

Pooled Fund TPF-5(101)
QUARTERLY REPORT FOR THE PERIOD
February 2010 – April 2010

Development of JSLAB 2007

ESCINC is working in coordination with UTEP and ORITE (OU) on this task order.

February 2010

UTEP:

The final report is currently being reviewed by Dr. Bendana and others.

OU:

The pending software update was received and installed. The program would open and a pop up window would appear stating that the date and time were incorrect. Clicking "OK" (the only option) would terminate the program. A patch to fix this issue was requested and received from the programming team. The full-screen program window shows about 10% of the program interface with a very large font – finding other parts of the program screen is impossible since there is no scrolling capability. The program has been renamed NYSLAB. Some more issues have been reported that need to be fixed.

March 2010

UTEP:

The final report is currently being reviewed by Dr. Bendana and others.

OU:

Another software update was received and installed. The full-screen program window presents a larger portion of the program interface, but portions of the interface are still outside the area of the screen/window, and there are no scroll bars to enable access to these portions of the interface, thus it is not possible to enter all the data required to run the program. Some more issues have been reported that need to be fixed. Another update was received to install and needs testing.

April 2010

UTEP:

UTEP has submitted their final report; however Ohio University has requested additional changes which have been conveyed to UTEP.

OU:

Another software update was received and installed. This version will work on one computer in an office, but still has the display size issues on their research engineer's home computer, where most of the programming work is done. As such, the program interface still is not ready for wider distribution. Parts of the interface are still outside the area of the screen/window, and there are no scroll bars to enable access to these portions of the interface, thus it is not possible to enter all the data required to run the program. Since a complete set of data cannot be entered, the capability to load and save files could not be tested. The documentation lists many fundamental changes to the algorithm that the previous results on sensitivity of the program no longer apply. There is a draft user manual included, however, it requires additional technical details that a serious practitioner would want.

Development of IntPave

ESCINC is working in coordination with UTEP on this task order.

February 2010

Task 1 is complete at this time. More detail about this task was provided in October 2009 progress report.

Task 2 is complete at this time. A MATLAB subroutine that can simulate road roughness, calculate IRI and estimate the dynamic load factor based on Cebon (2000)¹ has been developed. That formulation has been generalized for tandem and tridem axels as well.

Task 3 on improving the post and pre-processor is progressing rapidly. The pre-processor, which is being harmonized with the one developed for NYSlab, is close to completion. The post-processor is being worked on at this time. The Matlab software for the analysis has been incorporated in the software at this time and is being optimized.

Task 4 has been implemented in NYSlab pre-processor. This module has been translated into the code of IntPave. The user can define any number of axles in any configuration and save them for future use. The truck files to be shared by both NYSlab and IntPave.

Task 5 has started and is in progress.

March 2010

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¹ Handbook of Vehicle-Road Interaction, Taylor & Francis, 612 p.

² Handbook of Vehicle-Road Interaction, Taylor & Francis, 612 p.

Task 5 is in progress and should be complete by the end of April. A library of rehabilitation costs has been incorporated and the algorithm to consider more than one passes of a heavy truck is being worked on.

April 2010

Task 1 is complete at this time. More detail about this task was provided in October 2009 progress report.

Task 2 is complete at this time. More details about this task were provided in the February 2010 progress report.

Task 3 on improving the post and pre-processor is progressing rapidly. The pre-processor, which is being harmonized with the one developed for NYSlab, is complete. The post-processor is close to completion at this time. The Matlab software for the analysis has been incorporated in the software and has been optimized to improve speed. This task is somewhat delayed because of a change in the graphical user interface of the pre- and post-processor. Based on recommendation from the project director they are developing the interface in a way that would be easily integrated as a suite. This requires several modifications to the interface. Their programming team had to modify several subroutines. At this stage, the personnel have separated the software into three phases: a) analysis, b) damage and c) permit fee. They hope that with a three month no cost extension they will have the new interface complete and be able to do a verification of the new version with the old version of INTPAVE. The extension will also allow them time to update the manual.

Task 4 has been implemented in NYSlab pre-processor. This module has been translated into the code of IntPave. The user can define any number of axles in any configuration and save them for future use. The truck files to be shared by both NYSlab and IntPave.

Task 5 is in progress and should be complete by the end of May. A library of rehabilitation costs has been incorporated and the algorithm to consider more than one passes of a heavy truck is being worked on. This task is slightly delayed because of the changes to the pre and post processors.

Development of JPCP Design Catalog for NY State

ESCINC is working in coordination with ORITE (OU) on this task order.

February 2010

Data on New York test road Syracuse I90 has been collected and analysis of this data has commenced. Review of the traffic data will continue and they have started preparing a brief report on the traffic data. Review and entry of available material properties has continued. They have reviewed base material data and determined that very little was available.

March 2010

Collected data on New York test road Syracuse I90. Completed analysis of previously collected data and began analysis of new data. They completed review of previously collected traffic data, continued preparing a brief report on traffic data, and acquired some additional traffic data. They have continued review and entry of available material properties.

April 2010

Collected data on New York test road Syracuse I90. They began analysis of new data. They have continued the review of new traffic data and continue review and entry of available material properties.

Enhancement of IntPave and NYSlab

ESCINC is working in coordination with UTEP on this task order.

February 2010

The Doctoral student working on this project continues to familiarize himself with the previous work on the development of NYSLAB and IntPave. He has also started work on Tasks 1 and 2 regarding literature review on ways to model the variation of material properties over time and location and how to implement an improved finite element in NYSlab. At this stage he is at the beginning of the learning curve but we expect to be at full speed in the next couple of months.

March 2010

The Doctoral student working on this project continues to familiarize himself with the previous work on the development of NYSLAB and IntPave. He has finished reviewing the literature on pavement modeling. The student is now reviewing the finite element programs developed previously in Matlab. The objective is for him to fully understand the codes so that he can start then implementing the improvements proposed.

April 2010

The Doctoral student working on this project continues to familiarize himself with the previous work on the development of NYSLAB and IntPave. He is now fully focused on reviewing the finite element programs developed previously in Matlab and highlighting the sections of the code that will need modifications to implement the proposed improvements.

Work Planned for Next Period:

1. Development of JSLAB 2007

UTEP: ESCINC has conveyed the concerns to ORITE and asked the PI from UTEP to follow-up with OU and coordinate accordingly.

OU: Ohio University will continue trying to get a latest version of the program that works and continue generating results. When they have a version that can be used, they will prepare another bug report.

2. Development of IntPave

Continue working on Task 5.

3. Development of JPCP Design Catalog for NY State

- Continue collection and analysis of data collected on New York test road Syracuse I90.
- A truck test on I90 is scheduled for May.
- Complete review of new traffic data and report when review is complete.
- Continue review and entry of available material properties.
- Will commence with laboratory testing of material specimens from New York.

4. Task Order #14: Enhancement of IntPave and NYSlab

The student will complete the study of the current code by the middle of June. Once this is done, the student will focus in Tasks 1, 2 and 3 of the SOW.