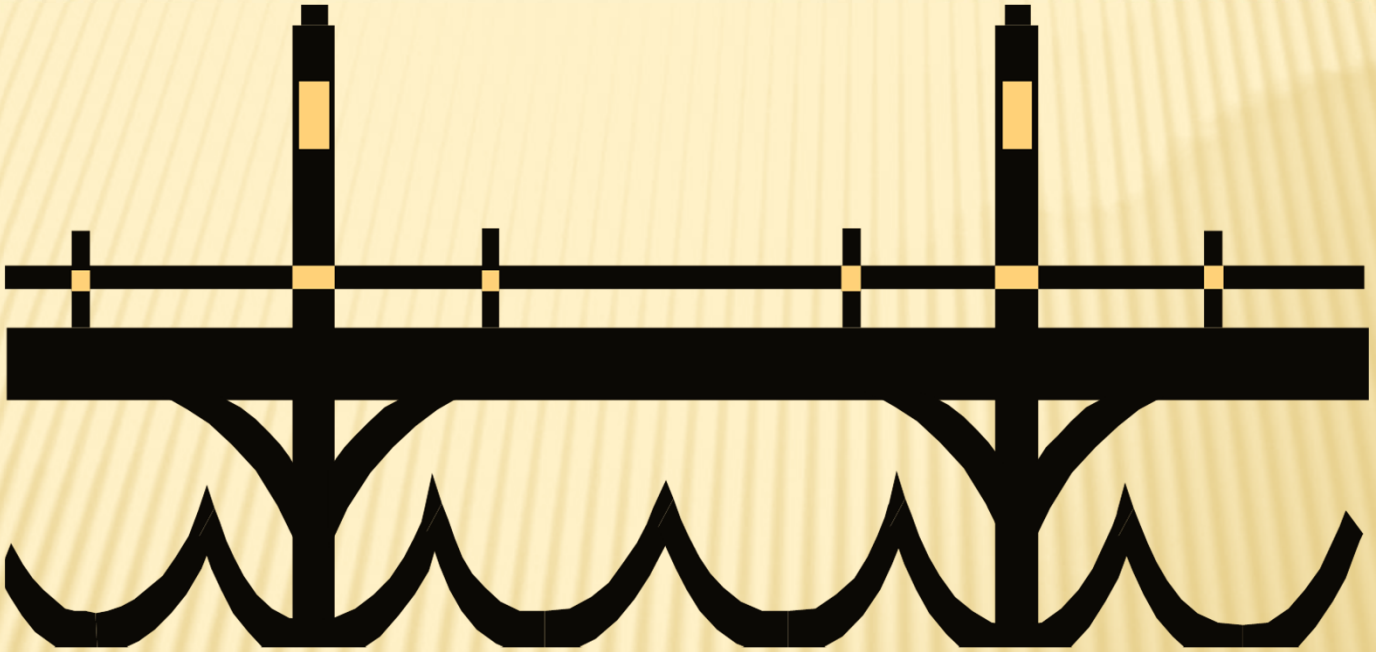
Improved Bridge Project Selection Method



SCDOT

SCDOT Bridge Project Selection History

- ***Pre-December 1998…..No selection method***

- ***December 1998 to September 2007…..AASHTO Pontis combined with Engineering Judgment***
- ***September 2007 to March 2011…..Commission Ranking Formula (ACT 114)***

- ***Change was needed…..***

- ***March 2011…..Improved Bridge Project Selection Method (aka AASHTO Pontis combined with Engineering Judgment)***

Commission Formula

- ***Structural Condition of Bridge (50%) – Bridge condition has two parts. The first part is a combination of the Sufficiency Rating and the Health Index. Sufficiency Rating looks at the sufficiency of the bridge to remain in service. A Sufficiency Rating below 50,0 and Substandard qualifies the bridge for replacement; a Sufficiency Rating between 50.0 and 79.9 and Substandard qualifies the bridge for rehabilitation. The Health Index is a measure of the total value of the bridge's elements compared to an as new condition using AASHTO Pontis software. The second part of bridge condition looks at the condition of the bridge, as well as whether it is Substandard.***

- ***Traffic Status (5%) – Traffic Status designates the operational status of the bridge (open to legal loads, restricted, or recommended for restriction or closing).***

- ***Average Daily Traffic (ADT) (5%) – ADT is the average traffic volume per day, including trucks.***

- ***Average Daily Truck Traffic percentage (ADTT%) (10%) – ADTT is the percentage of ADT that is truck traffic, converted to truck volume.***

- ***Detour Length (15%) – Detour length is the additional net distance one would have to travel if the bridge must be restricted or closed.***

Commission Formula

- ***Location and Significance to Community/Local Businesses (5%) – This is a measure of the bridge's overall functional value based on the road system.***

- ***Current Maintenance Costs for Bridge (10%) – This is the currently estimated cost for maintenance needs calculated by the AASHTO Pontis software.***

- ***Environmental Impact (Y/N) – This is an indicator of effects either to the natural environment and/or other environmental effects. This factor is a yes/no marker. If no, the bridge may still be considered for replacement, but the status will be placed on hold until the environmental issues are mitigated. This is only applied after Commission approval.***

Why was Change Needed?

What were the Benefits from the Change?

Would the Change be ACT 114 Compliant?

Why was Change Needed?

- ***The Commission ranking formula approved in 2007 was a product of strict numerical percentages. However, there is a demonstrated need to improve the ranking process and to allow for more local engineering input from our DEA's, as well as a more sophisticated and effective approach to manage the bridge program from a preservation, rehabilitation, and reconstruction process, similar to the resurfacing program.***

- ***The Commission ranking formula performs as a "snapshot" ranking with limited data on changing conditions in the field.***

- ***The Commission ranking formula had no provisions for route corridor or river basin management.***

Examples of Preservation and Rehabilitation

Preservation

- ***Painting***
- ***Deck patching (Concrete and Steel Grating)***
- ***Expansion joint resealing***
- ***Bearing support saddles/stubs***
- ***Pile/column repairs***
- ***Other concrete patching***
- ***Washing***

Rehabilitation (Structural)

- ***Overlays***
- ***Re-decking (Concrete and Steel Grating)***
- ***Expansion joint replacement***
- ***Bearing replacements***
- ***Strengthening***
- ***Scour Mitigation***
- ***Seismic Mitigation***

Rehabilitation (Functional Improvements)

- ***Widening***
- ***Raising***

What were the Benefits from the Change?

- *More effective Strategic Planning for current and future needs*
- *Flexibility in responding to changing conditions and needs*
- *Modern analysis and management system techniques using detailed data*
- *Includes pertinent external data with sound engineering judgment*
- *Includes route corridor and river basin management*
- *Expanded bridge project review teams with specific functions based on areas of knowledge and expertise SCDOT has on staff*
- *Will provide a synergistic approach to optimizing our available funding while providing for the highest user benefit*
- *Time and Preparation Dependent Bridges (definition to follow)*

Planning and Preparation Dependent Projects…..

These are projects that because of the scale, funding requirements or the environment may need to be identified earlier than most projects so that adequate time is provided for the planning and preparation. This also provides for additional public safety, continued functional service and for minimal but adequate maintenance expenditures.

Current Bridge Projects…..

US 15/401 over Great Pee Dee River
US 378 over Great Pee Dee River
US 378 over Little Pee Dee River
US 601 over Congaree River
US 176 over Broad River
SC 41 over Wando River
SC 9 over Broad River
US 21 over Catawba River

Future Bridge Projects…..

I-95 NB/SB over Lake Marion
I-85 NB/SB Bridges over Lake Hartwell

Project Selection Components…..

Pontis Analyses (75% or a maximum of 750 Points)

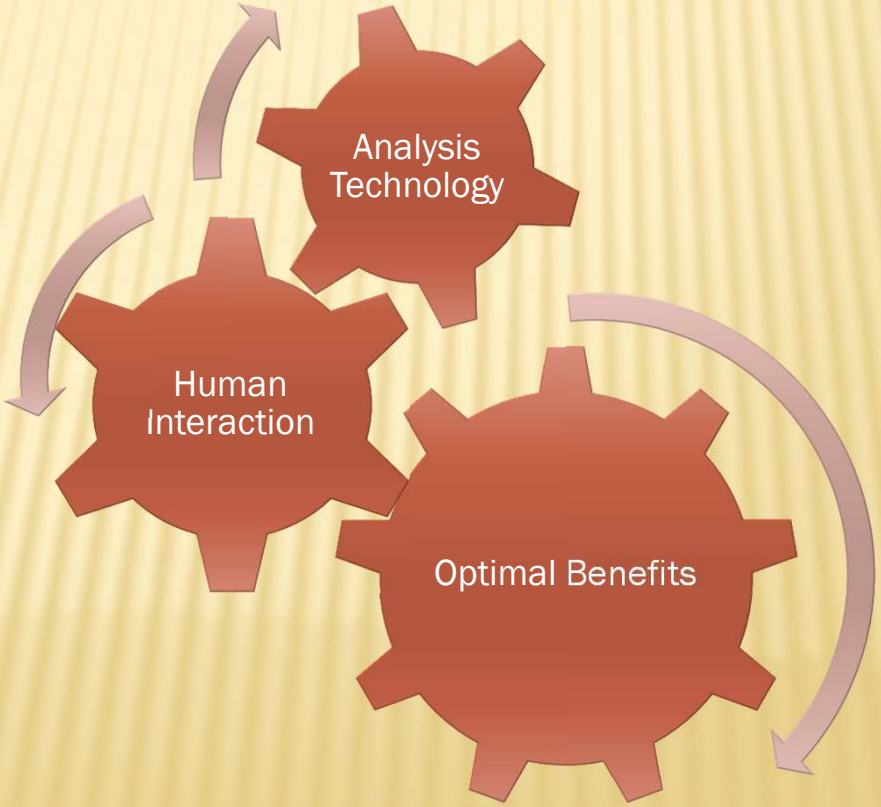
- *National Bridge Inspection Data*
- *Detailed Element Condition Data*
- *Deterioration Models*
- *Preservation and Cost Models*
- *Predictive Models*

The Pontis Bridge Management System proposes and ranks bridge projects by analyzing bridges at the network level and individually by analyzing structural deterioration, maintenance (MR& R), improvement, and replacement needs. It then performs a benefit/cost analysis to rank projects. Engineering judgment should then be applied in conjunction with the analyses.

Project Selection Components…..

Engineering Judgment (25% or a maximum 250 Points)

- ***Human Interaction***
  - ***District Expertise***
  - ***HQ Expertise***



Examples of Engineering Judgment Criteria

- ***District Maintenance Capabilities, Frequency of Repairs, Effectiveness of Repairs, Funding Availability including Contracts***
- ***Coordination with Other SCDOT Projects***
- ***Additional Engineering Review of Rehabilitation -vs- Replacement Options***
- ***Current and Future Economic/Industrial Developments***
- ***Current and Future Housing Developments***
- ***Route and River Basin Upgrades***
- ***New Schools and/or Changes in Bus Routes***
- ***Improved Emergency Services and Emergency Evacuation Routes***
- ***Strategic and Network Planning for Current and Future Needs***

District Maintenance Capabilities, Frequency of Repairs, Effectiveness of Repairs, Funding Availability including Contracts (30 pts): *This item is used to evaluate the bridge repair history, needs and effectiveness. Funding availability should also be considered. Emergency repairs may be necessary if justified but should generally not be used as a mechanism for accommodating project delays.*

Maintenance Feasibility	Points
Not feasible	30
Somewhat feasible w/ assistance	20 to 25
Feasible w/ assistance	10 to 15
Very feasible w/ assistance	5
Entirely feasible	0

Coordination with other SCDOT Projects (NA): *This criteria is only used as a scheduled project check that may allow for some benefits to the public and SCDOT. It should not be used to delay a project if the need is justified and the project needs to proceed in the interest of public safety or economic development.*

Additional Engineering Review of Rehabilitation -vs- Replacement Options (NA): *This criteria is used as a qualitative and long term analysis of rehabilitation projects. This is necessary due to certain federal constraints and to ensure that the optimal long term solution is obtained based on conditions, need and funding levels.*

Current and Future Economic/Industrial Developments (45 pts): *This criteria is used to measure the current and future needs and benefits provided to existing or future developments. This is a very key component as our infrastructure relates to the needs of economic development and also has a trickle down effect when states are recruiting economic development.*

Estimated Value ($)	Points
$100M or greater	45
$75M to $100M	30 to 40
$50M to $75M	20 to 30
$25M to $50M	10 to 20
$0 to $25M	0 to 10

Route Continuity and River Basin Upgrades (30 pts): *This criteria provides for ensuring that needed route upgrades are justified and provide both short and long term benefit. It also provides a mechanism to ensure that our river basins receive additional consideration since these bridges are generally larger, carry more traffic and also have significant detours if major work or restrictions are required.*

Route and River Basin Upgrades	Points
Route Continuity/River Basin Critical	30
Route Continuity/River Basin Important	25
Route Continuity/River Basin Needed in 5 Years	20
Route Continuity/River Basin Needed in 10 Years	15
No Route Continuity/River Basin	0

Improved Emergency Services and Evacuation Routes (20 pts): *This criteria ensures that emergency services such as fire and ambulance are considered and that interruptions are minimal. This has a trickle down effect on fire insurance premiums as well. This also ensures that hurricane evacuation routes are maintained to a high level as well as the primary and secondary lifeline routes for seismic response.*

Response Time and Evacuation Importance	Points
Response Time/Evacuation Critical	20
Response Time/Evacuation Important	15
Response Time/Evacuation Moderate	10
Response Time/Evacuation Normal	0

Strategic and Network Planning for Current and Future Needs (25 pts): *This criteria ensures that the SCDOT considers the current and long term needs in consideration of how decisions affect the entire network of both existing and planned infrastructure improvements and new infrastructure assets.*

Network Connectivity	Points
Strategic Connectivity Important	25
Strategic Connectivity Moderate	15 to 20
Strategic Connectivity Normal	5 to 15
No Strategic Connectivity	0

Environmental Impacts (65 pts): *This criteria is only to identify time dependent projects that require advanced planning, design or permit issues. It should be carefully used to rank projects and the schedules should be carefully planned in the interest of public safety, continuity, connectivity and economic benefit.*

Project Time Dependency	Points
6 to 10 Years	65
5 to 6 Years	55
4 to 5 Years	45
3 to 4 Years	35
Normal Track	0 to 25

Current and Future Housing Developments (15 pts): *These developments should be analyzed in terms of how much impact new developments have when constructed and also in terms of getting construction supplies into the site.*

Development Level	Points
More than 500 Units	15
250 to 500 Units	10
100 to 250 Units	5
Less than 100 Units	0

New Schools and/or Changes in Bus Routes (20 pts): *These developments should be analyzed in terms of how much impact new schools have when constructed and also in terms of getting construction supplies into the site. Since school bus routes are relative to the population and location of the school aged students and can change from year to year, close coordination with the school districts is necessary.*

School Impact	Points
0 to 5 Mile Radius	20
5 to 10 Mile Radius	10 to 15
10 to 15 Mile Radius	5 to 10
Greater than 15 Mile Radius	0 to 5

ACT 114 Criteria	Recommended Updated Bridge Management Policy	Criteria Met Yes/No/NA
Financial Viability	Pontis looks to find the best long term solution by considering all feasible alternatives.	Yes
Public Safety	Pontis considers whether the bridge is restricted or closed and uses it in conjunction with the ADT and ADTT to calculate user costs. Substandard bridges, i.e. structurally deficient bridges, tend to be in worse condition and have higher agency costs as well.	Yes
Economic Development	Yes	Yes
Traffic Volume	Pontis uses it to determine user costs of detours based on ADT.	Yes
Truck Traffic	Pontis uses it to determine user cost of detours based on ADTT.	Yes
PQI	NA	NA (Road Data)
Environmental Impact	Yes	Yes
Alternative Solutions	Pontis can be used to generate alternate options depending on the program, project funding or scoping.	Yes
Local Land Use	Yes	Yes
Engineering Judgment	Yes	(not in ACT 114)

Project Selection Management…..

Questions…..