

## **Accelerated Intelligent Compaction Technology for Embankment Subgrade Soils, Aggregates Base and Asphalt Pavement Material**

The anticipated time frame for posting a “request for proposal,” tasks to be conducted by the contractor, and IC project types, and possible methods of funding for the IC projects, etc. are summarized below. For additional information regarding intelligent compaction: overview and research need please link to the following website

[http://www.webs1.uidaho.edu/bavomy/trb/afh60/IntCompaction\\_Briaud\\_September2004\\_.pdf](http://www.webs1.uidaho.edu/bavomy/trb/afh60/IntCompaction_Briaud_September2004_.pdf)

### **Summary:**

A project statement (request for proposal) for the proposed study (Accelerated Implementation of Intelligent Compaction Technology for Embankment Subgrade Soils, Aggregates Base and Asphalt Pavement Material) anticipated to be posted in October 2005.

Subsequent to selection of contractor and contract award, the contract will be conducting a series of tasks including, but not limited to: forming a technical working group (TWG), coordination with roller manufacturer representatives to provide roller(s), develop reports (i.e., work plan, intelligent compaction in Europe, project summary, annual reports, etc.), management of database and analysis interpretation of the data, and development of technology transfer package.

We encourage that each participant states to travel to IC projects to observe IC operation. The goal is for each pool fund participant states to gain experience from each IC project regardless of its location within the US. Engineers from participant state will work as a virtual team on each new IC project. The goal is for each DOT to gain significantly more IC knowledge via this method than would have obtained if an equivalent number of IC projects were performed in their home state. In addition to cost savings, this approach should radically reduce the development of a US based IC expert pool and network.

Studies will be on each of four pavement /subgrade material types listed below. IC data will be reported using a roller-mounted documentation system to provide a visual plot of compaction results. Also, will be conducting concurrent testing of the final, compacted material to determine density, strength, and modulus. On the initial projects, this may include in-place testing using equipment to be determined such as Dynamic Cone Penetrometer, plate load testing, GeoGauge, Falling Weight Deflectometer, etc. and density testing (nuclear and/or volumetric). It may also include laboratory testing of compacted material, such as elastic modulus testing.

The proposed material types are:

- Type I granular, non-cohesive subgrade soils
- Type II fine grained, cohesive subgrade soils
- Type III aggregate base material
- Type IV asphalt pavement material

The contractor will be responsible for coordinating with the NCHRP 21-09 project entitled “Examine the Benefits and Adoptability of Intelligent Soil Compaction,” to prevent any duplication of IC field trials.

Standard experiments shall be conducted on each of the pooled fund projects, specific to the type of material being compacted. Both conventional compaction equipment and IC compaction equipment will be used on adjacent test sections to compact the subgrade or pavement material. Then, testing of the compacted material will be performed and the test data will be recorded. Three basic questions will be answered:

- Is the density and/or the variability of density improved when IC technology is used as compared to conventional compaction technology (average density and variability)?
- Is the efficiency of the compaction operation improved when IC technology is used as compared to conventional compaction technology (fewer roller passes, decreased time of compaction)?
- How does stiffness, modulus, density etc. measured or calculated from the roller instrumentation compare to measurements of the same properties using stand alone pavement testing equipment (plate loading, GeoGauge, FWD, nuclear density gauges, etc.)?

For the purposes of this Pool Fund Project:

1. An IC project is defined as one where:
  - IC Technology is employed over entire limits of a construction project, or at a minimum of four test section locations between 500-ft to 1,000-ft in length and two traffic lanes in width.
  - The QC program at the test sections includes both the traditional compaction specifications verification testing, and the additional testing as outlined in the pool fund projects standard testing protocol document.
2. For IC Pool Fund Projects, the Compaction Specifications for acceptance and or payments of contractor’s compaction work will be the State’s current in place specifications. No alterations should be made that are dependent upon IC roller results or that of the additional testing for IC evaluation (methods and/or frequency of testing).
3. The IC work and related supplemental testing will be for the sole purpose of gathering data and gaining the knowledge needed to develop credible and productive IC specifications for future projects. The results of the IC data/work should not be used as a tool to require the contractor to perform additional work beyond what is required by the State’s project contract and

The TWG membership will be formed to attending TWG meetings, travel to IC projects to observe IC operation, provide input to the contractor on technical aspect of the IC projects and contract deliverable and other items as required. The TWG will consist of four or five representatives of participating state DOTs, FHWA, as well as representatives Contractor and Material Suppliers Associations. The expertise of the TWG members should include extensive technical expertise in the compaction of all materials. The TWG will meet once a year for the entire three-year period covered by this plan.

The travel expense reimbursements (transportation, lodging, and per diem) will be made from the pool fund. The following additional construction costs for IC projects also will be made from pool fund.

- IC roller rental
- Roller manufacturers expert engineers project activities and attendance/assistance/training at specific individual IC projects
- Additional contractor activities

Possible methods of funding for the IC projects may include:

- FHWA experimental features
- Work Order/Change order
- State Construction Funds.
- State or Federal Research Funds.

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