

The benefit/cost analysis  
was performed in 1997



JTRP / INDOT RESEARCH PROGRAM

# Research Pays Off

## Multimedia Constructability Program

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When a construction project is undertaken, there are often problems encountered. The problems encountered are solved, but the solutions are only known to those who worked on the solution of the specific problem. In future projects, the same problems often reoccur and time and money expended in resolving them. The knowledge from the first occurrence is not always available to avoid similar future occurrences. This is a waste of time and money.

The costs that occur are exacerbated because INDOT has a high engineer turnover rate. New INDOT engineers typically work 4-5 years before they move on to other employers (Mr. W. Land, INDOT). This means that

valuable knowledge learned in those 4 years is lost. This knowledge must be retained.

The purpose of this project was to study the use of multimedia to utilize information gained from highway projects that would otherwise be either lost or retained only by those who created the information. Every highway project produces knowledge about that project:

- what works,
- what does not work, and
- what lessons should be learned.

This knowledge, especially the lessons learned, formed the basis for the final multimedia presentation.

## Research Findings and Implementation

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Multimedia can be used to retain the information and present it in a convenient and effective manner. The project developed a multimedia tool for design engineers. The project takes the knowledge and puts it into a database that is easily accessible. This means that when a new project is proposed, the lessons that were learned in earlier projects can be applied to new projects. This will save costs by giving information about what techniques work well and about mistakes that can be avoided. The tool is an effective means to improve the constructability of INDOT projects.

There will be a cost of approximately \$100,000 annually for INDOT to maintain and update the system. The system was designed to operate on all multimedia PCs which are largely al-

ready in place. At present, information for the database is being gathered through user friendly software used in the field by the engineer. Change orders are also being reviewed, categorized and entered in the database. This information base will continue to build up with time as the number of projects increase.

The research portion of the project is complete. In February 1997, the content database was reviewed and is being implemented on computers in the field. Multimedia tools for providing ready access to new engineers is made available. This tool will also be nationally available, and currently there is a waiting list of 100 to 200 public and private engineering entities waiting to purchase it.

## Benefits

According to the Construction Industry Institute (CII) at the University of Texas at Austin, an effective constructability program should reduce construction costs by 6% to 23% annually. Assuming an annual highway construction cost of \$450 million, and using a conservative estimate of 3% cost reduction, the savings

generated should be \$13.5 million per year. Mr. Walter Land of IN-DOT expects a 3% to 5% reduction in costs in 2 or 3 years when implementation is well underway.

*Cost of  
Research  
\$135,000*

## Estimated Economic Value Over 20 Years At 5% Discount Rate

Cost Component	Annual Cost	Annual Savings	Discounted Savings (20 years)	Benefit/Cost Ratio
Construction Budget	\$ 450,000,000	\$ 13,500,000	\$ 168,750,000	
Additional Operation	\$ 100,000	\$ (100,000)	\$ (1,250,000)	
<b>Discounted Savings</b>			<b>\$ 167,500,000</b>	<b>1240.7</b>

## Assumptions

- That the INDOT construction budget is \$450 million per year.
- That there will be a 3% savings in construction costs (conservative compared to CII of 6%-23%)
- That the experience gained in a given job can be retained for similar jobs in the future.

## References

- Construction Industry Institute, 1993, Preview of Constructability Implementation
- Land, W. (INDOT), 1997 conversation
- McCullouch, B. G., (JHR Project Manager), 1996, conversation
- McCullouch, B. G. and Patty, R., "An INDOT Lessons Learned Constructability Program and Integrated Multimedia System," Joint Highway Research Project FHWA/IN/JHRP-93/6 Final Report, May 1994
- Wright, R. (Arizona DOT) 1996, conversation