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Development & Implementation of the Division of Research and Technology Web Page

FINAL REPORT
October 2002

Submitted
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16. Abstract

The New Jersey Department of Transportation (NJDOT) Research Division increased their output of technology transfer with the creation of an interactive web page. The web page provides technology transfer through information distribution of current as well as previous research to those who browse through the site. Current news and updates are available on the "what's new page." A photographic outline of the Research Division hierarchy, mission, strategic plan, and core values are available. Online distribution of resources for research associates provides a valuable tool for the University and research communities.

Web page education of the NJDOT Research Division employees was included with the project. This allowed Research Division employees the ability to modify the graphics and other essential elements to the presentation of the website. The final placement of the website was to be located at the New Jersey Department of Transportation site. This allows Research Division employees to update and change sections of the site to provide up to date information to research professionals and others who would be using the website resources.

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ABSTRACT

The New Jersey Department of Transportation (NJDOT) Research Division increased their output of technology transfer with the creation of an interactive web page. The web page provides technology transfer through information distribution of current, as well as previous, research to those who browse through the site. Current news and updates are available on the "what's new page." A photographic outline of the Research Division hierarchy, mission, strategic plan, and core values are available. Online distribution of resources for research associates provides a valuable tool for the University and research communities.

Web page education of the NJDOT Research Division employees was included with the project. This allowed Research Division employees the ability to modify the graphics and other essential elements to the presentation of the website. The final placement of the website was to be located at the New Jersey Department of Transportation site. This allows Research Division employees to update and change sections of the site to provide up to date information to research professionals and others who would be using the website resources.

BACKGROUND

The original purpose of this project was to develop an avenue for technology transfer for the Research Division to disseminate their research findings. However, over the course of several years, the purpose became more refined to cover advancements in web capabilities as well as covering a more robust scope of work.

The project was contracted through Rutgers University and the Center for Advanced Infrastructure and Transportation (CAIT). Advanced Technology Concepts (ATC) was the sub consultant. CAIT acted as the liaison for the project to filter, condense, and digitize information provided by the NJDOT in non web related formats. CAIT submitted the information to ATC in a web content format for facilitation of the design, coding, and completion of the project. As the sub consultant, the brunt of the design, coding, and back end work was done by ATC. They performed the design work performing several changes in design specifications. The design and coding of the database, search engine, and research input tools involved heavy object oriented programming as well as coding expertise which was provided by ATC.

Progression of the completion of the website followed three distinct but overlapping time phases: the design phase, access phase, and the implementation phase. The design phase focused on gathering information of what was exactly desired as an outcome of the website. This included determining the audience as well as creating the designs and gathering the necessary information for static web page design. The static web page design involved basic html without heavy programming. Back end of the web page including database work for search engine and final report scanning was completed in this phase. The main focus of

the access phase was the introduction of the website to the public. The Implementation phase of the web page covered adjusting the NJDOT to ownership of the website, so that they could maintain and update the site as needed. Education of NJDOT employees by ATC was covered in this phase.

DESIGN

The overall design of the web page was covered in seven subtasks: web page management, directory structure, theme, toolbar, content, and data.

The web page management focused on three important techniques that contributed to the Research Division website being highly effective and enjoyable. A web page that is effective brings about organization of the design, implementation of strategies that will convey the correct message, and simplicity along with functionality. These three management techniques are extremely critical to any web design process, and needed to be taken care of first. A series of monthly meetings were held between the Research Division, CAIT, and ATC. Initial meetings focused on applications of the website and determining exactly what the Research Division wanted on the website. Later meetings focused on gathering the content for inclusion within the website.

A competent directory structure was created for ease of use, as well as correct filing could take place throughout the design process. The directory structure is easily navigable and easy for others to learn. The original directory structure was modified due to the nature of the server that the website was installed upon. Initially the directory structure consisted of all of the research reports and the back-end structure for the search engine and the listings. However the State of New Jersey's Office of Information Technology (OIT) required that the directory remain separate for deployment to a separate server in another location. Based on this, the Research Division employees would have access to change the static web pages which would be on the NJDOT web server. The backend structure was too complex for CAIT or Research Division employees to modify, thus the OIT will eventually handle updates or changes to this resource.

The theme behind the web page consisted of the background prints, buttons, and "decorations" that adorned the web page and made it creative. The object was to offer the browser an inviting atmosphere within the process of perusing the website. The development of the theme allowed connectivity between the readers and the pages as well as continuity from page to page. When the reader finds the web site interesting and pleasant to the eye, there will be a greater chance they will return to use the site again. The implementation of the theme was very critical to the web page design. The development of the theme was established by obtaining supporting images, backgrounds that provided textural feel, and color schemes that promoted learning. A concept was brought to the NJDOT for initial viewing. This was the first visual representation of the Research Division that was expressed and supported with reservations. Suggestions were obtained from Research Division staff on the colors and the decorations that were provided. The printable functionality was also explored due to the obvious determination that the site would be widely

used and printed out. Several initial changes were made to the website, including using a white background with black text so that the text was viewable when printed out.

The toolbar was a unique part of the theme that was developed. The toolbars purpose was to provide a continuous structure throughout the web page. It contained links to other pages within the site, as well as a menu that organized the web page into a displayed directory structure. The initial toolbar contained several different links that navigated through both the site and provided links to supporting university centers. This toolbar was deemed as acceptable to the Research Division. However, due to restructuring of the NJDOT, the inclusion of an additional top toolbar was needed for navigation through the NJDOT website. This revised toolbar was included and the design and theme were modified to accommodate this change in the theme of the page. A different color scheme was adopted and the change to screen space, due to the toolbar taking up space at the top of the page.

The content of a website is targeted at a particular audience. Making sure the page provides technology transfer to the correct audience is critical to its success. The audience was determined to be current researchers in universities, private practice, and federally funded research organizations. Other, secondary audiences, were those people with interests in the specific topics of the archived data. By determining who the audience was, the correct information was conveyed to the people who would benefit from use of the web site.

As the project progressed, the content of the website was gathered through meetings and e-mails from the Research Division through CAIT to ATC. This assured that each contributing member of the project was aware of additions that were being added to the website and changes that were being made to existing content. The goal was to assure that the content was directed at the correct audience. The gathering of content was crucial to the implementation of the website because the size of the content was used to determine the best layout on each webpage. Once the theme was established, the content was needed to complete the front end design phase of the site.

The data section of the website can be split into two categories, the backend content and the backend applications.

The backend content included the final reports and previous quarterly reports. There were over 400 final reports cataloged in the Research Division Library. Nearly all of them were in a paper format with the average size being roughly 40 pages. This required an implementation of a method of scanning each one of the reports in a timely manner. This task was given to CAIT due to the sheer multitude of pages that needed scanning.

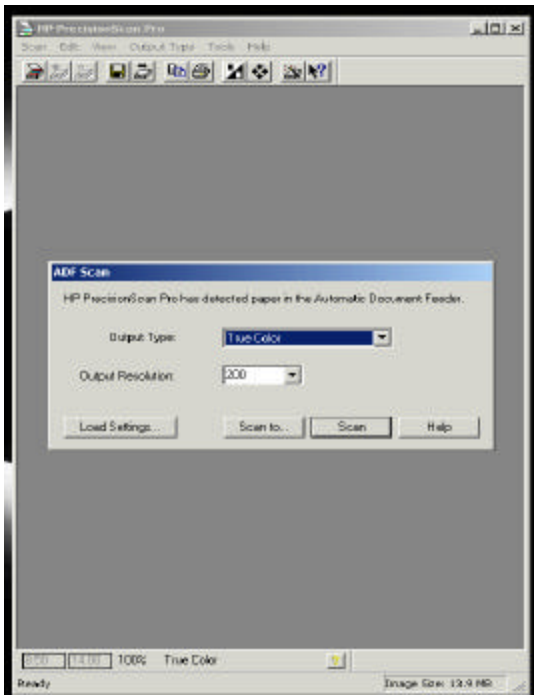

Figure 1 ADF Scan dialog box during scanning process

The process was developed using a scanner with an automatic document feeder. The use of this feature was instrumental in providing the ability to scan all of the reports in a length of time adequate for completion within the proposed project length. Roughly 25 pages of a document were placed on the automated document feeder, which was in the single page scan position. When the lever was moved to the multiple page scan position, a box like Figure 1 appeared on the screen. The option “Load Settings” was selected and another box popped up on the screen. The settings were pre-set for a 8.5” x 11” sheet of paper. The setting was selected for a black and white bitmap image.

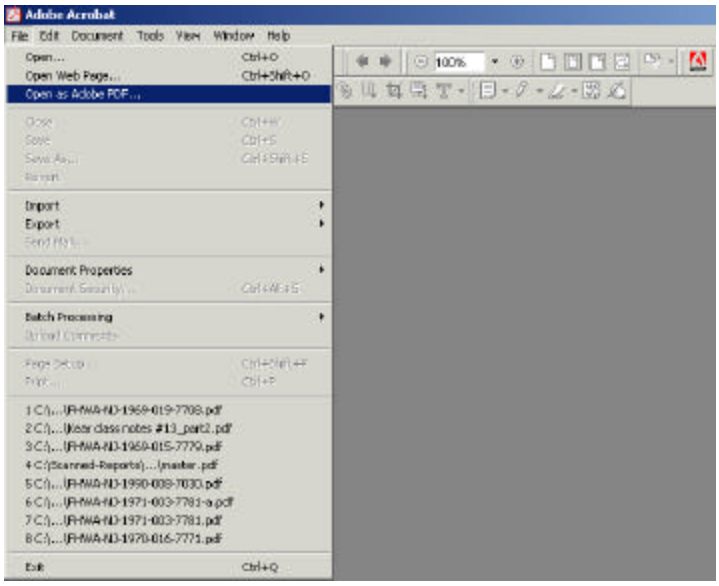

Figure 2 Opening bitmap files to import into Adobe Acrobat

The files were saved to a specific directory for each particular report. After the entire report was saved in bitmap format to the directory, Adobe Acrobat was opened. The option “Open as Adobe PDF…” was selected as shown in Figure 2 and the entire directory where the bitmaps were located was selected. All of the images were rendered to PDF format. One of the requirements for dissemination of the reports was that they had to be searchable within the body of the PDF. This presented a challenge based on the software that was available through Adobe Acrobat. However, a third party software called PaperCapture was found through the Adobe website. This program went through existing pdf documents as shown on the right side of Figure 3, and examined the existing images that were in black and white bitmap format. The option “Paper Capture…” was selected and it used Online Character Recognition software to obtain the text within the document.

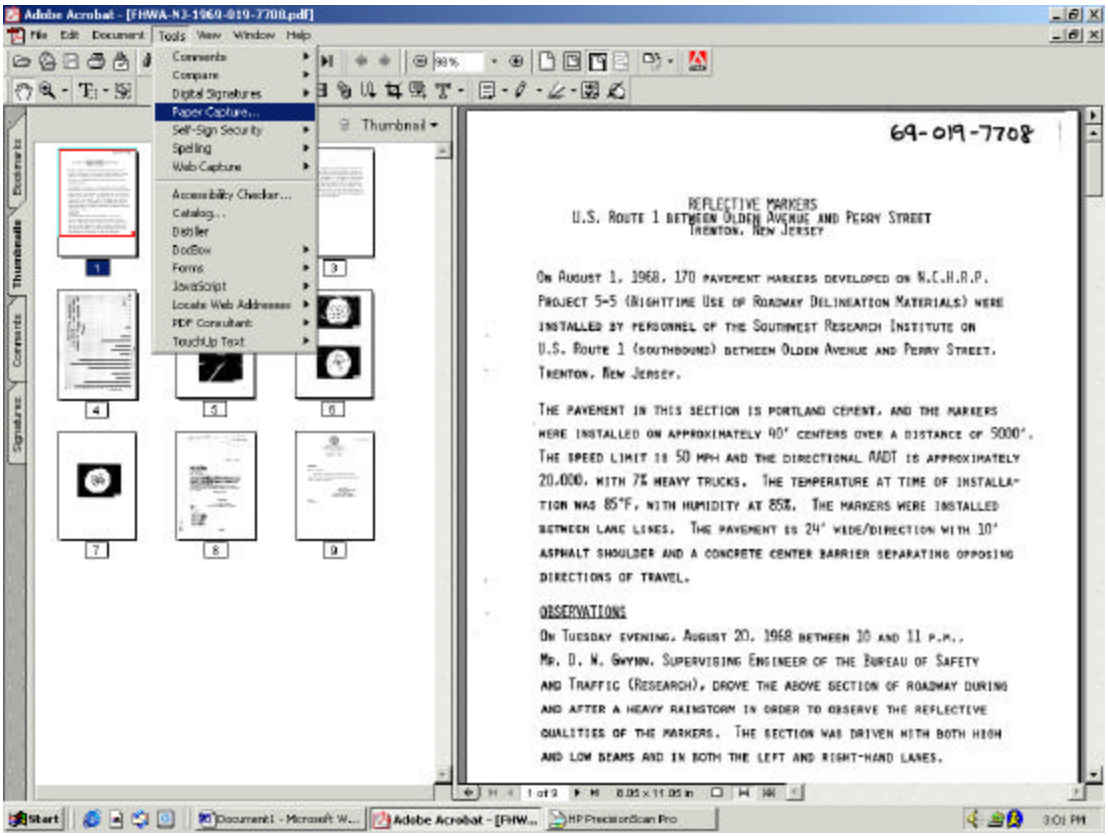

Figure 3 Processing of Bitmap images with PaperCapture to produce a exact image of the document with a hidden searchable text layer

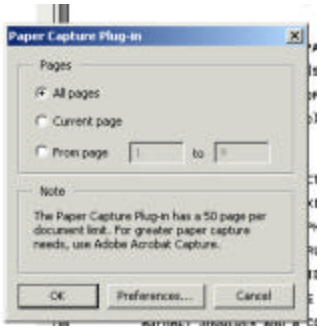

Figure 4 All pages need to be processed

This was very useful in that it could go through the entire PDF document as shown in Figure 4, recognize the words, and make the document searchable for keyword searches. This is what the Research Division needed to meet their goal of making their entire database of final reports searchable.

The backend applications were needed to render the final reports in an organized manner. There are over 400 final reports that have been completed for the Research Division by various entities and the reports needed to be cataloged and organized for visitors to the site

to be able to access them in a quick and orderly manner. Based on the configurations of the OIT's application server, a certain server configuration needed to be reproduced on ATC's development system. The iPlanet Application Server needed to be reproduced not only the development of the specific code that was developed by ATC, but also for testing and determining what could and could not be done on the OIT server.

The database component consisted of two parts: the database itself on an Oracle server and the database access code written in Java Beans and JSP. The Oracle database schema is a directory where the information is stored much like a road map. It has only two types of Oracle objects: tables that store data and sequences that are used to generate primary keys. The tables that store the data contain the basic information for each of the final reports like the titles or the authors for example. The sequences that generate the primary keys is the distinguishing information for each report that separates it from a similar report by the same author in the same year for example.

The database access code, which comprises the application part itself, consisted of two parts: the website administration interface and the search engine.

The website administration interface is the tool used by the website administrator to modify data in the database. This was necessary based on the needs of the Research Division to modify or add reports after the completion of the project. The interface tool was designed to facilitate ease of use for the Research Division personnel with adding, deleting, and modifying properties of each project in the database.

The search engine of the application was intended to search the projects in the database. The user has the capability to search by project titles, authors, Research Division numbers, dates, schools, organizations, or keywords. The engine searches for the given search criteria and displays the data in the selected format. The capabilities were provided for the user to select two "and/or" statements to limit/expand the variables that the search engine looks for. This provided a much more robust data mining tool for visitors to the search page.

The search engine was tightly embedded into the application and was functioning as part of it, not just as an add-on, so it worked on the platform the client specified for deployment (iPlanet Application Server). The search engine only provides read only access to data, which prevents data from being overwritten or changed by users other than the person using the website administration interface.

The output of the search engine provided the results according to the search criteria and a listing of matches there were based on the search. This allows the user to determine whether he had obtained enough data sets to actually use the narrowed set of data. The screen that is brought up after the search also contains previous searches, providing the ability to compare the results and limit the searches to an even narrower subset of data.

When it is determined that the data has been pared down to a manageable subset of reports, the search output is selected and it goes to a display of the search output. The general output provides a descending alphabetical or numerical listing of the reports based on the search criteria and then a column for the abstract, a column for the Tech Brief, and the name of the report. The abstract is a concise explanation of the project and what was

performed. The Tech Brief provided a 2-3 page explanation of the project, listing the research approach, results, and conclusion.

If there was an abstract or Tech Brief for the project in the database, that column would have the word "view" underlined with a hyperlink to the actual document. The final report name could be selected and the entire pdf would be downloaded. These options allow the user to select how much information they wanted or needed for the project based on the work done by the Research Division.

ACCESS

The access phase began with the review of the web pages by members of the Research Division (outside of the research manager). This outside influence helped to gain a new perspectives on the website and provided some insight into what a user would seek out within the website. Various design elements were slightly modified and pages and links within the website were shuffled around to provide smooth use for people who were testing the site. The access phase culminated in the display of the website outside of the firewall that the OIT provided for testing by the Research Division members.

The public display portion of the access phase was intended to be the point where people could begin using the website. This included researchers that needed the information that was contained within it as well as random browsers that happened upon the website by chance. During the public display phase, the e-mails and phone calls to the listed numbers and e-mail addresses was taken as feedback. This feedback was considered by the Research Division staff who determined if the website needed to be changed or modified. The intent of the initial period of public display was to streamline the site for improved navigation and organization.

The "what's new" page was designed to be edited or modified roughly once a month in order to keep up to date with any new information such as notices of new project report forms online, as well as to report on current projects that the Research Division is working on and their progress.

Based on the time associated with the access phase, it was necessary to determine whether some hyperlinks had become outdated. This was necessary to keep the content on the links pages from becoming outdated and to avoid frustrating for users who cannot browse to where they would like to go. Addition of new links, as they became available, helped the users become aware of new technologies or information being reported on other web sites. The greater the number of links listed on the web page, the more the web page is seen as a valuable resource to others.

SUMMARY OF WEB PAGE FEATURES

The New Jersey Department of Transportation (NJDOT) Research Division interactive web page has seven (7) key features:

1. Research Partners: Easy connection to University research partners and their respective websites.
2. E-mail: Direct e-mail access to all NJDOT research staff.
3. Current Projects: Summary of quarterly meeting schedule and current research quarterly reports.
4. Research Reports: Listing of completed research, abstracts, tech briefs, and final reports. These full text documents can be searched utilizing the built in search tool.
5. Organization/Directions: Photographic organizational charts and directions to the NJDOT.
6. Links: Listing of research sites at the National, State, and Local levels.
7. Guidelines/Formats: Provides downloadable guidelines for proposals, invoices, and final reports.

IMPLEMENTATION

The implementation phase focused on finalizing the processes of updating the page so that others can effectively maintain the page. This phase included teaching Research Division employees how to maintain the site and providing a manual for updating the site once the project has been completed.

A course was set up using the Rutgers Center for Applied Computing Technologies facilities. The syllabus that was distributed is shown in Appendix 1. The Research Division employees were taught on three basic programs: Macromedia Dreamweaver, Adobe Acrobat, and Adobe Photoshop. These three programs are the programs that were used to develop most of the design phase information that was put on the site. Based on previous explanations, the back end capabilities were not taught to the Research Division employees. The directory structure was taught and the intricacies of the site were explained. They were taught where and how to put new files online so that future updates can be accomplished. This allowed the Research Division to assume complete control of the site by certain people with access in the division.

A manual explaining the site and updating procedures was created so that anyone with minimal experience in web page design is able to understand what is necessary to continue servicing the page for the division.

CONCLUSION

The NJDOT Research Division web page was created to broadcast their research results, successes, and to establish their presence on the web. Their intent is to focus on the distribution of current research information and to allow others to gain access to the resources and other information that they have gathered through numerous years of research. The continual addition of information to the site allows browsers of the site the ability to continually see the progress of research within the division.

APPENDIX 1 SYLLABUS FOR NJDOT TRAINING

Advanced Technology Concepts, Inc.

Rutgers Internet Institute

February 13, 2002

NJDOT IT Training

Session 1

Basics of Internetworking and HTML. Introduction into NJDOT R&T Site.

10:00 AM – 12:00 PM

- Introduction into TCP/IP protocol family.
- Introduction into HTML.
- How to use NJDOT R&T site. Searching the Project Database.
- Using Admin tool – adding new items into the Project Database.

12:00 PM – 1:00 PM

Lunch

1:00 PM – 3:00 PM

- HTTP and FTP protocols: how to upload/download/view a website.
- Creating simple HTML page.
- Basics of Image editing using Adobe Photoshop.

Advanced Technology Concepts, Inc.

Rutgers Internet Institute

February 20, 2002

NJDOT IT Training

Session 2

NJDOT R&T Site Management using Macromedia Dreamweaver 4 (Part 1).

10:00 AM – 12:00 PM

- Manipulating tables in HTML.
- Defining a site. Site storage in Local folder. Remote access via FTP.
- Site structure. Image folders. File Folders.

12:00 PM – 1:00 PM

Lunch

1:00 PM – 3:00 PM

- Removing/editing text in individual web pages.
- Adding/Removing/Updating images and files.
- Adding/Updating links.
- Updating files on the remote web server.
- Important tips.

Advanced Technology Concepts, Inc.

Rutgers Internet Institute

February 27, 2002

NJDOT IT Training

Session 3

NJDOT R&T Site Management using Macromedia Dreamweaver 4 (Part 2).

10:00 AM – 12:00 PM

- Adding/Editing specific items in the website.

12:00 PM – 1:00 PM

Lunch

1:00 PM – 3:00 PM

- Quiz for Two Teams:

  Team 1: Add a new person's contact information (Name, Photo, e-mail) into "Getting to know us" page.

  Team 2: Adding a new department into "Contact us" page.

APPENDIX 2 LIST OF SCANNED REPORTS

Table 1 List of Scanned Reports

Report Name	***Year***	***FHWA Number***
INFORMATION NEEDS AND INFORMATION SERVICES AT THE NEW JERSEY DEPARTMENT	1999	99-001-7460
Reestablishment of Research Library Operations at the New Jersey Department of Transportation	1999	99-004-TESC-1
To Advance the Concept of Aesthetics and Constructability in the Design of Noise Barrier Walls Throug	1999	99-007-NC19
EVALUATION OF RECLAIMED ASPHALT PAVEMENT AND RECYCLED CONCRETE AGGRE	1999	99-027-7280
Reestablishment of Research Library Operations at the New Jersey Department of Transportation	1999	99-004-TESC-1
Impact of Access Driveways on Accident Rates at Multilane Highways	1999	99-008-NCTIP5
4D DRIVE-THROUGH VISUALIZATION OF I-280 FOR REVIEW OF PROPOSED SIGNING	1998	98-001-CAIT6
VEHICLE IMPACT SIMULATION FOR CURB AND BARRIER DESIGN	1998	98-048-CAIT1
EROSION AND SEDIMENTATION ON HIGHWAY SYSTEMS	1998	98-001-7560
STRUCTURAL COATINGS PERFORMANCE EVALUATION (MATHIS BRIDGE STUDY)	1998	
The Use of Lidar to Evaluate Existing Incident Management System on 1-80 in Morris, Essex, and Passa	1998	98-004-7290
I-80 HOV Lane Evaluation Study	1997	97-004-7290
Reduction of Traffic Noise at the Source	1997	98-002-7610
Asphalt Additives and Rut Resistant Pavements	1997	97-002
TRUCK NOISE LEVEL UPDATE FOR NEW JERSEY	1997	97-003-7950
EVALUATION OF SUBSURFACE ROAD DRAINAGE SYSTEMS	1997	97-005-7080
EXPERIMENTAL LIME FLY ASH BASE COURSE, ROUTE 1-295, MERCER COUNTY, NEW JER	1997	97-006-4712
USING NIGHT VIDEOTAPES FOR SRPM MAINTENANCE DECISIONS	1997	97-008-7480
External Validity Test for Discrete Choice Transportation Forecasting Models based on the Stated Choic	1997	99-003-NC4
DEVELOPMENT OF AIR VOIDS SPECIFICATION FOR BITUMINOUS CONCRETE	1996	96-003
Evaluation of Highway Runoff Pollution Control Devices	1996	96-007-7620
Intelligent Transportation Systems Measures of Effectiveness	1996	
An Evaluation of Thorma Joint- A Flexible Bridge Expansion Joint System	1995	95-001-7030
GUIDE SIGN PLACEMENT AND HIGHWAY ENVIRONMENTS	1995	95-002-7370
EVALUATION OF BRIDGE DECK CATHODIC PROTECTION	1994	93-006-7520
SKID RESISTANCE IMPLEMENTATION STUDY	1994	94-002-7750
OPERATION OF WEAVING AREAS UNDER NON-FREEWAY CONDITIONS	1994	94-003-7230
TRUCK NOISE LEVELS ON UPGRADES AND A SIMPLE METHOD FOR NOISE PREDICTION	1992	91-004-7910
PUBLIC RESPONSE TO NOISE BARRIERS	1992	93-003-7890
THE EFFECT OF TREES ON NOISE BARRIER PERFORMANCE	1992	93-004-7870
OWNERSHIP COSTS OF TRAFFIC SIGNAL LAMPS	1992	93-005-7810
STRIPING METHODS TO REDUCE ACCIDENTS AT INTERCHANGES	1991	91-002-7550
ARAN RUT DEPTH MEASUREMENT SYSTEM	1991	91-007-7030
EVALUATION OF THE TILT AND ABSORBING NOISE BARRIERS ON 1-78 SECTIONS 5M, 5BV	1991	92-002-7840
GUIDE SIGN VIEW SURVEY IN NEW JERSEY	1991	92-004-7370
SIGNS ON BREAKAWAY BARRICADES WIND AND CRASH TESTS	1990	90-007-7410
AN EVALUATION OF THORMA JOINT A FLEXIBLE BRIDGE EXPANSION JOINT SYSTEM	1990	90-009-7120
IMPROVED SIGNING FOR TRAFFIC CIRCLES	1990	91-003-7350
COLD RECYCLING OF BITUMINOUS PAVEMENTS BUCKSHUTEM ROAD, COUNTY ROUTE (	1990	91-005-7070
CALIBRATION OF FACE DIPSTICK AND ARAN TO REPORT ROUGHNESS IN IRI UNITS	1990	90-008-7030
EFFECT OF WIDTH ON EDGELINE LIFE	1989	89-003-7728
CORRELATION OF USER PERCEIVED PAVEMENT ROUGHNESS PSR WITH PHYSICAL ROUG	1989	89-007-7060
LONGITUDINAL WEDGE JOINT STUDY	1989	89-009-7340
WHEEL PATH RUT MEASUREMENT	1989	90-005-7250
EXPERIMENTAL CONCRETE PAVEMENT TINING, ROUTE 1-295, Section 1X	1988	88-008-7703
PAVEPREP MEMBRANE REPORT: INSTALLATION AND MONITORING	1988	88-010-7779
SOLAR DOMESTIC HOT WATER SYSTEM HARDING TOWNSHIP REST AREA BUILDING, 1-2	1988	88-011-7799-11
CENTER BARRIER DELINEATOR SPACING STUDY	1988	88-013-7714
TRAFFIC FLOW IN CONSTRUCTION ZONES	1988	88-014-7738

Table 2 List of Scanned Reports (Continued)

Report Name	***Year***	***FHWA Number***
Effects of Access On Capacity and Flow	1988	89-005-7739
State Sponsored Research in FY 87	1988	
RT. 1-78 SHOULDER REHABILITATION EVALUATION	1988	88-015-7799
APPLIED REGRESSION IN THE PRESENCE OF X ERROR	1988	88-016-7788
GEORGE WASHINGTON BRIDGE BUS-CARPOOL LANE ONE YEAR OPERATIONAL REPORT	1988	89-001-0206
NEW JERSEY PAVEMENT MANAGEMENT STUDY	1988	89-002-7060
Evaluation of New A Passing Zone Gore Design	1988	89-004-7733
U.S Department of Transportation Asphalt Emulsions for Highway Construction	1987	86-011-7726
SECOND GENERATION PAVEMENT OVERLAYS	1987	86-013-7778
SKID RESISTANCE STUDY	1987	86-016-7711
Evaluation of the Accuracy, Reliability, Effectiveness, Expansibility, and Additional Potential Benefits o	1987	88-003-7750
INCENTIVES/DISINCENTIVES	1987	88-007-7730
REPAIR OF BRIDGE DECK STRUCTURES IN COLD WEATHER	1987	88-012-771
Texturing Bridge Decks	1986	86-009-7703
EXPERIMENTAL LIME FLY ASH BASE COURSE, ROUTE 1-295, MERCER COUNTY, NEW JER	1986	86-012-4712
ANALYSIS OF TWO ALUMINUM WELD ACCEPTANCE PROCEDURES	1986	86-015-7720
EPOXY THERMOPLASTIC PAVEMENT MARKING MATERIAL-FINAL REPORT	1986	86-019-4730
FIELD EVALUATION OF A FUSION-BONDED WHITE POLYESTER COATED GUIDERAIL	1986	87-001-4706
INVESTIGATION OF SRPM REFLECTOR DAMAGE CAUSED BY SNOWPLOW CASTER WHEE	1986	87-002-7703
DETERMINATION OF INSERTION LOSS FOR TRAFFIC NOISE' BARRIER ALONG 1-676 CAMI	1986	87-004-7790
NJ Breakaway Sign Testing	1985	85-006-7715
Guidelines for raising manhole and inlet heads	1985	85-010-7703
Use of Discarded Tires and Reclaimed Rubber in Highway Construction	1985	86-003-7703
ASPHALT ADDITIVES STUDY	1985	85-007-7713
New Jersey Paint Skip Technical Manual	1985	85-009-9171
REVISION OF A FLAWED ACCEPTANCE STANDARD	1985	86-005-7788
REVISED DECISION CRITERIA FOR BEFORE/AFTER ANALYSES	1985	86-006-7788
CONCEPTS, APPLICATIONS, AND MISAPPLICATIONS OF THE CHI-SQUARE STATISTIC	1985	86-007-7788
LONG TERM, FREEWAY WORK ZONE DELINEATION ISSUES AND INNOVATIONS	1985	85-008-7703
Correlation Between Design Exceptions and Accidents	1984	84-009-7703
Guiderail Visibility Needs Analysis	1984	85-001-7751
Highway Performance Monitoring System	1984	85-002-7703
Analysis of Pavement Damage Attributable to Overweight Trucks in NJ	1984	84-014-7720
THE EVALUATION OF HONEY COMB HIGHWAY SOUND BARRIER 1-280 SECTION 88	1984	85-004-7799-10
EPOXY THERMOPLASTIC PAVEMENT MARKING MATERIAL-CONSTRUCTION REPORT	1984	85-005-4730
IMPROVED DRAINAGE AND FROST ACTION CRITERIA FOR NEW JERSEY PAVEMENT DES	1984	84-015-7740
Construction Zone Safety and Delineation Study	1983	83-005-7768
Evaluation of Chem-Trete Bsm Silane Surface Treatment	1983	84-005-7799
Skid Resistance Performance of NJDOT Surface Course Mixes	1983	84-006-7703
Review of Asphalt Production and Specification Methods	1983	84-007-7799
Left Turn Treatments at Signalized Intersections Without Turn Slots	1983	84-008-7709
EVALUATION OF AN EXPERIMENTAL CONTRACTION JOINTED PAVEMENT	1983	84-002-7799
Accident, Traffic Performance, and Procedure Evaluation for Positive Guidance Demonstration	1982	83-002-4466
Shoulder Rehabilitation Evaluation I-78	1982	83-008-7799
EFFECT OF RAISED PAVEMENT MARKERS ON TRAFFIC PERFORMANCE	1982	83-001-7769
ROADSIDE VEGETATION IMPLEMENTATION OF FINE FESCUE GRASSES	1982	83-003-7727
A PROCEDURE FOR PROCESSING HIGHWAY NOISE COMPLAINTS	1982	83-004-4596
Premature Deterioration of White Concrete Curb	1981	81-008-7777
Rail Travel Program	1981	81-010-7753

Table 3 List of Scanned Reports (Continued)

Report Name	***Year***	***FHWA Number***
Experimental Cost Effective Reconstruction of Bridge Decks	1981	82-001-7799
Pulaski Skyway Epoxy Traffic Striping Construction Report	1981	82-002-7799
Evaluation of The Interstate 80 Emergency Reporting System	1981	82-005-7716
Experimental Pavement Project- Route 80/95	1981	82-007-7702
Improved Drainage and Frost Action Criteria for New Jersey Pavement Design - Road Surface Drainage	1981	81-012-7740
BREAKAWAY CABLE TERMINAL EVALUATION	1980	81-001-7799
Bituminous Concrete Pavement Recycling Route US 130 From Vicinity of Route US 1 to North of Hick	1980	81-002-4669
EVALUATION OF SEVERAL BRIDGE DECK PROTECTIVE SYSTEMS	1980	81-003-7783
NEW JERSEY CONCRETE MEDIAN Barrier SPECIFICATIONS	1980	81-004-7747
DETERMINATION OF TRUCK NOISE LEVELS FOR NEW JERSEY	1980	81-006-7791
A PROCEDURE FOR PROCESSING HIGHWAY NOISE COMPLAINTS	1980	81-007-4596
EVALUATION OF ANTI-SCALING AGENTS FOR CONCRETE	1979	79-007-7732
BRIDGE CONSTRUCTION with EIGHT YEAR PROGRESS REPORT UNPAINTED HIGH - STREN	1979	79-001-7799
NEW JERSEY CONCRETE MEDIAN BARRIER DELINEATION	1979	80-008-7799
SNOWPLOWABLE RAISED REFLECTIVE PAVEMENT MARKERS AT HAZARDOUS LOCATIO	1979	80-011-4668
Determination of Hot and Cold Start Percentages for New Jersey	1978	81-005-7792
THE EFFECT OF DOTTED EXTENDED LANE LINES ON RIGHT, SINGLE DECELERATION LA	1978	77-011-7714
NOISE MEASUREMENTS	1978	78-005S-7787
FURTHER EVALUATIONS OF SKID RESISTANT CHARACTERISTICS OF CARBONATE ROCK	1978	78-010-7772
PERMEABILITIES & L0AD SUPPORT CHARACTERISTICS OF MATERIALS USED AS BASE O	1978	78-014-7775
THE USE OF THE COLOR PURPLE FOR VARIABLE MESSAGE SIGNS	1978	78-015-0725
BRIDGE-CONSTRUCTION with UNPAINTED HIGH STRENGTH LOW - ALLOY STEEL: THE AE	1978	79-002-7799
EVALUATION OF THE OUTFLOW METER AS A MEASUREMENT OF PAVEMENT TEXTURE	1978	79-004-7767
I-95/695 ORIGIN/DESTINATION SURVEY PROCEDURES MANUAL	1977	77-009-1819-1823
Determination of Hot and Cold Start Percentages for New Jersey	1977	78-004-7792
DETERMINATION OF TRUCK NOISE LEVELS FOR NEW JERSEY	1977	78-008-7791
Railroad Subsidy: County Share	1977	77-005-7956
BUS SUBSIDIES TO COUNTIES	1976	76-007-7834
VEHICLE ENTRAPMENT	1976	76-008-7701
FIELD EVALUATION OF VARIOUS BRIDGE DECK JOINT SEALING SYSTEMS	1976	76-009-7784
PREFORMED ELASTOMERIC JOINT SEALERS FOR BRIDGES	1976	76-010-7731
Ensuring Reliability of Mays Roughness Measurements	1976	76-005-7776
JOINT USE PARK-AND-RIDE	1975	74-010-2892
PASSIVE CONTROL AT RAIL-HIGHWAY GRADE CROSSINGS	1975	75-002-7707
CONSULTANT CONTRACT MANAGEMENT PENALTY-AWARD ARRANGEMENTS	1975	75-005-7700
PEDESTRIAN GRADE SEPARATION LOCATIONS -A PRIORITY RANKING SYSTEM	1975	75-006-7712
SKID RESISTANT CHARACTERISTICS OF CARBONATE ROCK AGGREGATES	1975	75-008-7772
LOAD TESTS OF ARMORED BRIDGE JOINTS	1975	75-009c-7731
DIAGRAMMATIC SIGN STUDIES ON 1-287 IN NJ	1975	75-012-7757
BETTER GRASSES FOR ROADSIDES FINAL REPORT	1975	75-013-7726
BETTER GRASSES FOR ROADSIDES EXECUTIVE SUMMARY	1975	75-013S-7726
CENTER BARRIER VISIBILITY STUDY	1975	76-001-7710
PAVEMENT WEAR MEASUREMENTS TO QUANTIFY STUDDED TIRE DAMAGE	1975	76-004-7759
SLIPFORM PAVING WITH AN EXPERIMENTAL CONTRACTION JOINT DESIGN	1975	75-007-7779
THE RELATIONSHIP OF ENVIRONMENTAL PARAMETERS TO DISPLACEMENT RESPONSES	1975	75-009B-7732
PAVEMENT RIDING QUALITY	1974	74-001-7713
Experimental Pavement Project- Route 80/95	1974	74-005-7702
CAPACITY OF SIGNALIZED INTERSECTIONS	1974	74-008-7711
CORROSION OF CORRUGATED METAL PIPE	1974	74-011-7781

Table 4 List of Scanned Reports (Continued)

Report Name	***Year***	***FHWA Number***
INVESTIGATION OF PEDESTRIAN-VEHICLE ACCIDENTS ADJACENT TO ROADWAYS	1974	74-012-7732
THE FEASIBILITY OF PROTECTING PEDESTRIANS ADJACENT TO ROADWAYS	1974	74-012-7752
An Evaluation of the Equipment and the Variability of Bridge Deck Reinforcing Cover	1974	74-013-7779
ANTI-SCALING AGENTS FOR CONCRETE	1974	74-014-7732
BRIDGE DECK PROTECTIVE SYSTEMS	1974	74-015-7783
COST-UTILITY ANALYSIS	1974	74-017-7751
Control of Subbase Compaction: A Progress Report	1974	75-001-7736
FREEWAY STYLE DIAGRAMMATIC SIGNS IN NJ	1974	75-003-7757
FRANGIBLE BASE ACCIDENT EXPERIENCE IN NEW JERSEY	1974	75-004-7752
WINTER PAVEMENT PATCHING MATERIALS AND TECHNIQUES	1973	73-006-7742
DESIGN WARRANTS FOR LEFT TURNING VEHICLES AT SIGNALIZED INTERSECTIONS	1973	73-007-7790
PASSIVE PROTECTION AT RAIL-HIGHWAY GRADE CROSSINGS	1973	74-002-7707
U-POST INVESTIGATION	1973	74-003-7758
RAISED REFLECTIVE PAVEMENT MARKERS	1973	74-006-7708
STORAGE OF HOT BITUMINOUS CONCRETE MIXES	1973	74-007-7733
ROUTE 3 URBAN CORRIDOR - Summary	1973	74-009-2891
NOISE MEASUREMENTS	1973	74-018-7787
Urban Corridor Demonstration Program Volume II	1973	DOT-FH-11-7778
Urban Corridor Demonstration Program Volume IV	1973	DOT-FH-11-7778
STANHOPE STUDY OF COMPACTION METHODS FOR BITUMINOUS STABILIZED BASE	1972	71-006-7782
PAVEMENT HEATING	1972	72-003-7722
PREFORMED ELASTOMERIC BRIDGE JOINT SEALERS INTERIM GUIDE FOR DESIGN AND C	1972	72-004-7731
AN INVESTIGATION OF CONCRETE PAVEMENT DISTRESS ON INTERSTATE 78	1972	72-005-7779
TWO WIRE EMERGENCY CALL SYSTEM	1972	72-007-7716
A SUMMARY OF THE ACTIVITIES OF THE STATES IN PROMOTING THE NEW MANUAL ON	1972	73-003-7753
PREFORMED ELASTOMERIC BRIDGE JOINT SEALERS INTERIM GUIDE FOR DESIGN AND C	1971	71-001-7731
PAVEMENT HEATING	1971	72-001-7722
CHEMICAL CONTROL OF SNOW AND ICE	1971	73-001-7781
DIAGRAMMATIC SIGN STUDY PHASE I REPORT	1970	71-002-7765
ROUTE 1 FOG BROOM INSTALLATION	1970	71-004-7712
ANALYSIS OF 1969 ADDENDA "A" TO NEW JERSEY DEPARTMENT OF TRANSPORTATION S	1970	70-009-7771
TRUCK EQUIVALENCY (Final Report)	1970	70-011-7704
PAVEMENT HEATING Project 7722	1970	70-014-7722
1969 ADDENDA "A" TO NEW JERSEY DEPARTMENT OF TRANSPORTATION STANDARD SPE	1970	70-016-7771
EXCLUSIVE BUS LANE ANALYSIS N.J. LINCOLN TUNNEL APPROACHES	1970	70-019-7760
CHEMICAL CONTROL OF SNOW AND ICE	1970	71-003-7781
Development of the Narrow Median Concrete Barrier	1970	
Highway Research in Progress	1970	
FIFTH INTERIM REPORT COMPOSITE PAVEMENT ROUTE 3 - SECTION 1D EAST RUTHERFO	1969	69-002-7734
EVALUATION OF A HAZARDOUS LOCATION FOR THE PURPOSE OF TV SURVEILLANCE	1969	69-018-7769
A FUTURE OUTLOOK IN TRANSPORTATION	1969	69-020-7723
METHODS OF SAMPLING, TESTING & PAYMENT OF ASPHALT CONCRETE	1969	69-021-7781
SNOW AND ICE CONTROL BY PAVEMENT HEATING A PROGRESS REPORT	1969	69-014
REFLECTIVE MARKERS	1969	69-019-7708
CAPACITY OF SIGNALIZED INTERSECTIONS	1969	69-023-7711
CRIM ROAD STUDY OF COMPACTION AND CONSTRUCTION METHODS FOR BITUMINOUS	1969	70-002-7782
CHEMICAL CONTROL OF SNOW AND ICE (First Interim Report)	1969	70-006-7781
RED-COLORED PAVEMENT: EVALUATION OF MATERIAL	1969	70-008-7771
CAPACITY OF SIGNALIZED INTERSECTIONS	1969	70-013-7711

Table 5 List of Scanned Reports (Continued)

Report Name	***Year***	***FHWA Number***
TWO WIRE EMERGENCY CALL SYSTEM State Project 7716 Bureau of Public Roads Study 19	1968	68-012-7716
DIVISION OF RESEARCH AND EVALUATION BUREAU OF STRUCTURES AND MATERIALS	1968	68-008-7785
RED COLORED PAVEMENT	1968	68-010-7771
YIELD SIGN STUDY	1968	68-011-7789
AN EVALUATION OF GREENSHIELDS QUALITY INDEX AND THE ACCELERATION NOISE PARAMETER FOR USE IN SUFFICIENCY RATING PROCEDURES	1968	69-011
NARROW MEDIAN CONCRETE BARRIER	1968	69-013-7794
Abatement Project-Progress Report	1968	68-007-7767
PORTLAND CEMENT CONCRETE PAVEMENT DAMAGE DUE TO JOINT INTRUSION AND TH	1968	68-013-7784
CHAIN LINK FENCE EVALUATION	1968	68-017-7788
DRINKING AND SINGLE VEHICLE FATAL ACCIDENTS IN NEW JERSEY	1968	69-010-7791
Auto Trip Generation in Small Urban Areas	1968	69-012-7721
INVESTIGATION INTO THE DETERIORATION OF THE CONCRETE ON ROUTE US 206 BETW	1968	69-015-7779
METHODS OF IDENTIFYING HAZARDOUS LOCATIONS	1968	69-017-7769
Analysis of Atmospheric Corrosion Tests on Low Alloy Steel	1967	
Rumble Strips	1967	68-004-7754
CAPACITY OF DESIGN FEATURES	1967	68-006-7705
Truck Equivalency	1967	68-009
Preformed Elastomeric Bridge Joint Sealers	1967	
Reflective Pavement Markers	1967	
Studded Tire Evaluation in NJ	1967	
2nd Interim Composite Pavement Report Route 3 1D	1966	
30th Hour Peak Hour Factor Trend	1966	
A Milepost System for NJ State Highways	1966	
Intersection Design Route US 1 and Ryders Lane	1966	
Lateral Placement and Stopping Distance of Vehicles at a Signalized intersection	1966	
Operational Effects of Geometrics on Highway Safety	1966	
Summary of Sufficiency Rating Elements	1966	
Truck Equivalency	1966	
Two Wire Emergency Call System	1966	
An Evaluation of a New Pedestrian Actuated Signal Sign	1966	
Asphalt Paving Problems	1966	
Can Traffic Accidents be Reduced Significantly	1966	
Investigation Route 72	1966	
Relationship of Accident Rates	1966	
Report SM3-66	1966	
Socioeconomic Effects of Highways	1966	
Composite Pavement Report Route 3 1D	1965	
Evaluation of Reflectorized Highway Signs	1965	
Pilot Operation of the Fog Screen	1965	
Reinforced Bituminous Overlays in NJ	1965	
Low Level Bridge Lighting Installed in NJ	1965	
Pavement Investigation Route 295 Section 2F	1965	
30th Peak Hour Trend 1964	1964	
A New Concept in Highway Design		
Study of Left Hand Exit From Rt. 287		

APPENDIX 3 SCREEN CAPTURES OF WEBSITE

Figure 5 Main Index.html home page for the Research and Technology website

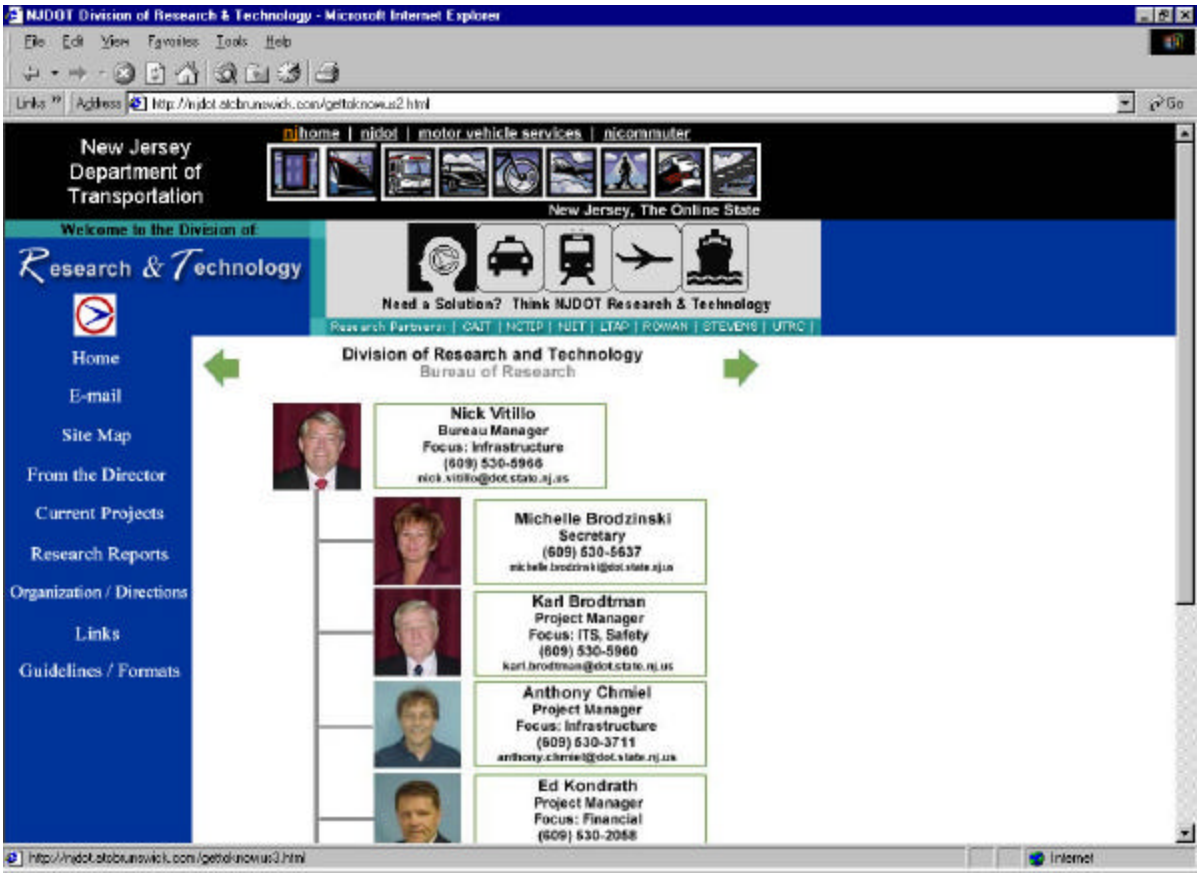

Figure 6 Directory page for the Research and Technology website

Figure 7 List of research reports for the website

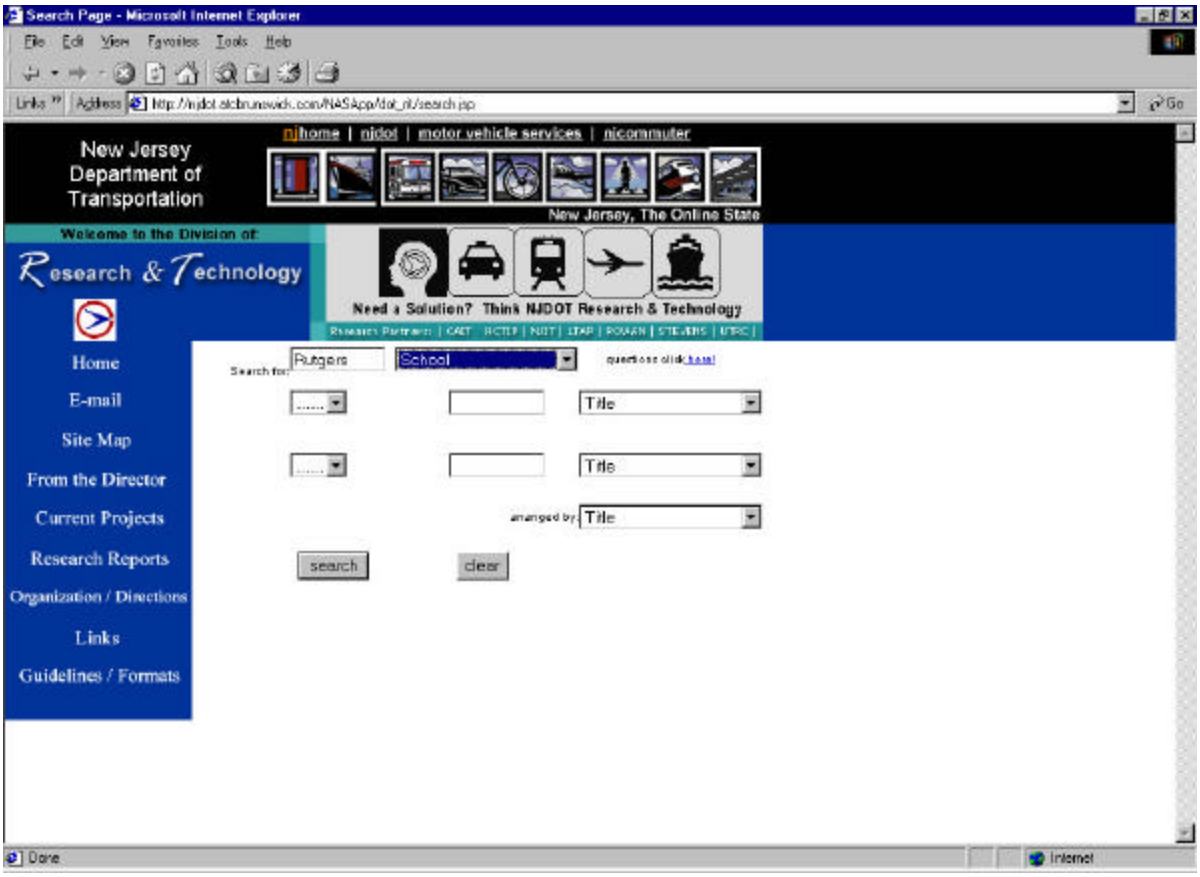

Figure 8 Search tool for the archived research reports

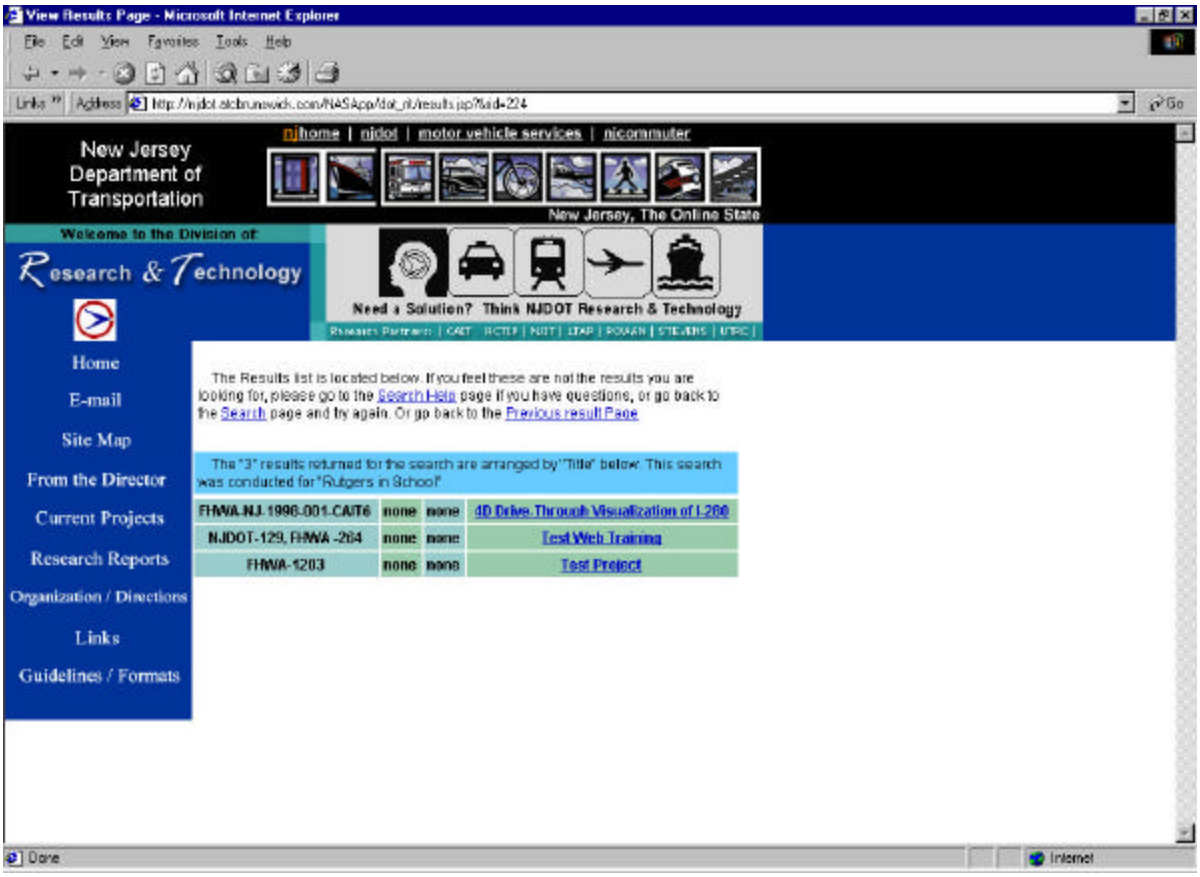

Figure 9 Sample results of a search utilizing the search tool