with more projects and less supporting staff, but also additional requirements have been placed on them during recent years. Examples include the oversight of documentation from subcontractors who are DBE (Disadvantage Business Enterprises), and further contractor payments to the DBE subcontractors, as well as training and management of contracted inspection personnel, while dealing with typical daily situations such as traffic control and requests for additional quantities of a needed material. All of these additional tasks make Resident Engineers to focus their time and expertise in managing projects that are still active, and de-emphasize his resources on projects that have been called complete.

Another reason that takes the Resident Engineer's mind away from their goal of completing project requirements for its acceptance is their direct involvement with contractors, which would demand response to them for their payments due to work already performed, as they are the most visible KYTC personnel to them in the field. Therefore, for completed projects that the contractors believe they have provided the necessary documentation for them to receive their final payments, the Resident Engineers priority would be to make certain that the *Final Estimate* has been reviewed and processed. As they are not directly involved in the development of the *Materials Certificate* and *FHWA-47*, Resident Engineers do not see these documents within their authority to complete.

Technology has helped KYTC to improve or maintain the completion rate of documentation needed to finish the process, while reducing its workforce. KYTC personnel interviewed have high hopes with the rollout of “*Transport SiteManager Construction Management System*”, a database to administer all construction and contract administration data including notice to proceed, change orders, and necessary contract documentation, while this information is shared among the Divisions of Construction, Construction Procurement, Accounts and Materials, as well as District construction and materials personnel. This program would certainly help KYTC to meet internal goals while continuously improving their administration of the process.

Finally, each of the previous steps is not held accountable by a specific team or individual within the KYTC. For instance, the Kentucky Standard Specifications and guidance memoranda do not specify the Division or specific official responsible within the KYTC to process these documents, with the exception of the often-used term “the Engineer”. This is often the primary cause of confusion, as to identify the individual within the KYTC who would be responsible to perform required steps and deliver related documents.

Research Question 3: Does the process work differently depending on whether it is non-interstate or interstate project?

Although the acceptance process should not differentiate from whether it is non-interstate or interstate project, descriptive analysis was performed to assess characteristics and trends for each of these types of projects, as well as to assess whether the 1999 FHWA/KYTC Stewardship Agreement has been of benefit to the process.

During the twenty-four year study period, KYTC has increased its annual production of federal-aid highway projects being let from 2 in 1981 to 69 in 2004 (see Figure 2). It was also observed that the number of federal-aid projects let in Kentucky peaked during the latter years of the 1990s (i.e., 1997 and 1998). This coincides with two major historic factors: the last fiscal year of the 6-year federal transportation act at the time (Intermodal Surface Transportation Efficiency Act, ISTEA, from 1991-1998); and the development of the new FHWA/KYTC Stewardship Agreement, signed on March 17, 1999.

ISTEA allowed flexibility in use and combination of program funding for States to be able to finance their highway programs. Also, federal transportation acts typically authorize the highest level of funding during its last fiscal year of the enacted law. Finally, ISTEA required FHWA to develop new oversight mechanisms to allow States to manage FHWA functions, primarily on projects that were not interstate and in the National Highway System (NHS). The new FHWA/KYTC Stewardship Agreement,

although becoming official in the first part of 1999, it was already employed by both agencies since 1998.

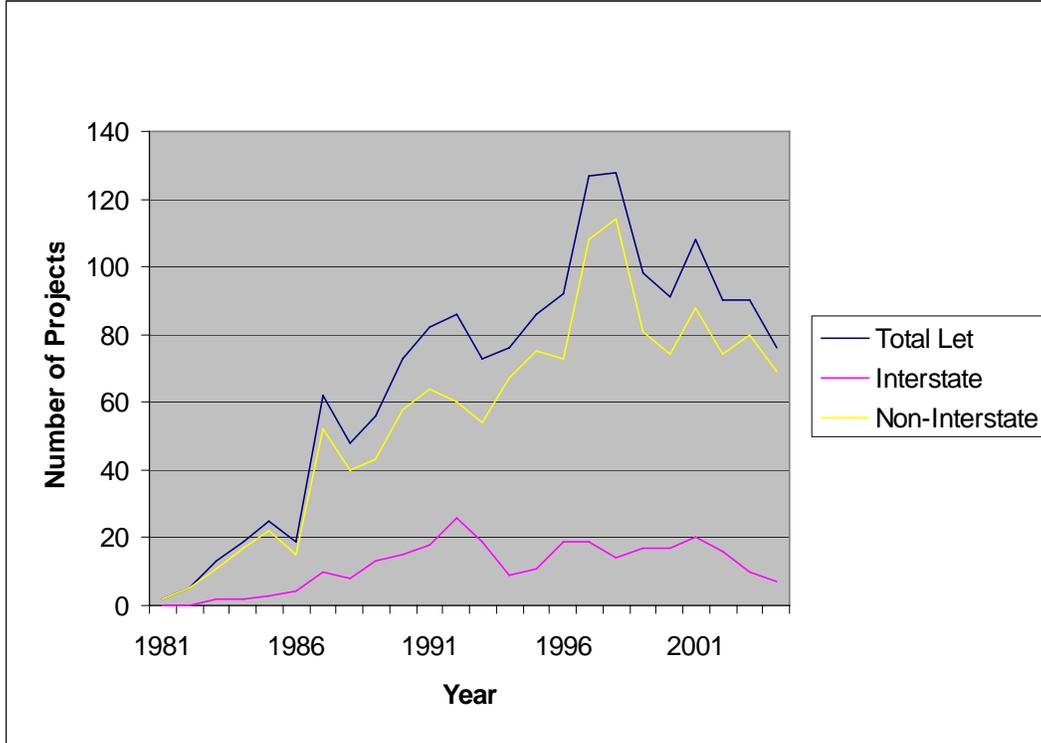


Figure 2. KYTC Let Projects (1981-2004)

The size of the construction program in Kentucky, as shown in Figure 2, contrasts with the number of employees at KYTC during this period, shown in Table 1 (Hancock, 2002 and 2005). This demonstrates that the size of the construction program has increased throughout the last three decades, while the workforce to administer it has continuously decreased.

| <i>Year</i> | <i>Employees</i> | <i>Difference</i> | <i>Construction Awards</i> | <i>Per employee</i> |
|-------------|------------------|-------------------|----------------------------|---------------------|
| 1980 | 8,013 | **** | **** | **** |
| 1990 | 6,185 | -1,828 | \$ 424,000,000.00 | \$ 68,552.95 |
| 2000 | 5,972 | -213 | \$ 736,000,000.00 | \$ 123,241.80 |

Table 1. Comparison of KYTC Personnel with Construction Program^{25, 26}

Often quantity is not reflected in quality, and consequently, in the effective management of the construction program. Table 2 shows the number of completed projects with proper documentation within the analysis period.

| <i>Total Interstate Projects</i> | <i>K FIR</i> | <i>F FIR</i> | <i>K FAR</i> | <i>F FAR</i> |
|--------------------------------------|--------------|--------------|--------------|--------------|
| 279 | 235 | 79 | 261 | 105 |
| | 84% | 28% | 94% | 38% |
| <i>Total Non-Interstate Projects</i> | <i>K FIR</i> | <i>F FIR</i> | <i>K FAR</i> | <i>F FAR</i> |
| 1346 | 1106 | 163 | 1214 | 558 |
| | 82% | 12% | 90% | 41% |

Note: FIR = Final Inspection Report; FAR = Final Acceptance Report

| | |
|------------------------------------|-----|
| All KYTC Final Inspection Reports | 83% |
| All FHWA Final Inspection Reports | 15% |
| All KYTC Formal Acceptance Reports | 91% |
| All FHWA Final Acceptance Reports | 41% |

Table 2. Number of completed projects with proper documentation (1981-2004)

During the 24-year study period, approximately 15% and 41% of all federal-aid projects were finally inspected and formally accepted by FHWA, respectively. It could also be observed similar trend among interstate and non-interstate projects, such as an average of 83% and 91% of all federal-aid projects were finally inspected and formally accepted by KYTC, respectively. With the exception of the *FHWA Final Inspection Report (FFIR)*, these trends confirm the similarities in how the process is conducted for both interstate and non-interstate projects.

Based on these facts, it could be concluded that more projects were formally accepted without being finally inspected by both agencies, as the *Final Acceptance Process* requires. Interviewed personnel commented on possible reasons this occurs, such as

staffing turnover, as well as lack of oversight and accountability from FHWA and KYTC Division of Construction to the KYTC District Office and its Resident Engineers.

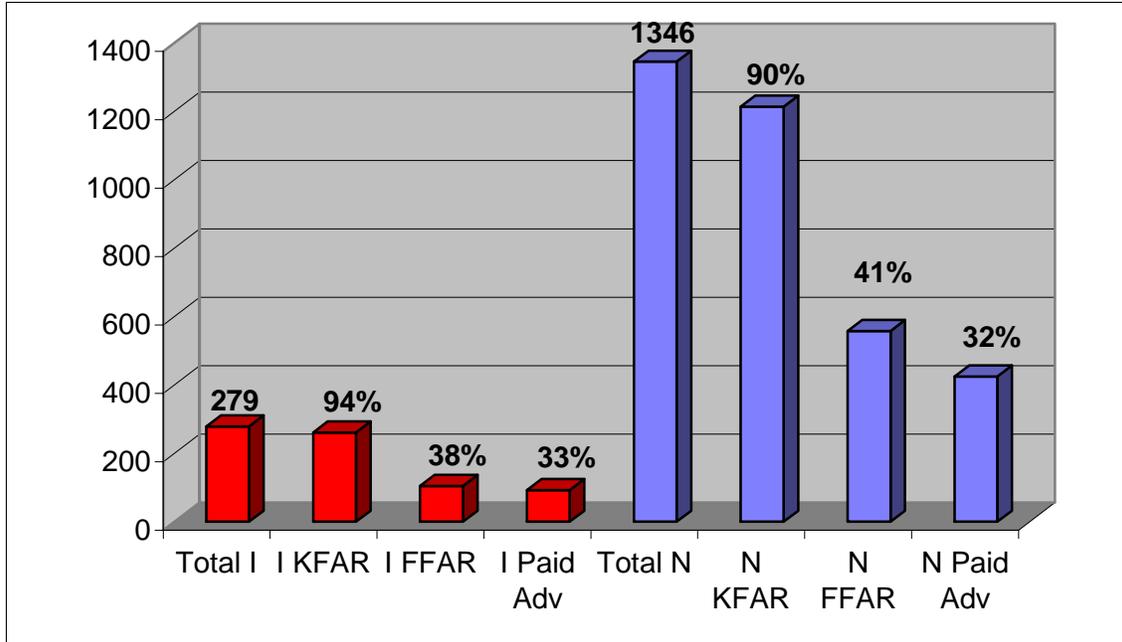


Figure 3. Projects that have been finally paid prior to FHWA Final Acceptance (1981-2004) (Note: I = Interstate projects; N = Non-Interstate projects)

Further review of individual project data allowed for accounting the situation previously described. Figure 3 shows the number and percentage of projects that have been finally paid, prior to FHWA Final Acceptance. During the 24-year study period, about 30% of all federal-aid projects were finally paid by KYTC prior to FHWA Final Acceptance. Averages of time paid by KYTC in advance of FHWA Final Acceptance were 109 and 151 days for non-interstate and interstate projects, respectively. Individual project data led to also conclude that the *KYTC Formal Acceptance Report (K FAR)* was conducted in about 90% of all projects, comparing with just about 40% of all projects having the *FHWA Final Acceptance Report (F FAR)* completed. When advised of these facts, KYTC

personnel interviewed seemed surprised of the magnitude of the problem regarding the lack of administrative oversight to support quality in construction projects.

There was consensus among interviewed KYTC personnel that the two 90-day rules stated in the Kentucky Standard Specifications were intended as a goal for KYTC to perform and complete the final acceptance process. To understand how effective KYTC has been able to achieve this process and meet this goal, a comparison of average time periods (in days) for the 18-year study period (1981-1999) and the 5-year period between years 2000 and 2004 was done. The reason for this analysis is to assess KYTC's performance after the FHWA/KYTC Stewardship and Oversight Agreement became effective in 1999.

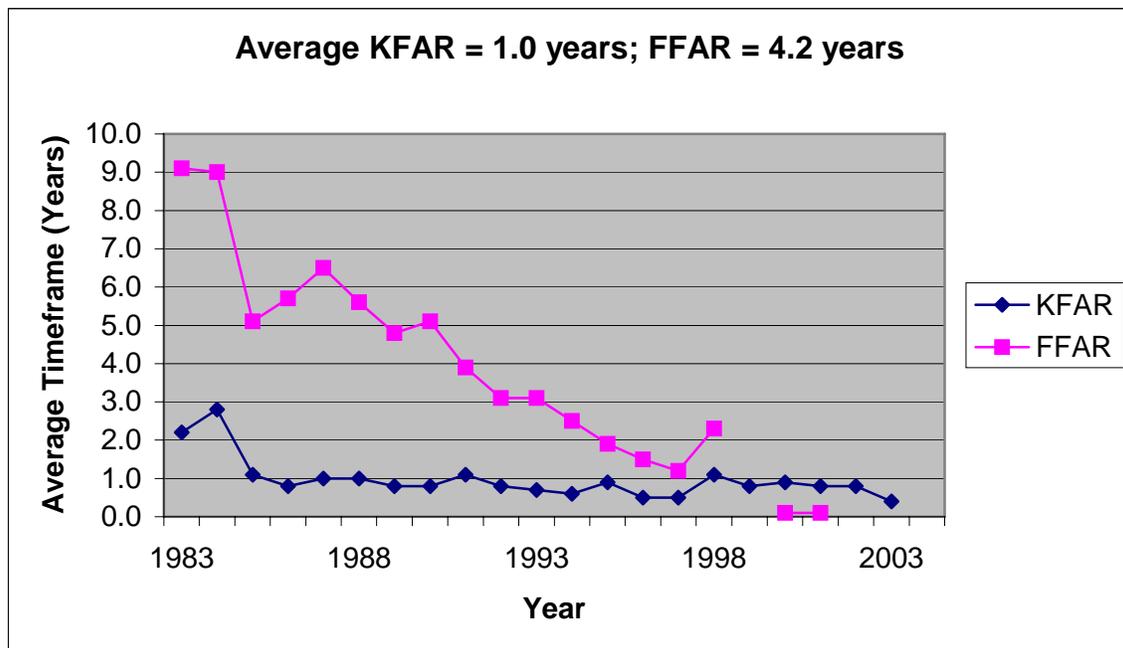


Figure 4. Interstate Projects Completed and FAR Timeframe (Sample of 270 completed projects).

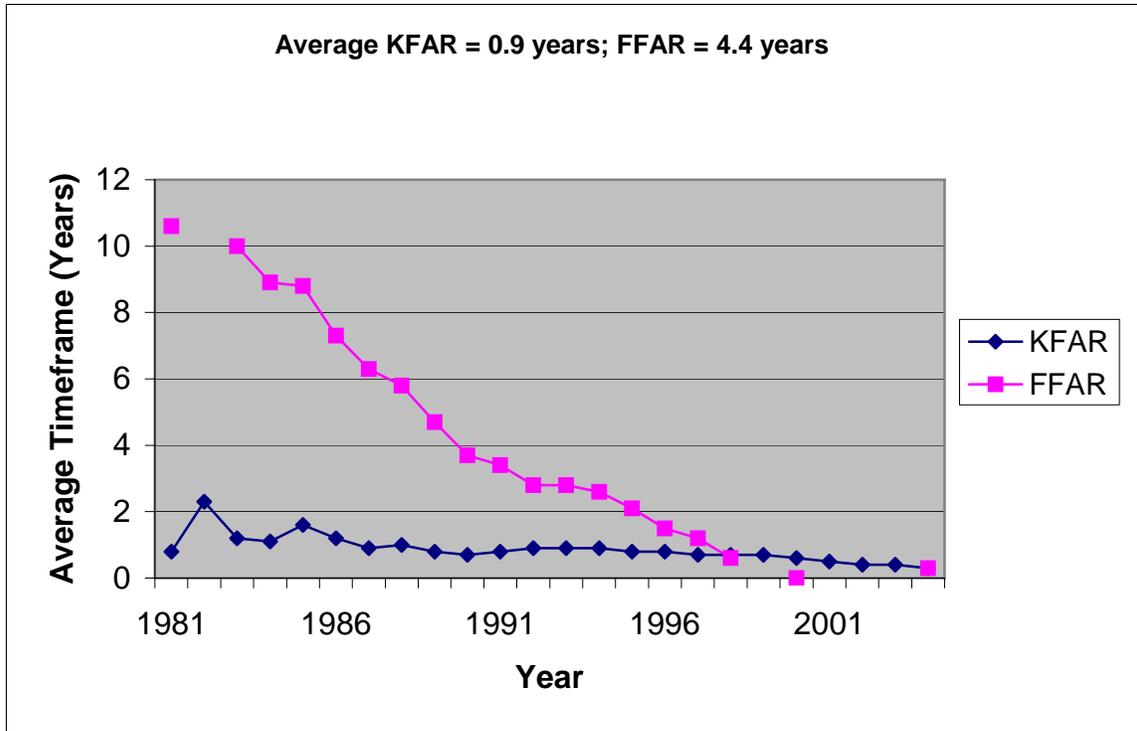


Figure 5. Non-Interstate Projects Completed and FAR Timeframe (Sample of 1,212 completed projects)

Annual average time (years) for FHWA and KYTC Formal Acceptance Reports are shown in Figures 4 and 5. While a long-term improvement for the FHWA reports could be observed throughout the analysis period, KYTC reporting process time did not change substantially. Hence, it could be concluded that improvements in the process have been observed prior the implementation of the Stewardship Agreement in 1999.

Due to the availability of the data, a different analysis was performed using combined averages for the periods before and after 1999. Table 3 and Figure 6 show average time (days) that took required KYTC and FHWA documentation to be completed, as well as the average time (days) it took for project completion being finally paid (i.e., *Compl to Pay*) during each of the analysis periods.

| <i>Project Documentation (From Project Completion)</i> | <i>Average Time Period, days (1981-1999)</i> | <i>Average Time Period, days (2000-2004)</i> |
|--|--|--|
| Interstate KYTC Final Inspection Report | 75 | 72 |
| Non-Interstate KYTC Final Inspection Report | 77 | 59 |
| Interstate FHWA Final Inspection Report | 67 | 94 |
| Non-Interstate FHWA Final Inspection Report | 99 | n/a |
| Interstate KYTC Formal Acceptance Report | 380 | 235 |
| Non-Interstate KYTC Formal Acceptance Report | 361 | 144 |
| Interstate FHWA Final Acceptance Report | 1,730 | n/a |
| Non-Interstate FHWA Final Acceptance Report | 1,939 | n/a |
| Interstate Completion to Final Pay | 1,351 | 539 |
| Non-Interstate Completion to Final Pay | 1,683 | 407 |

Table 3. Average time period (days) for Project Documentation

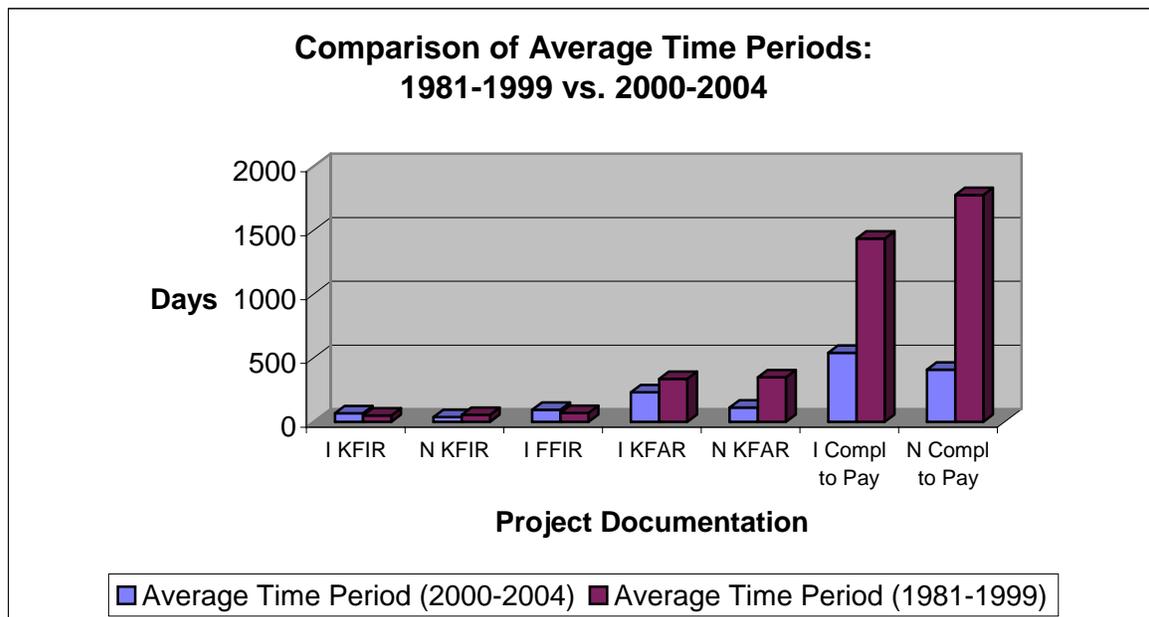


Figure 6. Comparison of Average Time Periods related to the Completion of Project Documentation (Note: I = Interstate projects; N = Non-Interstate projects)

Graphical analysis, including linear regression to observe long-term trends, was conducted for each of the 10 variables. For 3 of the variables (e.g., *N FFIR*, *I FFAR* and *N FFAR*), data is not available prior and/or after 1999. Please, refer to the Appendix for each of the 10 graphs. Based on the direction of the regression line for each of these 10

variables, all but 2 variables show long-term improvement throughout the analysis period. The 2 variables not showing long-term improvement are the final inspection reports conducted by FHWA on interstate and non-interstate projects (e.g., *I FFIR* and *N FFIR*).

The R-square value was obtained from each of the regression models, which indicates how well the model fits the data. The following is a summary of the values for R-square related to each of the 10 variables.

| Variable | R-square |
|-----------------------|-----------------|
| <i>I KFIR</i> | 0.0323 |
| <i>N KFIR</i> | 0.0136 |
| <i>I KFAR</i> | 0.1024 |
| <i>N KFAR</i> | 0.5495 |
| <i>I FFIR</i> | 0.0213 |
| <i>N FFIR</i> | 0.0250 |
| <i>I FFAR</i> | 0.7809 |
| <i>N FFAR</i> | 0.8352 |
| <i>I Compl to Pay</i> | 0.7699 |
| <i>N Compl to Pay</i> | 0.8439 |

Table 4. R-square Values

The graphs for the 5 variables with low R-square (e.g., *I KFIR*, *N KFIR*, *I KFAR*, *I FFIR* and *N FFIR*), show a significant variability in the data (e.g., lots of peaks and valleys). The low R-square value determines that for each of these 5 variables, the model given by the linear regression does not fit well with the data. On the contrary, for the other 5 variables with high R-square (*N KFAR*, *I FFAR*, *N FFAR*, *I Compl to Pay* and *N Compl to Pay*), the linear regression model does not only show the long-term improvement but also the reliability of these models with the data.

The graphs also show that all of the 7 variables with the exception of *I KFIR* and *I FFIR*, show gradual decrease (e.g., improvement in time) in their slopes after 1999. *I KFIR* shows this gradual decreasing slope between 2001 and 2003, but it shows an upward spike in both 2000 and 2004. Similar condition was observed for *I FFIR*, although a more cyclical pattern (e.g., decline, improvement, and decline). Therefore, it is reasonable to conclude from the graphical analysis that the treatment (e.g., the Stewardship and Oversight Agreement) for these two variables did not influence in a change in its trend nor improves its performance.

Although an improvement (e.g., non-gradual change in the slope) was observed in each of the remaining 5 variables compared to the trends observed pre-1999, another exception must be discussed. The variables *N KFIR* and *I Compl to Pay* showed a change in slope after 2000 (e.g., not after 1999), suggesting that their improvement was delayed after the treatment was introduced. *N KFAR* is the only variable that could be determined to have a significant difference in the slope from the pre and post-1999. The improvement of this sole variable out of 7 variables that were graphed for this analysis, only supports the fact stated before that no substantial changes pre- and post-1999 were observed throughout the analysis periods.

The results from these analyses truly reflect the nature of the data, as it shows a pattern of changes in variables related to non-interstate projects. Critical to this determination is the fact that the reports on these projects have been fully delegated to the KYTC, which could lead to possible improvements in the overall process for these projects due to the

ease of federal oversight as well as overall familiarity and a better understanding of the requirements and steps in the process, as higher volume of projects are noticed in the non-interstate than interstate projects. A question begs to be asked: why would change be found in the non-interstate projects, but not in interstate projects?

These remarks significantly contrast with the other analysis performed on this data, such as the graphical analysis of each of the variables with sufficient data to determine changes over time, as well as descriptive analysis and interviews. Therefore, long-term improvements were observed throughout the period of analyses, and it is debatable that observed changes after 1999 were significant enough to determine that the introduction of the Stewardship & Oversight Agreement was the cause to effect these changes and improving the overall final acceptance process.

An additional analysis, shown in Figure 7, was conducted to assess the amount of projects that completed the acceptance reports within a certain amount of time. In the sample of interstate projects (270 projects), 98% of the projects had *KYTC Formal Acceptance Reports* completed within the first 3 years (73% the 1st year, 19% the 2nd year, 5% the 3rd year). This compares favorably with the sample of non-interstate projects (1,212 projects), which had 99% of their *KYTC Formal Acceptance Reports* completed within the first 3 years (76% the 1st year, 20% the 2nd year, 3% the 3rd year).

In the sample of interstate projects, 89% of the projects had *FHWA Final Acceptance Reports* completed between 2 and more than 5 years (28% more than 5 years, 21% the 5th

year, 16% the 2nd year, 15% the 3rd year). This compares favorably with the sample of non-interstate projects, which had 93% of their *FHWA Final Acceptance Reports* completed between 2 and more than 5 years (25% the 2nd year, 22% the 3rd year, 20% more than 5 years, 14% the 5th year, 13% the 4th year).

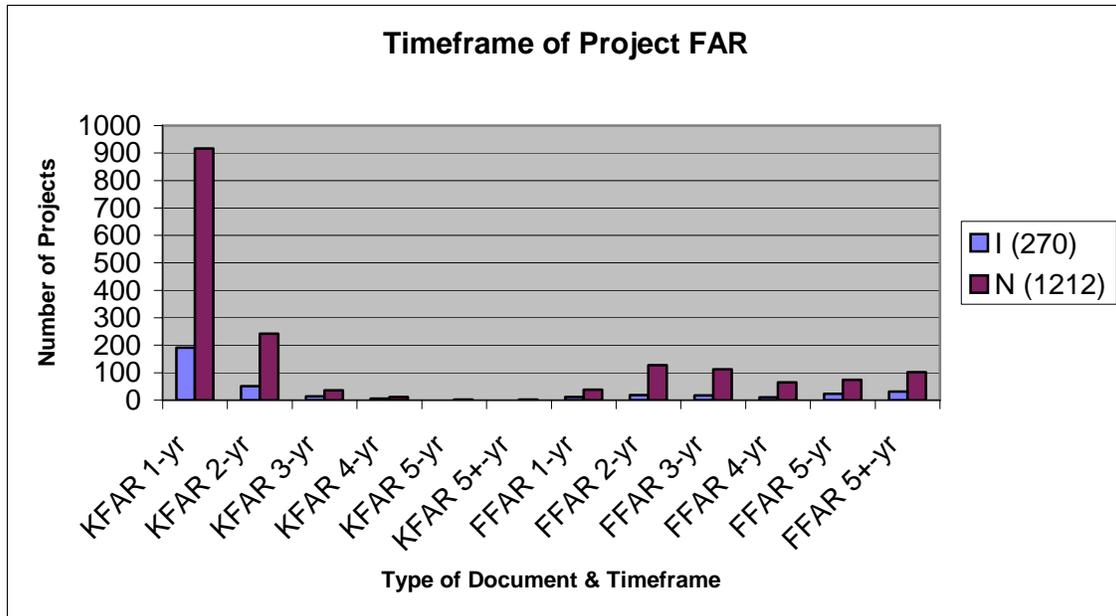


Figure 7. Timeframe of Project Final Acceptance Reports

A final analysis was performed to compare the number of projects awarded during the last three state fiscal years and the number of projects closed out, including amounts of unpaid funds that FHWA has not been able to reimburse. That analysis is summarized in Tables 5 and 6.

| <i>Year</i> | <i>Awarded</i> | <i>Completed</i> | <i>Corrective Work</i> |
|-------------|----------------|------------------|------------------------|
| S FY03 | 19 | 18 | 4 |
| S FY04 | 5 | 4 | 2 |
| S FY05 * | 5 | 3 | 3 |
| Total | 29 | 25 | 9 |

| <i>Year</i> | <i>KFAR</i> | <i>Finally Paid</i> | <i>% Finally Paid Proj</i> |
|-------------|-------------|---------------------|----------------------------|
| S FY03 | 13 | 7 | 36.84% |
| S FY04 | 2 | 1 | 20.00% |
| S FY05 * | 0 | 0 | 0.00% |
| Total | 15 | 8 | 27.59% |

| <i>Year</i> | <i>Total \$\$</i> | <i>Amt Unpaid</i> | <i>% Unpaid Amt</i> |
|-------------|-------------------|-------------------|---------------------|
| S FY03 | \$200,406,895 | \$4,183,924 | 2.09% |
| S FY04 | \$25,904,232 | \$1,432,932 | 5.53% |
| S FY05 * | \$53,566,424 | \$16,973,872 | 31.69% |
| Total | \$279,877,551 | \$22,590,728 | 8.07% |

Table 5. Number of interstate projects awarded, formally accepted, and finally paid; including authorized and unpaid amounts during the State Fiscal Years 2003-2005

Approximately 28% of the 29 interstate projects awarded during the state fiscal years 2003 through 2005 have been finally paid. Total amount of funds that accounts for these projects is approximately \$280 million, which about \$22 million are still unpaid. This accounts for 8% of the total authorized funds. Projects awarded during year 2005 bear the majority of these unpaid funds with almost 32% (\$16 million). 60% of the completed projects (15 out of 25) have been formally accepted by the KYTC but not finally accepted by FHWA due to the unavailability of the *FHWA-47* and/or *Materials Certificate*. Using the same reasoning, 60% of the total amount unpaid for years 2003 and 2004 could be reimbursed if FHWA proceeds with conducting their final acceptance report. This could lead to about \$3.3 million that could be reimbursed.

| <i>Year</i> | <i>Awarded</i> | <i>Completed</i> | <i>Corrective Work</i> |
|-------------|----------------|------------------|------------------------|
| S FY03 | 86 | 73 | 11 |
| S FY04 | 65 | 46 | 19 |
| S FY05 * | 25 | 12 | 11 |
| Total | 176 | 131 | 41 |

| <i>Year</i> | <i>KFAR</i> | <i>Finally Paid</i> | <i>% Finally Paid Proj</i> |
|-------------|-------------|---------------------|----------------------------|
| S FY03 | 62 | 53 | 61.63% |
| S FY04 | 27 | 12 | 18.46% |
| S FY05 * | 1 | 0 | 0.00% |
| Total | 90 | 65 | 36.93% |

| <i>Year</i> | <i>Total \$\$</i> | <i>Amt Unpaid</i> | <i>% Unpaid Amt</i> |
|-------------|-------------------|-------------------|---------------------|
| S FY03 | \$238,073,805 | \$25,008,909 | 10.50% |
| S FY04 | \$214,640,303 | \$73,768,542 | 34.37% |
| S FY05 * | \$168,869,105 | \$101,680,591 | 60.21% |
| Total | \$621,583,213 | \$200,458,042 | 32.25% |

Table 6. Number of non-interstate projects awarded, formally accepted, and finally paid; including authorized & unpaid amounts during the State Fiscal Years 2003-2005

Almost 37% of the 86 non-interstate projects awarded during the State fiscal years 2003 through 2005 have been finally paid. Total amount of authorized funds that accounts for these projects is approximately \$622 million, which about \$200 million are still unpaid. This accounts for 32% of the total authorized funds. Projects awarded during year 2005 bear the majority of these unpaid funds with almost 50% (\$101.7 million). Almost 70% of the completed projects (90 out of 131) have been formally accepted by the KYTC. Using the same reasoning, 70% of the total amount unpaid for years 2003 and 2004 could be reimbursed if FHWA proceeds with conducting their final acceptance report. This could lead to about \$123 million that could be reimbursed.

Therefore, descriptive and fiscal analyses demonstrate that there is no difference in how interstate and non-interstate projects are processed. Also, the FHWA/KYTC Stewardship Agreement implemented since 1999 was found to continue, but not to significantly change, the improvements observed in the processing times for each of the reports since 1981.

Conclusions and Recommendations

This project addressed a variety of issues regarding the *Final Acceptance Process* for federal-aid projects. Questions regarding how does the process work, why does it take so long and it is not completed with its requirements, and whether the process work differently if it is an interstate or non-interstate project, were assessed. After laying out the process for both KYTC and FHWA, it could be concluded that many different groups within each of these agencies need to effectively coordinate among each other to know the step that each federal-aid project might be in terms of the *Final Acceptance Process*. Stakeholders from KYTC include construction personnel at the Central, District and field (i.e., Resident Engineer's crew) offices; materials personnel at the Central, District and field (i.e., Resident Engineer's crew) offices; and the Divisions of Construction Procurement and Accounts at the Central Office. Within FHWA, the project delivery team (with its Transportation Engineers) and the fiscal management team will certainly be involved in the FHWA portion of the *Final Acceptance Process*.

The overall research question – *what are the reasons that lead highway projects not being able to be finally accepted?* – was answered. Lack of required documentation, such as *FHWA-47* and *Materials Certificate*, were found to be the two primary reasons that highway projects cannot be finally accepted by FHWA by both qualitative and quantitative analysis. This finding was originally observed in the sample of approximately 50 interstate projects in Districts 6 and 9 reviewed in 2002. This finding is reflected in the number of projects that have been formally accepted by KYTC vs. the number of projects finally accepted by FHWA. All members of the *Joint Process Review Team* (who consisted of statewide representation) acknowledged during their interviews that this finding is occurring in all Districts, and therefore was not systemic of one or two Districts in particular.

A variety of causes for this finding were gathered through a series of interviews with KYTC and FHWA personnel, including their unfamiliarity with the requirements and steps of the process, Resident Engineer's priorities and lack of supporting staff, staffing turnover, personnel accountability requirements and the focus in processing the final payments rather than following the established process.

One recommendation to address the separation within the process between FHWA and KYTC is for both primary users of the process – KYTC Division of Construction liaisons and FHWA Transportation Engineers – to conduct joint final inspections and exchange notes prior to KYTC preparing its *Formal Acceptance Report (KFAR)*. This exchange must lead to clarifications from both agencies, in particular FHWA, to assure that KYTC

will be having the *Materials Certificate* and *FHWA-47* along with its *KYTC Formal Acceptance Report*, for FHWA to then review these documents and prepare its *FHWA Final Acceptance Report* in a reasonable timeframe.

The Division of Construction could assemble a list of “called complete” projects on a quarterly basis including projects that has not been finally accepted and routed through Central Office Division of Construction and Materials. Its status could be periodically assessed through *Tr*nsport SiteManager* to focus on the requirements and be able to track how long has these projects taken to complete its final acceptance. A task force should be conformed by FHWA (both project delivery and fiscal management represented), Division of Accounts and Construction officials, to meet every quarter and determine actions needed to be taken to meet performance goals established by the Kentucky Standard Specifications & FIRE reviews.

Another recommendation is for the FHWA project delivery team and fiscal management team to devise a mechanism to allow for both administrative and construction requirements (i.e., fund management and construction management) to be a single process instead of two disjointed sub-processes. FHWA fiscal management must have in hand a *FHWA Final Acceptance Report* prior to process final voucher in any federal-aid project that is under FHWA full-oversight. The KYTC Division of Accounts could assist, as they have been in the recent years, gathering all the information and submitting it to both FHWA project delivery and fiscal management teams for them to become aware of the need for *Final Acceptance* and further processing of *Final Vouchers*.

Also, if required documents such as *FHWA-47* or *Materials Certificate* are unavailable, the Division of Construction ought not to prepare a *Formal Acceptance Report*. By doing so, it may force contractors to prepare the *FHWA-47* and materials personnel to finish their checks for the *Materials Certificate*, but it is obviously against the Standard Specifications's goal to complete the process within 180 days. The thought behind this argument is that, for the contractor to receive their final payment, they ought to comply with necessary requirements; unfortunately, the Division of Accounts would not likely enforce construction specifications, but it could lead through their financial requirements, which allows them to pay the contractors when final estimates are certified and received. Efforts to find the information to complete the *FHWA-47* gets more difficult after the *Kentucky Administrative Regulations* requires KYTC to retain documents for a maximum of 3 years after final payment for audit purposes.

Each of these steps needs to be held accountable by a specific team or individual within the KYTC. For instance, the practice and stakeholders previously mentioned are not disclosed in similar fashion in the Standard Specifications or guidance memoranda. The *FHWA-47* is loosely mentioned as a requirement, but no accountability as to who is required to complete it. Therefore, a memo clarifying the specifications to assert responsibility of each of the required documents is recommended. This memo may give the FHWA and KYTC top management an opportunity to reassert the importance of effectively managing this process together.

Training would likely be needed among all the process stakeholders, as KYTC may be losing up to 40% of their personnel due to retirements in the year 2008, as well as with FHWA's likelihood of personnel retirements and/or turnover due to 'baby boom' generation effects. This training must explain each of the steps and 'gatekeepers' involved in the process.

The data analysis demonstrated two trends: final payment of projects without *FHWA Final Acceptance Report* (about 30% of all completed projects) and an overall improvement of the process performance by FHWA and KYTC throughout the years, in terms of time it takes each agency to proceed their process. Although there might not be a goal specified by either FHWA nor KYTC regarding the number (or percentage) of projects who gets formally and finally accepted, along with reasonable timeframes for the completion of this process in a program basis, the opportunity for the top management of both agencies to express the significance of this process should be complemented with a set of performance measures. These performance measures could be developed around the two 90-day rules specified in Section 105.12 of the Kentucky Standard Specifications, similar to the way Alaska DOT currently has it incorporated within the State Government's "Mission and Measures".

After preliminary work done as part of this project, KYTC has recently implemented an internal memo related to inactive projects, in light of the financial integrity review stemmed from OIG and GAO investigations, as well as the FIRE order. This would certainly help in the development of performance measures in the monetary amounts

withheld and unpaid by FHWA, as well as enough accountability for the “gatekeepers” of required documents that are not completed within a certain timeframe.

It is recommended that a process review be done within a 4-year period to assess the implementations of these recommendations, as well as the changes in the process and the stakeholders involved in the final acceptance process.

A process will work efficiently and effectively if the stakeholders engage among themselves to learn and improve it to their satisfaction. Performance goals and measures, definition of roles for stakeholders and users of the process, guidance provided by the top management and training are some of the techniques that could be used to improve the FHWA/KYTC Final Acceptance Process.

References

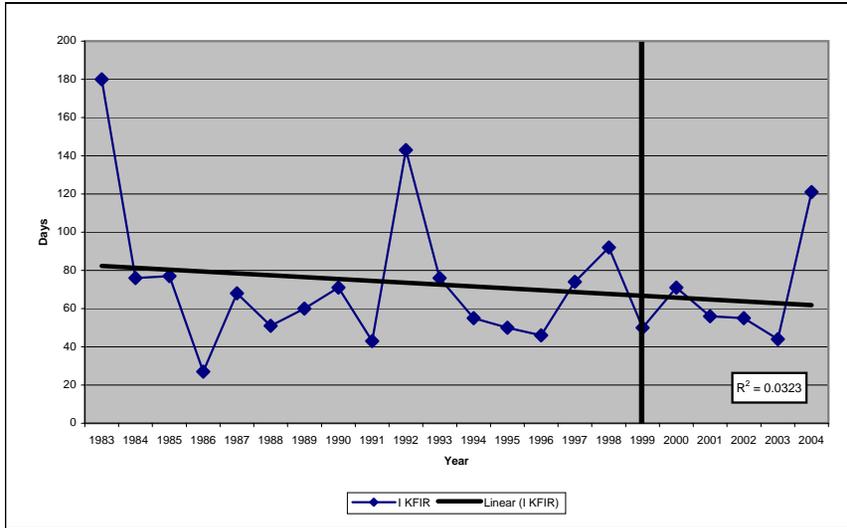
1. Blakemore, Ken. *Social Policy: an Introduction*. 1998.
2. Kentucky Transportation Cabinet (KYTC). *Design Memo 08-05*. 2005.
<http://www.kytc.state.ky.us/design/memos/memos.asp>
3. Howard, Thomas, H. *Highway Finance Information: A Key 21st Century Transportation Decision-Making Tool*. Public Roads. November/December 1999.
Vol. 63. No. 3. <http://www.tfrc.gov/pubrds/novdec99/finance.htm>
4. Federal Highway Administration (FHWA). *Highway Bridge Replacement and Rehabilitation Program*. 2004. <http://www.fhwa.dot.gov/bridge/hbrrp.htm>

5. Project Management Institute (PMI). *A Guide to Project Management Body of Knowledge (PMBOK)*. 2000.
6. Wikipedia, the free encyclopedia. *Program Management*. 2006.
http://en.wikipedia.org/wiki/Program_%28management%29
7. Collaborative for Distributed Software Development (C4DSD). 2004.
<http://www.c4dsd.com>
8. Graham, Jeffrey. *The Importance of Process*. 1999.
http://www.clickz.com/experts/brand/emkt_strat/article.php/818611
9. Dilger, Robert J. *American Transportation Policy*. 2003.
10. Federal Highway Administration (FHWA). *Workforce Planning and Professional Development Task Force – Final Report*. 2000.
<http://www.fhwa.dot.gov/reports/workforce/appendixa.htm>
11. Chatfield, Mark. *TQM – It really works!* Public Roads. Autumn 1995. Vol. 59. No. 2. <http://www.tfhr.gov/pubrds/fall95/p95a24.htm>
12. Robertson, Robert W. & Gill, Paul. *Linking Quality to Business Planning and Performance Goals in Local Government*. American Society for Quality. 2000.
<http://www.asq.org/gov/best/bestr&g.html>
13. National Partnership for Highway Quality. *History*. 2006. <http://www.nphq.org>
14. National Institute of Standards and Technology. *Baldrige National Quality Program*. 2006. <http://www.quality.nist.gov>
15. Federal Highway Administration (FHWA). *National Strategic Plan*. 1998.
<http://www.fhwa.dot.gov/policy/fhplan.html>

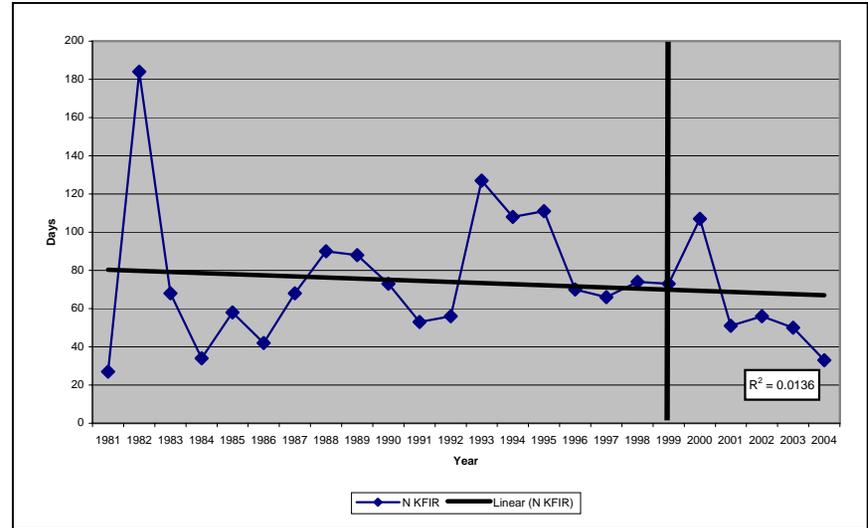
16. Highway Financing Community of Practice (CoP). *Inactive Projects*. 2004.
[http://knowledge.fhwa.dot.gov/cops/hcx.nsf/All+Documents/6214A97D81DBD3CD85256FDD0065BD8D/\\$FILE/Archived%20Discussion.doc](http://knowledge.fhwa.dot.gov/cops/hcx.nsf/All+Documents/6214A97D81DBD3CD85256FDD0065BD8D/$FILE/Archived%20Discussion.doc)
17. Loyselle, Michael. *Federal Role in Transportation Policy: Its historic perspectives, current aspects and future challenges (Unpublished)*. 2005
18. Federal Highway Administration (FHWA). *Stewardship and Oversight Task Force Final Report*. 2001.
<http://www.fhwa.dot.gov/infrastructure/stewardship/sotfa.htm>
19. Federal Highway Administration (FHWA). *Financial Integrity Review and Evaluation (FIRE) Programs for the Federal-Aid Division Offices*. 2005.
<http://www.fhwa.dot.gov/legsregs/directives/orders/45601.htm>
20. Federal Highway Administration (FHWA). *Financing Federal-aid Highways* (Electronic version of Publication No. FHWA-PL-99-015).
<http://www.fhwa.dot.gov/reports/fifahiwy/index.htm>
21. Kentucky Transportation Cabinet (KYTC). *CPES Database*. 2005.
22. Federal Highway Administration and Kentucky Transportation Cabinet (FHWA/KYTC). *FHWA/KYTC Stewardship and Oversight Agreement*. 1999.
23. AASHTO Subcommittee on Transportation Finance. *Discussion Summary*. 2005.
<http://finance.transportation.org/sites/finance/docs/Nashville%20Discussion%20Summary%204-2005.doc>
24. 23 CFR 1200.30. *Financial Closeout Regulations under Title 23 (Highways)*.
http://a257.g.akamaitech.net/7/257/2422/14mar20010800/edocket.access.gpo.gov/cfr_2002/aprqtr/pdf/23cfr1200.31.pdf

25. Hancock, Michael (KYTC). *PAIKY 2002 Presentation (Construction Awards per Year)*. 2002.
26. Hancock, Michael (KYTC). *Email communication related to the number of employees*. 2006.
27. Federal Highway Administration (FHWA). *Usage Factors for Major Highway Construction Materials and Labor*. 2003.
<http://www.fhwa.dot.gov/policy/ohim/hs03/htm/pt4.htm>
28. Federal Highway Administration (FHWA). Price Trends for Federal-Aid Highway Construction. <http://www.fhwa.dot.gov/programadmin/pricetrends.htm>
29. Florida Auditor General. *Miami Dade County Findings*. 2006.
<http://www.myflorida.com/audgen/pages/summaries/2006-103.htm>
30. U.S. Army Corps of Engineers. *Closeout Policy Regulations*.
<http://www.usace.army.mil/publications/eng-regs/er415-345-13/entire.pdf>
31. Alaska Department of Transportation (AKDOT, 2005). *Missions and Measures – Design and Construction*.
http://www.gov.state.ak.us/omb/results/view_details.php?p=217#sd1795
32. Carolinas Association of General Contractors (CAGC). *NCDOT Lists Projects Awaiting Closeout Because of Lack of Contractor Furnished Documents*. 2004.
http://www.cagc.org/contractors_hwy/files/projects_awaiting_closeout.cfm
33. Washington Department of Transportation (WSDOT). *List of Projects needing to be closed out*. 2006.
<http://www.wsdot.wa.gov/biz/construction/Reports/ProjectsNeedingCloseOut.cfm>

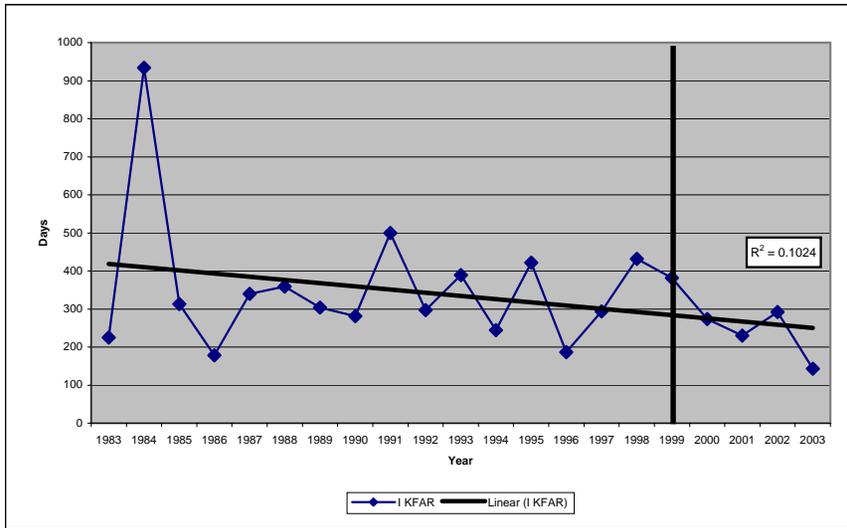
Appendix



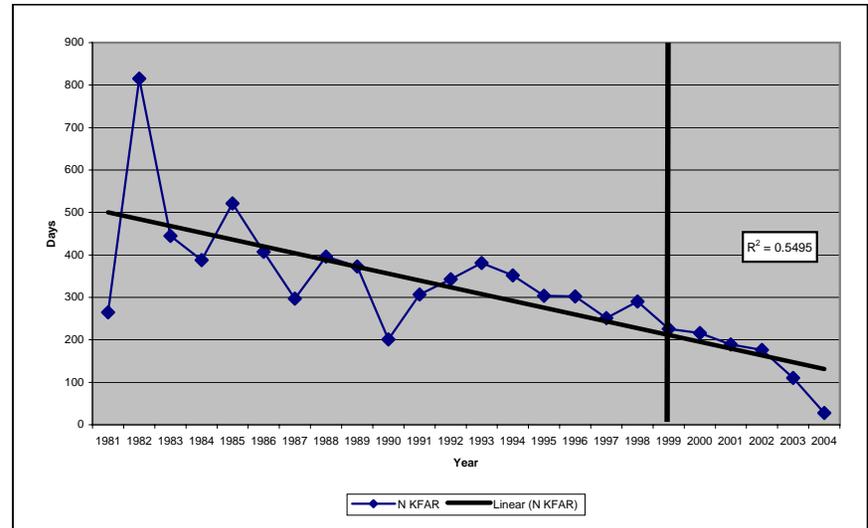
Average Time between Project Completion and Final Inspection Reports conducted by KYTC on Interstate Projects [I KFIR]



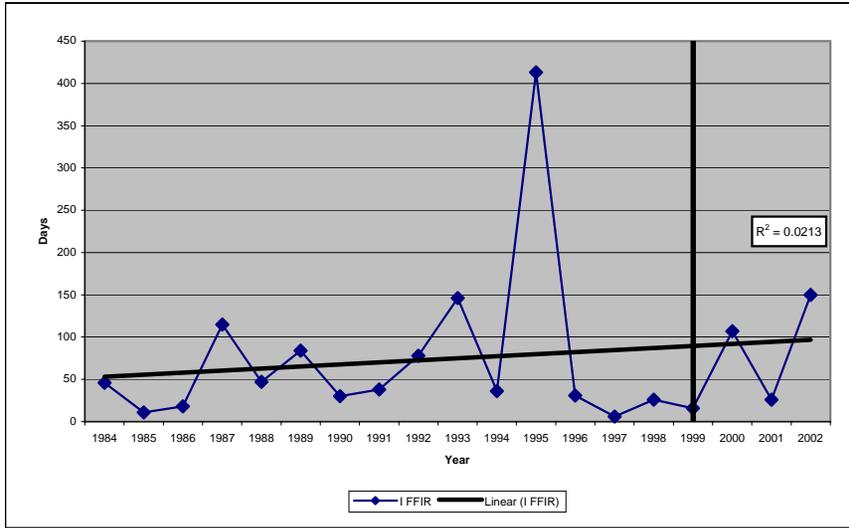
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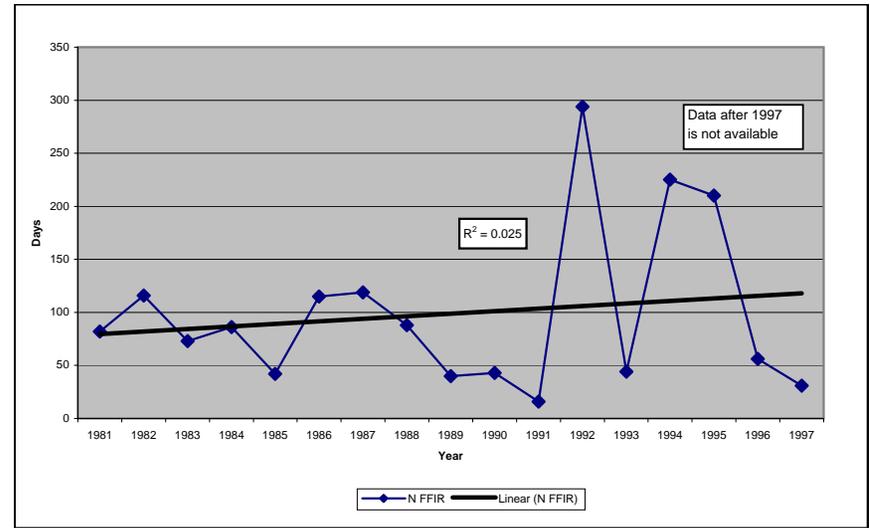
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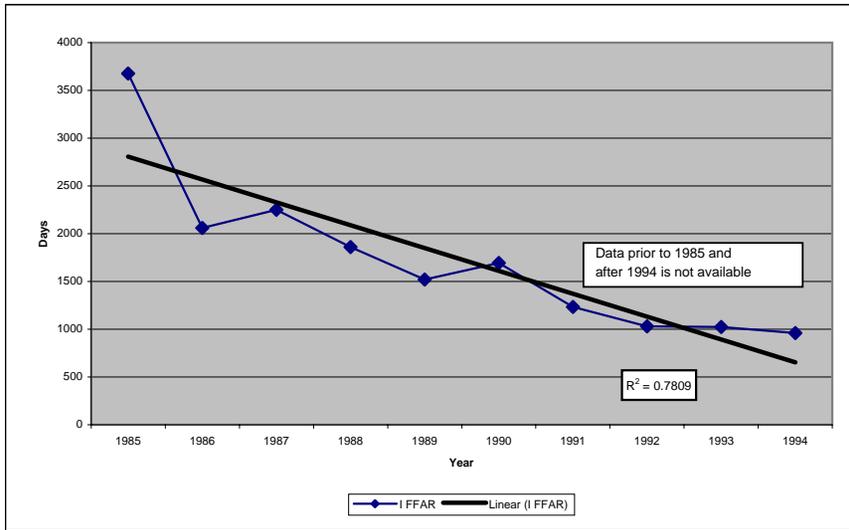
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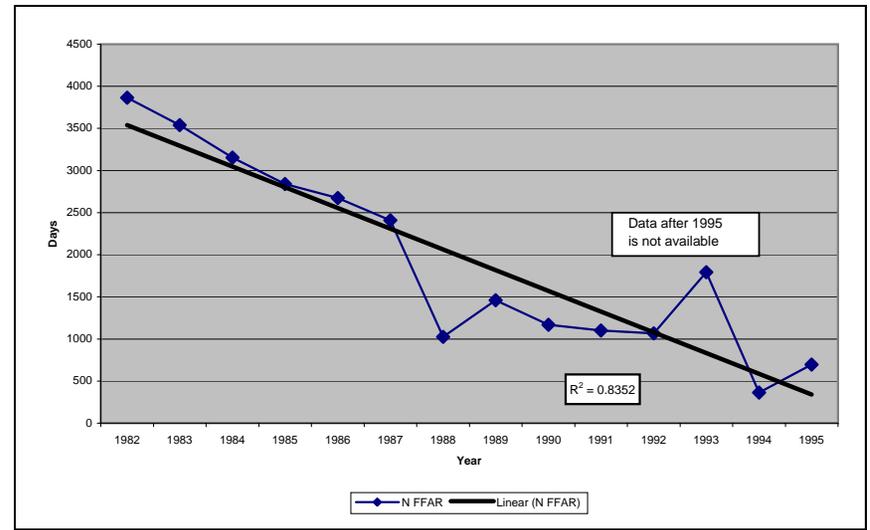
Average Time between Project Completion and Final Inspection Reports conducted by FHWA on Interstate Projects [I FFIR]



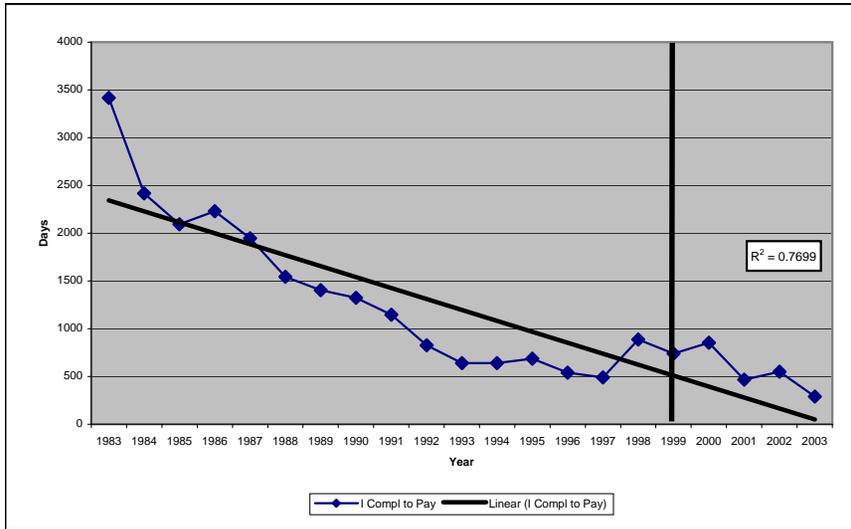
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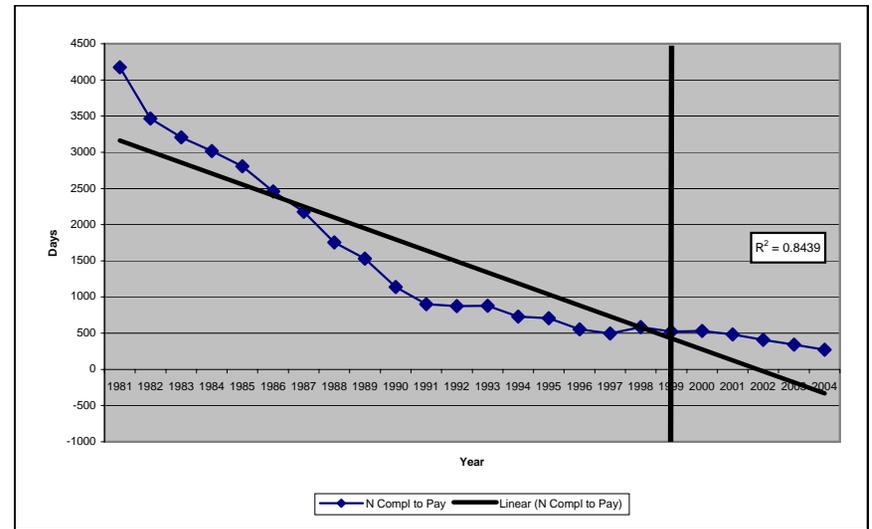
Average Time between Project Completion and Final Acceptance Reports conducted by FHWA on Interstate Projects [I FFAR]



Average Time between Project Completion and Final Acceptance Reports conducted by FHWA on Non-Interstate Projects [N FFAR]



Average Time between Project Completion and Final Payments on Interstate Projects [I Compl to Pay]



Average Time between Project Completion and Final Payments on Non-Interstate Projects [N Compl to Pay]