UDOT STRUCTURES
2016 Annual Bridge Report

The Bridge Management Divison inspects and manages **2,986 BRIDGES** including **state** and **locally** owned public bridges

The **State** owns **1,903** bridges

The other **1,083** bridges are divided among 140 Agencies

Region 1	588
Region 2	847
Region 3	489
Region 4	1,062

The 2016 Annual Bridge Report provides an overview of the **Bridge Inventory**, **Bridge Condition**, and ongoing **Bridge Programs** within the Structures Division

Bridge Inventory

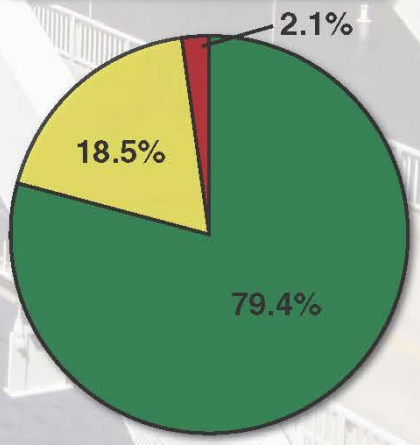
196	2010s	76
284	2000s	185
188	1990s	206
313	1980s	210
350	1970s	100
341	1960s	96
152	1950s	82
26	1940s	50
42	1930s	48
7	1920s	22
4	1910s	7
0	1900s	1

The average **state** owned structure is **32** years old

The average **locally** owned structure is **33** years old

21% of the **state** owned inventory is more than 50 years old

Bridge Condition



State-Owned Bridges

Bridge Programs

Management Strategy

Good (1,510)	Service life extended through **preservation** treatments
Fair (353)	Condition improved by **rehabilitation** treatments
Poor (40)	**Replacement** required - currently, 18 SD bridges are programmed for replacement

UDOT Keeping Utah Moving

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AASHTO	American Association of State Highway and Transportation Officials
ABR	Annual Bridge Report
AC	Asphaltic Concrete
ADT	Average Daily Traffic
BHI	Bridge Health Index
CFR	Code of Federal Regulations
CoRe	Commonly Recognized (elements)
FAST Act	Fixing America's Surface Transportation Act
FC	Fracture Critical
FO	Functional Obsolescence
JHC	Joint Highway Committee
MAP-21	Moving Ahead for Progress in the 21st Century Act
NBI	National Bridge Inventory
NBIS	National Bridge Inspection Standards
NHS	National Highway System
SC	Scour Critical
SD	Structurally Deficient
SF	Square Feet
STRAHNET	Strategic Highway Network

BRIDGE MANAGEMENT ENGINEER LETTER

I am pleased to provide the third Annual Bridge Report (ABR) on behalf of the Bridge Management Division. The purpose of this report is to provide a quick reference to those interested in key facts about the overall bridge inventory in Utah, the condition of the inventory, and ongoing bridge programs that address important objectives of the Structures Division.

Although bridge condition and inventory data are constantly changing, Utah remains one of the nation's leaders for maintaining and improving state bridge conditions. According to the 2015 National Bridge Inventory, Utah ranks third best in the U.S. for the least amount of state owned Structurally Deficient (SD) bridges. This annual report is intended to be the definitive source for bridge information in Utah and provides the most up-to-date information in an accessible and easy to understand format. All information has been updated to the current year.

Last year, 2015, was a full and successful year; accomplishments include:

- Developed a stronger responsive bridge maintenance program
- Advanced a barrier program to replace or retrofit vulnerable bridge railings
- Finished the five-year program to load rate every bridge
- Completed the first two-year cycle of bridge inspections utilizing AASHTO Elements
- Refined asset management strategies and reporting through Decision Lens
- Built on 3D technology to maximize asset management objectives
- Completed the local bridge inspection cycle

This year, 2016, promises to be equally eventful; key initiatives include:

- Increased coordination planning and inspection to optimize programming
- Implementation of the National Tunnel Inspection Standards
- Increased planning coordination with the Regions to combine projects and limit impacts
- Continued Maintenance support for reactive bridge maintenance
- Evaluation and implementation of LIDAR technology for establishing bridge clearances

The challenges that lie ahead appear formidable, but the Bridge Management Division is eager, focused, and steadfast on the vision to Keep Utah Moving through unrivaled bridge management practices.

Sincerely,

Rebecca L. Nix, Bridge Management Engineer

Section 1
EXECUTIVE SUMMARY

1.1 INTRODUCTION

The 2016 Annual Bridge Report provides an overview of the bridge inventory, bridge condition, and ongoing bridge programs within the Structures Division. The inventory includes all structures meeting the definition of a bridge. A bridge is defined as a structure that has a track or passageway for carrying traffic or other moving loads and having a length of more than 20 feet. Box culverts, three sided culverts, and other drainage structures that meet this definition are included in the bridge inventory. The Structures Division does not systematically inspect structures with a length less than 20 feet, overhead sign structures, or retaining walls. Data in this report does include 36 state owned pedestrian structures as these structures are inspected and managed by the Bridge Management Division.

1.1.1 Structure Inventory

The Bridge Management Division inspects and manages the data of 2,986 structures, including state and locally owned public structures as of April 1, 2016. This report will always be based on the April 1st date, as the data is dynamic throughout the year. There are 140 different agencies that own these structures; the state owns 1,903 structures, while all local agencies combined own 1,083 structures. State structures are divided geographically by region. The number of state owned structures within each region is 376, 565, 286, and 676 for Regions 1, 2, 3, and 4, respectively.

The average age of structures in the inventory is 32 years for state and 33 for locally owned structures. There is an ever decreasing number of structures built prior to 1950 that are still in service – 79 state and 128 local. These structures have significantly exceeded the design service life and may be considered for replacement or rehabilitation in the near future, based on condition and functionality.

The Bridge Management Division closely monitors two types of structures that have inherently more risk associated with them – Fracture Critical (FC) and Scour Critical (SC) bridges. FC bridges lack load path redundancy and have the potential to fail entirely if one element fails. SC bridges are vulnerable to failure due to scour in the event of extreme flows. The state owns 53 FC and 10 SC bridges.

Complex and high cost bridges represent a significant investment and require special bridge management consideration. These structures make up a relatively small amount of the overall inventory; however, the asset value is very high. Complex structures are characterized by non-typical construction such as large arches or post-tensioned segmental concrete box bridges. High cost bridges are large or complex structures that have significantly higher replacement costs. The state owns 13 complex and 66 high cost bridges.

The Bridge Management Division has begun to inventory ancillary structures, such as walls and overhead signs. Although not required by the National Bridge Inspection Standards (NBIS),

these are inspected on an as needed basis when deterioration is of concern or for project planning. Currently, 2,089 ancillary structures have been inventoried.

1.1.2 Structure Condition

The overall (state and local) structure inventory is generally in good condition primarily due to funding policies aimed at rehabilitating and replacing deficient bridges. With one the lowest percentages of Structurally Deficient (SD) bridges in the nation, Utah ranks third best for overall state owned bridge inventory condition in the 2015 National Bridge Inventory. The Bridge Management Division is focused on improving the overall bridge condition by addressing deficiencies and applying preventive treatments in a timely manner.

1.1.3 Structure Programs

The Structures Division has implemented several programs to identify and fund projects to maintain the structure inventory in a state of good repair. The following programs and corresponding purposes are:

- Bridge Inspection Program – The Bridge Management Division conducts biennial safety inspections according to the NBIS. Results are reported to the Federal Highway Administration (FHWA) annually in April. These inspections have been performed since the national standards program was adopted in 1971. In 2014, the Utah Department of Transportation (UDOT) began the transition to the recently updated American Association of State Highway and Transportation Officials (AASHTO) Elements, which are described in the *AASHTO Manual for Bridge Element Inspection, 1st Edition, 2015 Interim Revisions*. This transition is a two-year process that was completed in June 2016. Additionally, underwater inspections are performed on a five-year cycle.

- The Bridge Replacement/Rehabilitation Program – This program funds structures requiring major structural work, major safety upgrades, or complete replacement. The program prioritizes these types of structures based on vulnerability (i.e., risk), criticality (i.e., importance), condition, and load rating. This program addresses the structures with the poorest condition in the inventory. All structurally deficient bridges owned by the state are currently funded for rehabilitation or replacement.

- The Bridge Preservation Program – This is a proactive program aimed at preserving structures by preventing, delaying, or reducing deterioration of bridges and bridge elements. The primary benefit of this program is that it extends bridge service life and reduces the amount of future costly replacement or rehabilitation.

- The Off-System Bridge Program – All local public agency bridges not included in the Federal Aid Highway System are eligible for federal funding through the Joint Highway Committee (JHC). The state administers this funding to assist local agencies with removing deficient bridges from the National Bridge Inventory (NBI).

- The Bridge Maintenance Program – This program was initiated to quickly fix observed bridge deficiencies. The program is intended to address common deficiencies through a bridge procurement contract with dedicated bridge funding. This program allows for work to be done much sooner than other programs.

- Load Rating Program – This program load rates all state and locally owned structures. This program promotes safety of the traveling public, provides accurate data to support and allocate funding, assists in the development of a programmatic permit truck routing system, and more effectively evaluates higher truck load permits. Initial load ratings for all structures managed by the Bridge Management Division were completed in 2016. An ongoing effort will be in place to update load ratings as needed and to mitigate for load postings on the state highway system.
- Scour Program – This program allocates funding for projects to address structures that are scour critical. These funds are used to identify and remedy scour hazards and minimize the risk associated with bridge failures due to scour. The Bridge Management Division intends to address all state owned scour critical bridges in the next four years.

Section 2
STRUCTURE INVENTORY

2.1 INVENTORY BY CATEGORIES

The Bridge Management Division inspects and manages the data of 2,986 structures, including state and locally owned structures, as of April 1, 2016. The Bridge Management Division performs biennial NBIS safety inspections on these structures and provides recommendations to local municipalities for bridge maintenance, repair, or replacement.

2.1.1 Ownership

There are 140 different agencies that own structures in the structure inventory; the state owns 1,903 structures, which comprise 64 percent of the total structure inventory. All local agencies combined own 1,083 structures, which comprise 36 percent of the total structure inventory. The categories of structure ownership are shown in Figure 2-1. The Other Agencies category in this figure includes (7) Salt Lake International Airport bridges, (3) Bureau of Reclamation bridges, (29) private railroad bridges (that are over a public road), and (8) private vehicular bridges. The types of state and locally owned structures are shown in Table 2-1. The types of state and locally owned structures by facility carried are shown in Table 2-2.

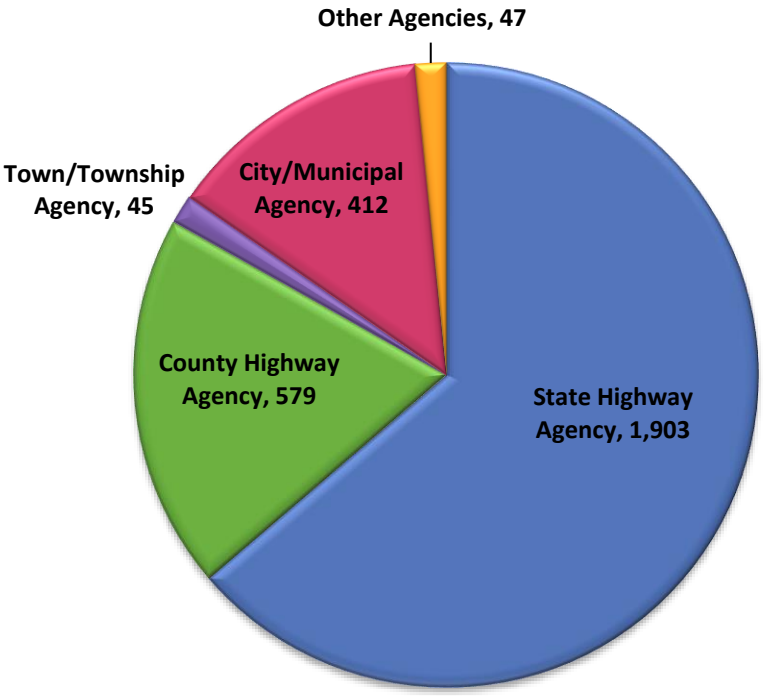


Figure 2-1
Structure Inventory by Owner

Structure Type	State	Local
Bridges	1,513	831
Culverts	385	251
Tunnels	4	1
Other[a]	1	0
Total	1,903	1,083

[a]0R-119 is a pipe crossing supported by columns

Table 2-1
Utah Structure Inventory by Structure Type

Facility Carried	State	Local
Highway	1,824	1,053
Railroad	21	29
Pedestrian	36	1
Other[a]	22	0
Total	1,903	1,083

[a]Other structures include canal crossings, pipe crossings, tunnels, and other miscellaneous crossings

Table 2-2
Utah Structure Inventory by Facility Carried

2.1.2 Distribution by Region

UDOT is divided into four Regions organized from north to south (with Region 1 in the north and Region 4 in the south). Table 2-3 shows the division of structures by Region.

Owner	Region 1		Region 2		Region 3		Region 4	
	Bridges	Culverts	Bridges	Culverts	Bridges	Culverts	Bridges	Culverts
State	326	50	501	64	233	53[a]	453	223[b]
Local	169	43	218	64	171	32	273	113
Total	495	93	719	128	404	85	726	336

[a] Includes two concrete-lined tunnels (US-189 – Provo Canyon)
[b] Includes two rock tunnels (Bryce Canyon National Park)

Table 2-3
Utah Structures by Region

2.1.3 Vehicular Route Types

UDOT identifies public roadways by using federal classifications. The NHS is the principal network of roadways important to the nation's economy, defense, and mobility. The NHS includes interstates (the Eisenhower Interstate System), other principal arterials, the Strategic Highway Network (STRAHNET), major STRAHNET connectors, and intermodal connectors. The U.S. Department of Transportation developed the NHS in cooperation with the states, local officials, and metropolitan planning organizations.

Table 2-4 categorizes the state's structure inventory by vehicular route type. Figure 2-2 categorizes the structures on each transportation system. See Figure 3-5 for additional information on route types and ownership.

Route Description	State		Local	
	Count	ADT	Count	ADT
NHS	1,335	28,815,769	11	240,455
Non-NHS	568	5,020,682	1,072	3,786,671
Federal-Aid Highways	1,758	30,029,826	410	2,154,040
Non-Federal-Aid Highways	145	3,806,625	673	1,873,086
Interstate Carried	803	22,132,240	0	0
Interstate Crossed	260	4,716,431	5[a]	N/A

[a] UPRR over Interstate

Table 2-4
Structures by Route Type Carried

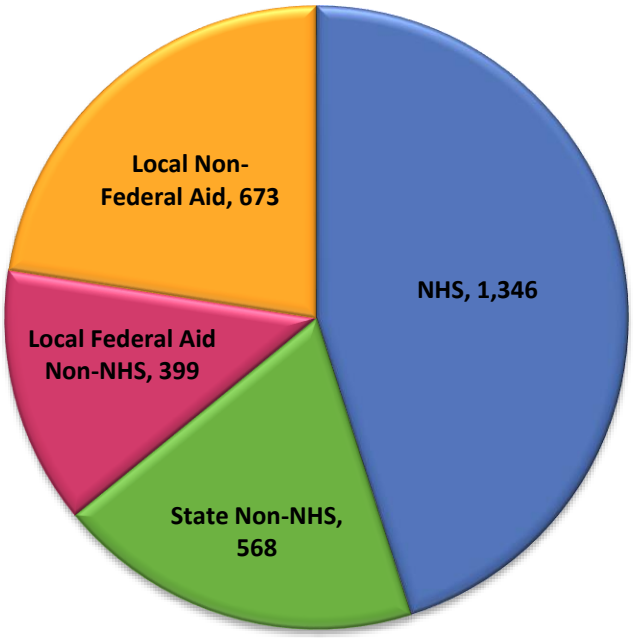


Figure 2-2
Structures by Route Type

2.1.4 Bridge Types

A typical way of categorizing structures is by the primary load carrying components in the superstructure, including the girders (or beams) that make up the span of the bridge. The superstructure types are outlined in Table 2-5.

Superstructure Type		State	Local
Concrete	Reinforced (Culvert)	315	186
	Reinforced (Single Span)	123	232
	Reinforced (Multi-Span)	94	22
	Prestressed/Post-Tensioned (Single Span)	592	274
	Prestressed/Post-Tensioned (Multi-Span)	172	16
Steel	Steel (Culvert)	69	62
	Steel (Single Span)	230	219
	Steel (Multi-Span)	298	38
Other	Wood or Timber	3	30
	Masonry	1	0
	Aluminum or Iron	2	4
	Tunnels	4	0
	Total	1,903	1,083

Table 2-5
Utah Structures by Superstructure Type

Figure 2-3 and Figure 2-4 illustrate state and locally owned structures by structure type.

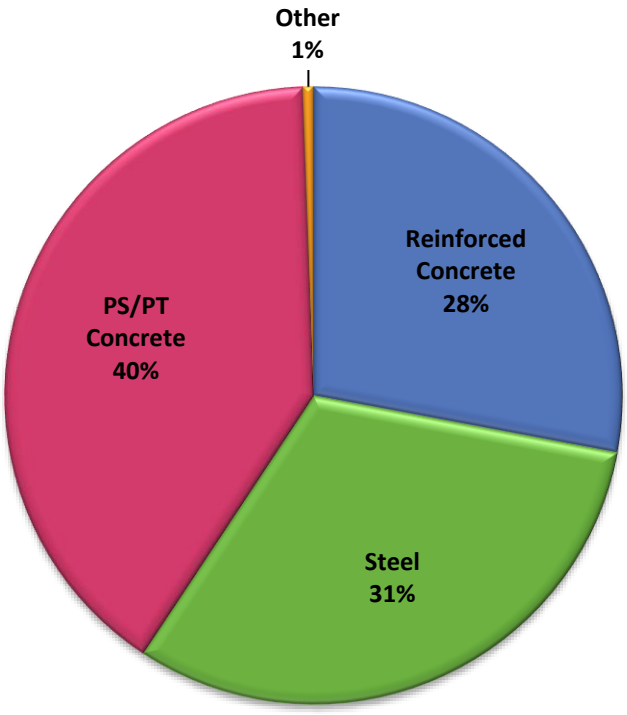


Figure 2-3
State Owned Structures by Structure Type

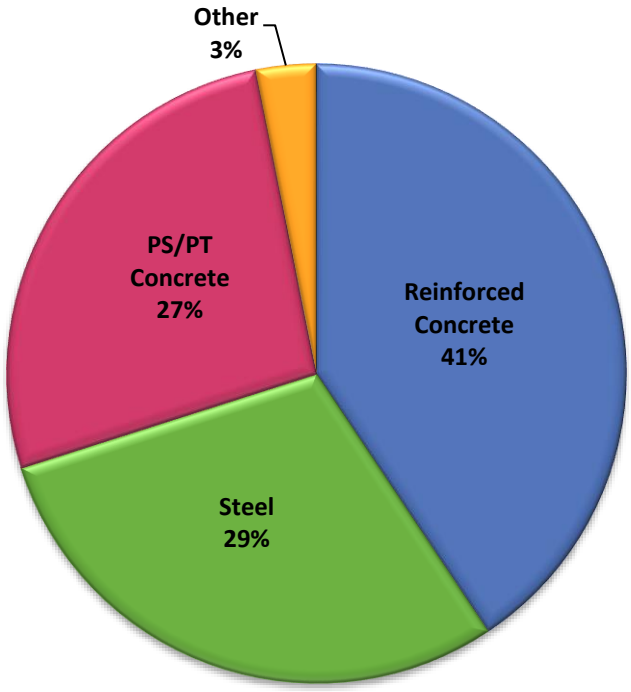


Figure 2-4
Locally Owned Structures by Structure Type

The majority of bridges in the state are short to medium span deck and girder bridges. The count of bridges by number of spans is shown in Table 2-6. The count does not contain culverts. Single span bridges are typically preferred because of the lower initial cost, lower maintenance cost, and higher seismic performance. Multi-span bridges have more foundations, which tend be significantly more expensive due to Utah's geologic conditions.

Number of Spans	State		Local	
	Count	Percentage	Count	Percentage
1	694	45.9%	686	82.6%
2	259	17.1%	51	6.1%
3	392	25.9%	67	8.1%
4	99	6.5%	14	1.7%
5	34	2.2%	7	0.8%
6	12	0.8%	2	0.2%
7	2	0.1%	3	0.4%
8	7	0.5%	1	0.1%
9	3	0.2%	0	0%
10+	11	0.7%	0	0%

Table 2-6
Bridges by Number of Spans

2.1.5 Bridge Deck Overlay Types

The deck is the driving surface of a bridge that spans between the main flexural members (i.e., beams, girders) and is the most important component regarding bridge durability and long term protection. Table 2-7 presents state owned deck overlay types on vehicular bridges. Figure 2-5 shows historical data for state owned deck overlay type counts and area, respectively, on vehicular bridges. The deck overlay types are identified using bridge inspection elements data.

Type	Count	Deck Area (SF)
No Overlay	344	4,157,975
Asphaltic Concrete (AC) Overlay	704	5,647,122
Thin Overlay (Polymer)	378	6,338,338
Rigid Overlay	15	505,609
Total	1,441	16,649,044

Note: This table does not include pedestrian bridges, culverts, canal crossings, or utility crossings.

Table 2-7
State Owned Vehicular Bridge Deck Overlay Data

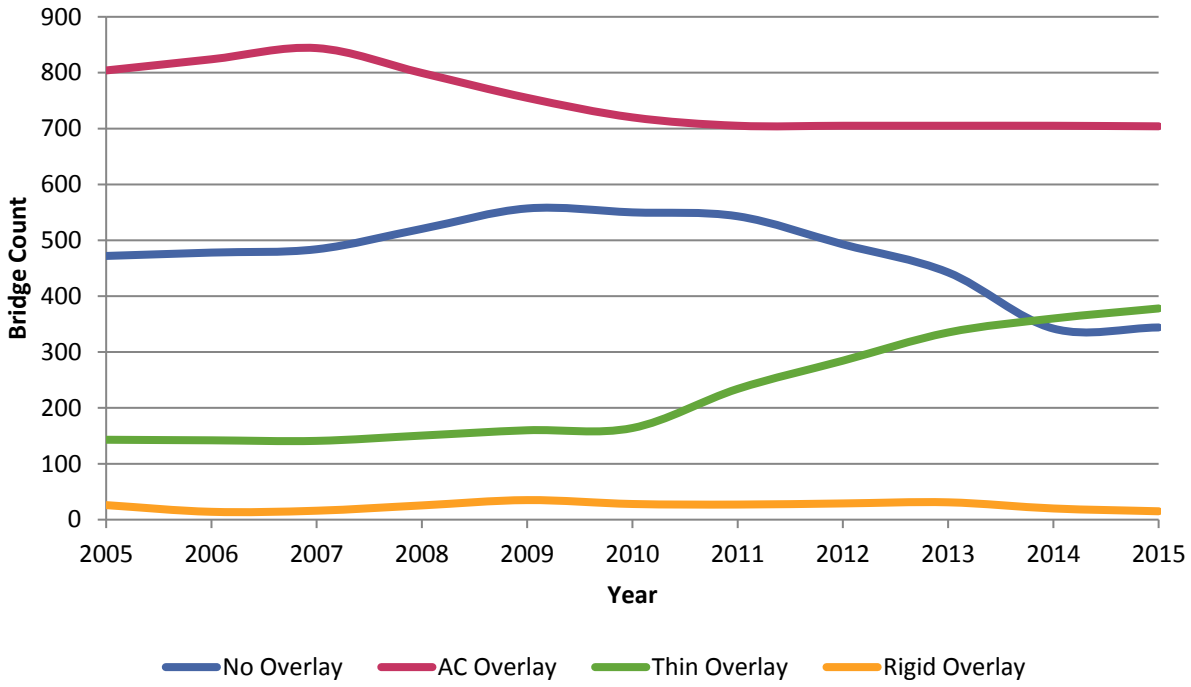
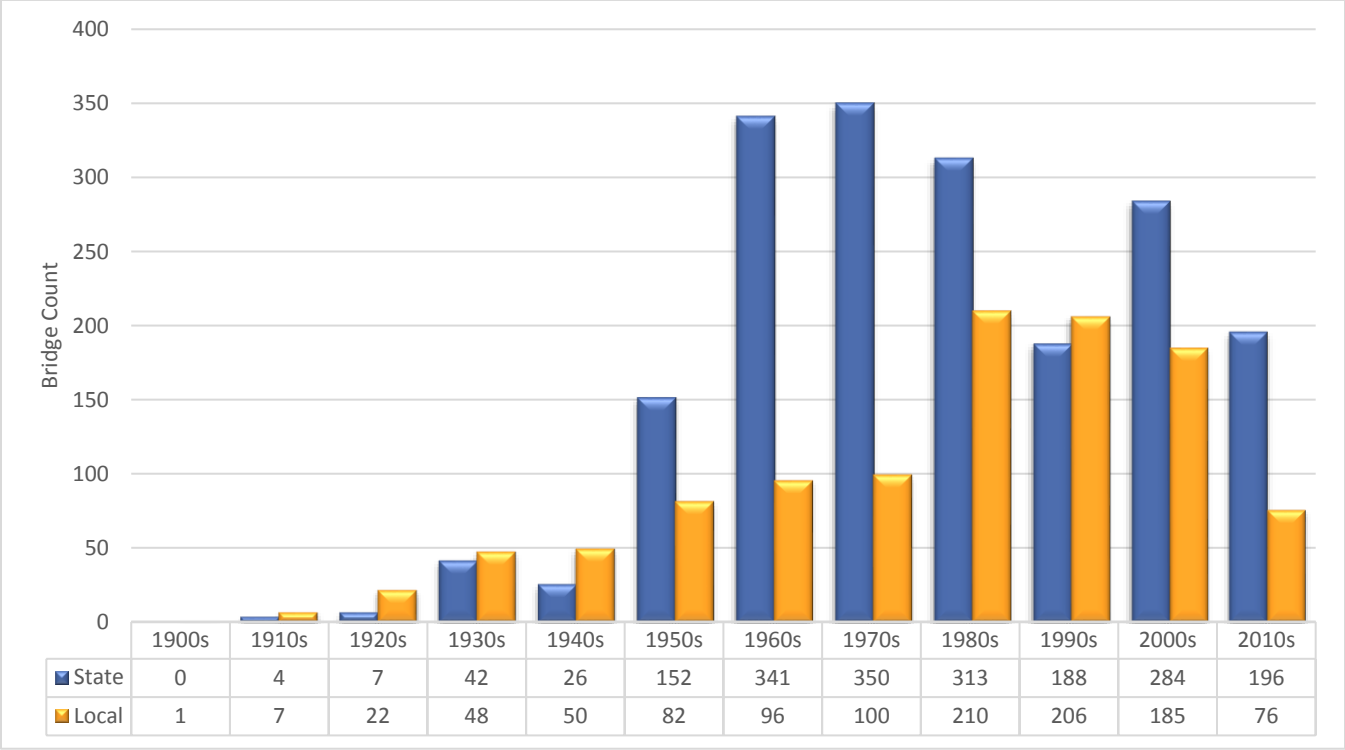


Figure 2-5
State Owned Vehicular Deck Overlay Type over Time

2.2 AGE OF IN-SERVICE STRUCTURES

In the past, the Structures Division has prioritized the repair or replacement of a bridge with a worst-first approach where the worst condition structures had the highest funding priority. Typically, older structures have experienced the most wear and have required replacement. As such, Utah has a decreasing number of structures built prior to 1950 still in service. This approach has served the Structures Division well in maintaining a system in a state of good repair. However, with fewer poor condition structures and the new availability of federal funding for preservation, the Bridge Management Division is transitioning into a more balanced planning approach that prioritizes funding based on needs and performance. The Bridge Management Division optimizes funding by employing techniques to preserve structures and extend service life.

Figure 2-6 shows the decade in which each structure in the state was built. Figure 2-7 shows the cumulative age distribution by decade. Structures built prior to the year 2000 were typically designed for a 50-year service life. The number of bridges that has exceeded this service life, i.e., structures built in 1966 or earlier, comprises 21 percent of the state owned inventory. The average year built of the inventory is 1982 for state and 1981 for locally owned structures. Refer to Section 3 for condition evaluation of the bridges within each decade.



	1900s	1910s	1920s	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	2010s
State	0	4	7	42	26	152	341	350	313	188	284	196
Local	1	7	22	48	50	82	96	100	210	206	185	76

Figure 2-6
Structures by Year Built

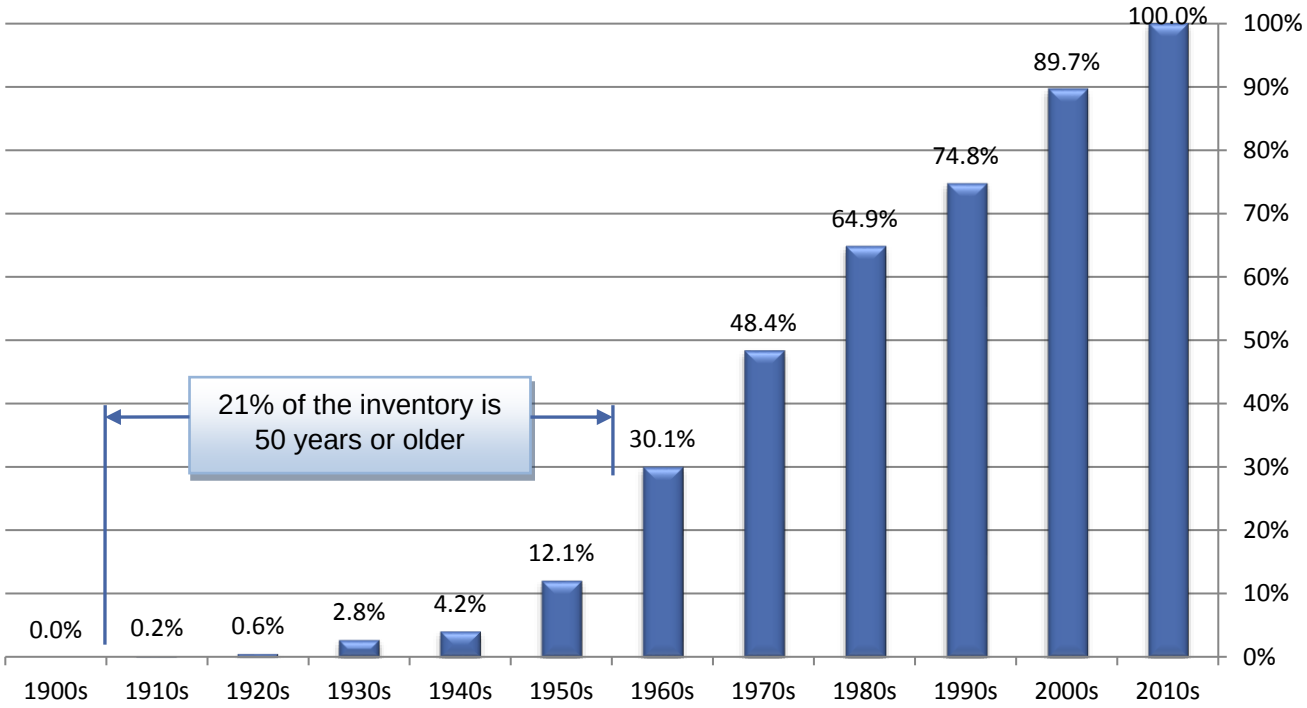


Figure 2-7
Cumulative Age Distribution of State Owned Structures by Year Built

2.3 FRACTURE CRITICAL BRIDGES

Fracture Critical (FC) bridges contain steel members in tension, or with a tension element, whose failure may cause a portion of or the entire bridge to collapse. The categories of FC bridges in Utah are shown in Table 2-8. The counts do not include railroad overpass bridges.

Route Description	State	Local
1 or 2 Steel Girder Systems	2	8
Pin and Hanger Details	35	3
Steel Bent Caps	1	0
Steel Trusses	2	14
Suspension or Cable Structures	1	0
Super/Sub Integral Framing Details	5	0
Multiple FC Details	7	1
Total FC Bridges	53	26

Table 2-8
Fracture Critical Bridges

FC bridges require in-depth inspections in which all FC members are inspected within an arm's reach.

2.4 SCOUR CRITICAL STRUCTURES

Scour Critical (SC) structures have potentially unstable foundations due to scour (removal of material due to channel flows) and are vulnerable to failure during extreme flows. Table 2-9 shows the number of SC structures as well as the scour status of the entire bridge inventory. Figure 2-8 shows the historical trend of SC structures. SC bridges are rated three or worse for NBIS Item 113.

Route Description	NBIS Item 113	State Owned	Locally Owned
SC – Bridge Failed	0	0	0
SC – Failure Imminent	1	0	0
SC – Extensive Scour	2	0	5
SC – Unstable	3	10	88
Stable, Needs Action	4	33	91
Stable Within Footing	5	115	312
Calculations Not Performed	6	0	0
Countermeasures	7	68	83
Stable Above Footing	8	593	417
On Dry Land	9	10	5
Not Over Waterway	N	1,074	82
Tidal, Low Risk	T	0	0
Unknown Foundation Risk	U	0	0
Total SC Bridges		10	93

Table 2-9
Bridge Scour Status

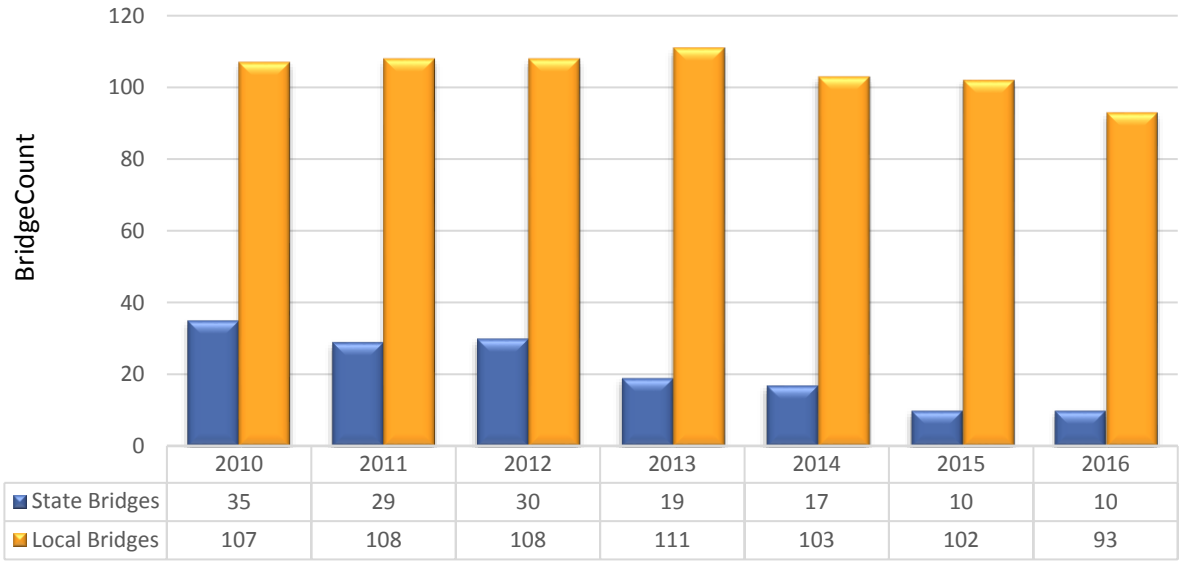


Figure 2-8
SC Bridges by Year

SC structures require specific attention during routine inspections. The footings are probed to determine if any progressive scour is occurring. Changes to the scour status are evaluated by bridge and hydraulic engineers based on inspection results.

2.5 COMPLEX AND HIGH COST BRIDGES

Complex and high cost bridges represent a significant investment and require special bridge management consideration. These structures make up a relatively small amount of the overall inventory; however, the asset value is very high. It is imperative that these structures maintain a state of good repair and the service lives are maximized.

2.5.1 Complex Bridges

Complex structures are characterized by unique or non-standard construction elements, such as truss, large arch, suspension, cable-stayed, movable, or segmental concrete box bridges that carry vehicular traffic. The number of bridges in each category is shown in Table 2-10.

Route Description	State Owned	Locally Owned
Deck Truss	0	2
Through Truss	2	12
Deck Arch	6	1
Through Arch	3	0
Suspension	0	0
Cable-Stayed	0	0
Movable	0	0
Segmental Box Girder	2	0

Table 2-10
Complex Vehicular Bridges

2.5.2 High Cost Bridges

The Bridge Management Division defines high cost bridges as meeting one or more of the following:

- Deck area greater than or equal to 40,000 square feet
- Max span length greater than or equal to 300 feet
- Total bridge length greater than or equal to 1,000 feet
- Complex bridges that carry vehicular or railroad traffic (not pedestrian traffic)

High cost bridges account for 3.5 percent of the state owned inventory and 1.8 percent of the locally owned inventory. Table 2-11 shows the characteristics of high cost bridges. Some bridges meet multiple criteria. Generally, a high cost bridge will cost a minimum of $15 million to replace. Large or complex structures will cost significantly more.

Route Description	State Owned	Locally Owned
Deck Area ≥ 40,000 SF	53	5
Max Span ≥ 300 FT	14	0
Total Bridge Length ≥ 1,000 FT	26	3
Complex Bridges (Vehicular/Railroad)	13	15
Total High Cost Bridges	66	20

Note: Some bridges meet multiple criteria.

Table 2-11
High Cost Bridges

2.6 ANCILLARY STRUCTURES

The Bridge Management Division currently inspects ancillary structures, such as walls and sign structures, on an as needed basis when deterioration is of concern or for project planning. Although not required by the NBIS, routine inspections may be appropriate. The Division is beginning to inventory these structures and will continue to do so. Table 2-12 provides details of the ancillary structures that have been inventoried.

Structure Type	Count
Minor Structures	468
Walls	649
Signs	972
Total	2,089

Table 2-12
Utah Ancillary Structure Inventory by Type

Section 3
STRUCTURE CONDITION

3.1 CONDITION OF STRUCTURES

In July 2014, the Division began using National Bridge Elements and Bridge Management Elements during NBIS inspections to provide more detailed inspection data and to conform to federal requirements. Previously, AASHTO's Commonly Recognized (CoRe) Elements were used dating back to 2002. Element level inspections provide more detailed bridge data and condition assessment. This information is a major contribution to the development of more effective bridge management tools. Significant advantages of the new elements are:

- Nationally uniform bridge assessment
- Improved assessment of bridge decks
- Identification and assessment of wearing surfaces and protective systems

3.1.1 Overall State Owned Bridge Condition

In general, the overall structure inventory is in good condition, particularly when compared to its national counterparts. Utah ranks third best in the nation for least amount of Structurally Deficient (SD) bridges on the NHS with only 0.9 percent as structurally deficient.

SD bridges are not inherently unsafe. An SD bridge, when left open to traffic, typically requires significant maintenance and repair to remain in service and eventual rehabilitation or replacement to address deficiencies. The Structures Division identifies SD bridges for consideration in the Replacement and Rehabilitation Program. Functional Obsolescence (FO) is a function of the geometrics of the bridge in relation to the geometrics required by current design standards. FO is not a key identifier for the Structures Division to determine funding. These structures are usually identified by the Regions as part of roadway projects due to substandard geometric standards.

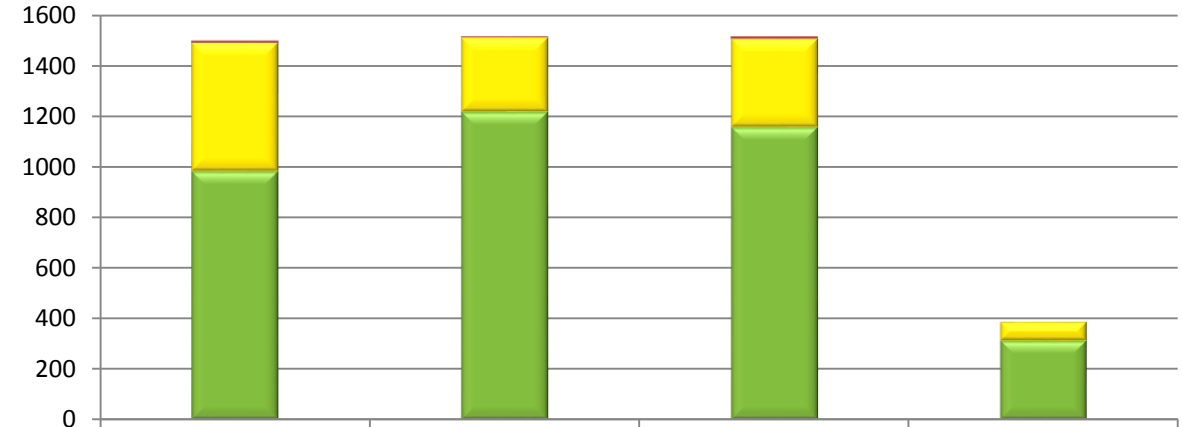
The following quantifies structure deficiency items of the state owned inventory:

- SD Structures – 18 (130,324 square feet of deck area)
- FO Structures – 187 (1,398,873 square feet of deck area)
- Load Posted Structures – 3

An overall representation of the general structural condition of state owned structures is shown in Figure 3-1. NBIS values for categories are:

- Good – 9-7
- Fair – 6-5
- Poor – 4-1

The number of state owned structures in each NBIS category is shown in Table 3-1.



	Deck	Superstructure	Substructure	Culvert
Poor	8	4	8	0
Fair	509	294	350	74
Good	984	1218	1158	315

Note: 0R-61 and 0R-288 have a Superstructure, Substructure, and Culvert NBIS Component (and carry water over I-215). Tunnels are included under Culvert.

Figure 3-1
Overall Structure Conditions by NBIS Components

NBIS Component		9	8	7	6	5	4	3	Average
Deck	Statewide	14	156	814	428	81	8	0	6.71
	Region 1	9	18	181	90	27	1	0	6.66
	Region 2	3	57	238	158	30	4	0	6.66
	Region 3	1	58	96	65	10	3	0	6.85
	Region 4	1	23	299	115	14	0	0	6.74
Superstructure	Statewide	18	475	725	228	66	4	0	7.09
	Region 1	9	97	154	48	18	1	0	7.09
	Region 2	5	167	244	62	23	1	0	7.13
	Region 3	2	105	74	38	14	0	0	7.18
	Region 4	2	106	253	80	11	2	0	7.00
Substructure	Statewide	18	316	824	288	62	8	0	6.94
	Region 1	10	67	164	71	12	3	0	6.95
	Region 2	5	120	271	79	24	3	0	6.99
	Region 3	1	78	106	34	12	2	0	7.07
	Region 4	2	51	283	104	14	0	0	6.83

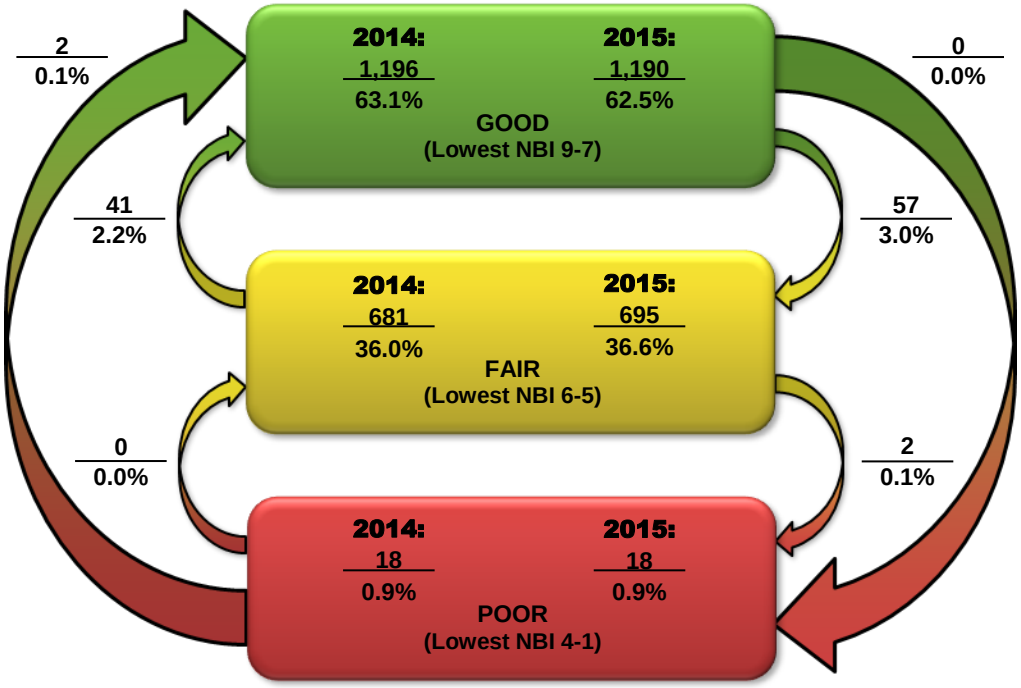
Table 3-1
Number of Structures in each NBIS Category

NBIS Component		9	8	7	6	5	4	3	Average
Culvert[a]	Statewide	1	79	235	58	16	0	0	6.98
	Region 1	0	17	26	5	1	0	0	7.20
	Region 2	1	11	35	14	4	0	0	6.86
	Region 3	0	10	33	9	1	0	0	6.98
	Region 4	0	41	141	30	10	0	0	6.96

[a]Tunnels are included under Culvert.

Table 3-1 (Continued)
Number of Structures in each NBIS Category

One way that the Bridge Management Division defines the overall condition of a structure is by taking the lowest of its NBIS component ratings. An overall representation of the changes that occurred from 2014 to 2015 on state owned structures is shown in Figure 3-2. There were 18 new bridges added and 10 bridges removed from the inventory in 2015.



Note: A net sum of 8 bridges was added to the state inventory in 2015.

Figure 3-2
NBIS Transitions in the State Inventory from 2014 to 2015

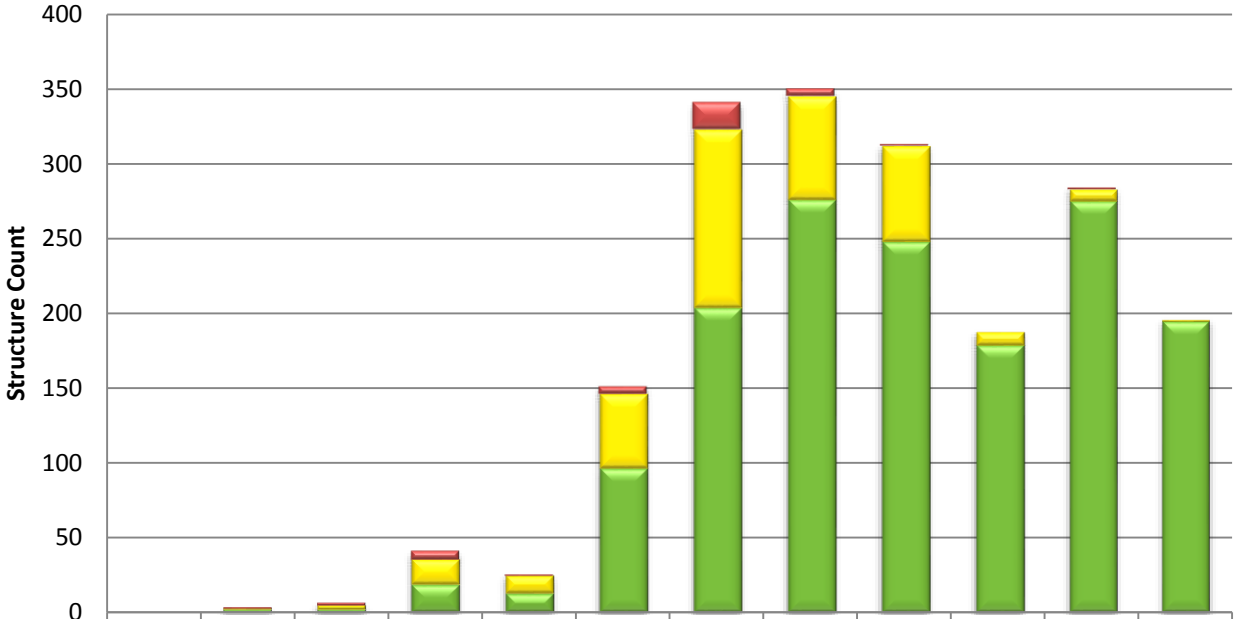
3.1.2 Bridge Health Index

The Bridge Management Division has developed its own method for assessing overall structure condition called the Bridge Health Index (BHI). This method rates the structure as a whole based on the deterioration of each element using its replacement cost as a means to weigh importance. This method is a useful tool in evaluating structure needs and prioritizing funding.

An older method that accomplished similar goals was called the Sufficiency Rating. It was provided by FHWA and was used to qualify for federal funding. The transition to funding under the MAP-21 legislation, and carried forward into the FAST Act, allows a state to develop a customized method of condition evaluation that is meaningful to the overall Bridge Management Program.

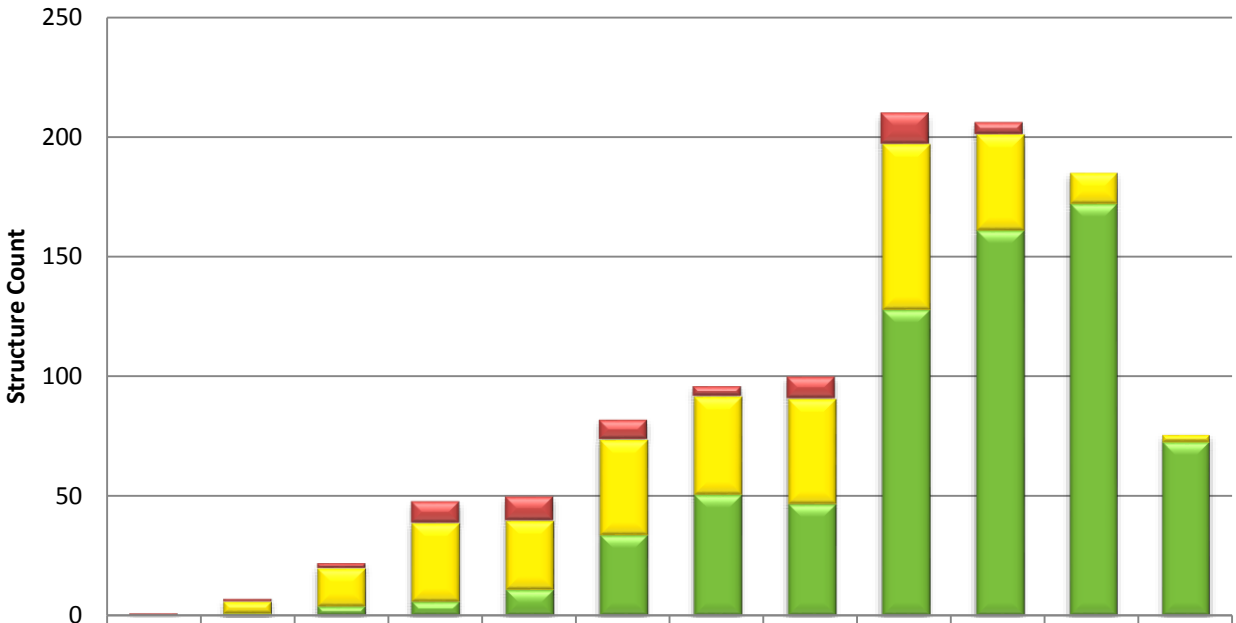
State owned and locally owned bridges are shown graphically in Figure 3-3 and Table 3-4. The BHI categories have been roughly calibrated to the NBI data. The categories are:

- Good – 100-80
- Fair – 80-60
- Poor – 60-0



	1900s	1910s	1920s	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	2010s
Poor	0	1	2	6	1	5	18	5	1	0	1	0
Fair	0	1	3	17	12	50	119	69	64	9	8	1
Good	0	2	2	19	13	97	204	276	248	179	275	195

Figure 3-3
State Owned Bridge Health Indexes by Decade



	1900s	1910s	1920s	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	2010s
Poor	1	1	2	9	10	8	4	9	13	5	0	0
Fair	0	5	16	33	29	40	41	44	69	40	13	3
Good	0	1	4	6	11	34	51	47	128	161	172	73

Figure 3-4
Locally Owned Bridge Health Indexes by Decade

3.2 FAST ACT FUNDING AND PERFORMANCE MEASURES

FAST Act is the current federal transportation bill that was signed into law in 2015. The FAST Act builds on several focus areas from MAP-21, the previous federal transportation bill, including streamlining the surface transportation program, performance based programs, improving safety, maintaining infrastructure conditions, improving system efficiency, and reducing delays in project delivery. Figure 3-5 displays how state and locally owned bridges are distributed among federal on-system and the NHS. Funding definitions are as follows:

- NHPP – National Highway Performance Program
- ST_Bridge – State Bridge Program
- UDOT STP – UDOT Surface Transportation Program
- JHC STP – Joint Highway Committee Surface Transportation Program

While some structures may be eligible for multiple funding sources, funding is prioritized based on restrictions. Structures on federal aid routes will be assigned NHPP funding whenever possible. If NHPP funding is not available for a top priority federal aid structure, the structure will be ranked against the remaining state owned, non-federal aid structures. If the federal aid structure is a top priority over the other state owned structures, it will be assigned STP funding. The same evaluation will be done for state owned structures when NHPP and STP funds are not available to determine if they will be assigned ST_Bridge funds, ranking them against all state owned structures.

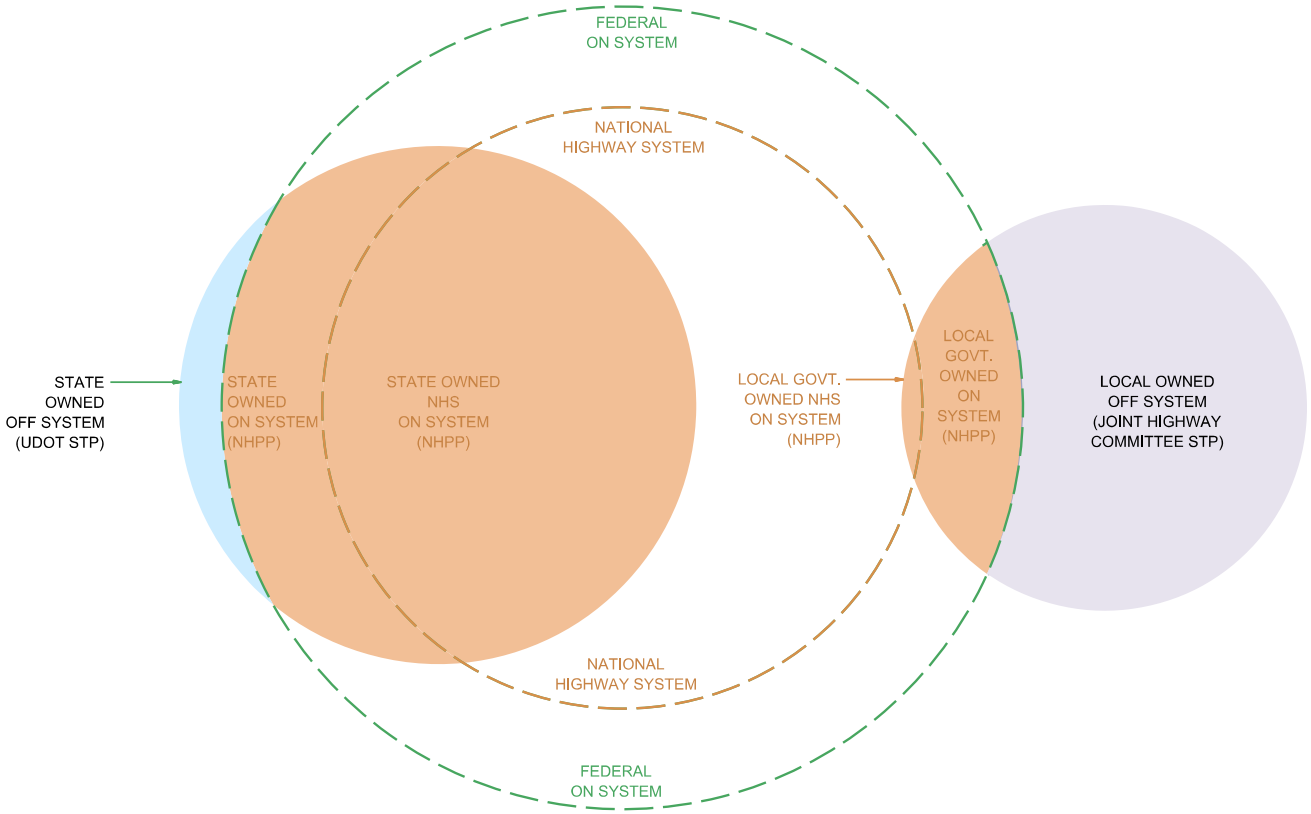


Figure 3-5
Diagram of Structures by Ownership and Funding

3.2.1 Structural Deficiency

The FAST Act requires a state to devote resources to improve the condition of the NHS until the established minimum is exceeded. The minimum standard for NHS bridges is that no more than 10 percent of the total deck area can be structurally deficient for the three years preceding. The bridge inventory in Utah is well below this threshold. The values of SD bridges for 2016 are shown in Table 3-2 and Table 3-3.

Type	Count	SD Count	Count Percentage	Deck Area (SF)	SD Deck Area (SF)	Deck Area Percentage
NHS	1,335	11	0.7%	13,716,824	85,864	0.6%
Non-NHS	568	7	1.1%	3,324,557	44,460	1.3%
Total	1,903	18	0.9%	17,041,381	130,324	0.8%

Note: Culverts are included in this table, which affect structure count but not deck area.

Table 3-2
Structurally Deficient, State Owned Bridges in Utah

Type	Count	SD Count	Count Percentage	Deck Area (SF)	SD Deck Area (SF)	Deck Area Percentage
NHS	11	0	0.0%	140,798	0	0.0%
Non-NHS	1,072	56	5.2%	2,489,057	59,091	2.4%
Total	1,083	56	5.2%	2,629,855	59,091	2.2%

Note: Culverts are included in this table, which affect structure count but not deck area.

Table 3-3
Structurally Deficient, Locally Owned Bridges in Utah

The historical trend of SD bridges in Utah is shown in Figure 3-6.

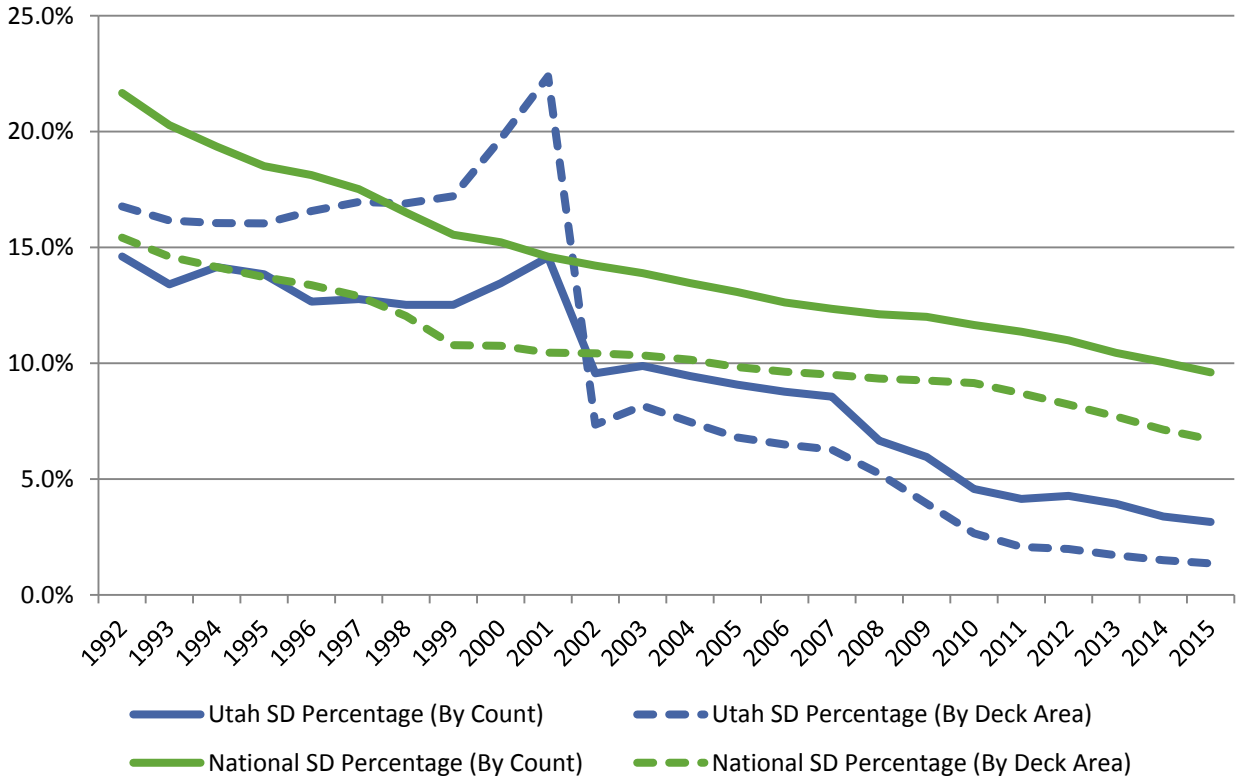


Figure 3-6
Percentage of Structurally Deficient Bridges – Utah vs Nation

All state owned SD bridges are projected to be replaced or rehabilitated within the next five years. Table 3-4 provides details of each bridge and the timing of replacement.

Structure Number(s)	Region	Location	Deck Area (SF)	Concept	Year Programmed
0C-433	2	County Road over I-80, Northeast of Wanship	10,736	Deck Replacement	Under Construction
0C-434	2	County Road over I-80, Northeast of Wanship	8,938	Deck Replacement	Under Construction
0C-293	4	SR-18 over Santa Clara River	10,079	Superstructure Repair	Under Construction
0F-24	1	SR-240 over I-15, Honeyville Interchange	9,578	Bridge Replacement	In Design
2C-402	2	I-15 Ramp to SR-270 (West Temple) at 200 South	17,717	Substructure Repairs	In Design
0F-49	2	1700 East over I-80	11,828	Deck Replacement	In Design
0F-52	2	SR-186 (Foothill Drive) over I-80 Off Ramp (Parley's Way)	12,839	Deck Replacement	In Design
3C-423	2	SR-186 (Foothill Drive) Ramp to I-215 (Parley's Interchange)	12,889	Deck Replacement	In Design
4C-424	2	I-80 WB to I-215 SB Ramp (Parley's Interchange)	5,750	Substructure Repairs	In Design
1D-672	2	US-89 to I-15 Ramp, Beck Street Interchange	8,910	Substructure Repair	In Design
0C-454	3	SR-75 over UPRR, North of Springville	6,187	Deck Replacement	In Design
0C-72	3	SR-311 over Strawberry River, North of Duchesne	1,493	Bridge Replacement	In Design
2F-261/ 4F-261	3	SR-265 over Provo River, West of University Avenue Interchange	11,493	Bridge Rehabilitation	In Design (with UTA)
0D-820	1	SR-102 over West Canal, South of Thatcher	1,888	Bridge Replacement	2018
0C-274	4	SR-163 over San Juan River near Mexican Hat	5,578	Feasibility Study	2019
2C-476	1	I-84 EB over UPRR and Weber River	19,287	Feasibility Study	2019
3C-341	3	I-15 SB over UPRR in North Lehi	23,845	In Scoping	2019

Table 3-4
State Owned SD Bridges and Year Programmed

Section 4
STRUCTURE PROGRAMS

4.1 STRUCTURE INSPECTION PROGRAM

NBIS inspections are performed on each bridge on a two-year (maximum) cycle. The number of inspections performed in 2015 was 1,473. These inspections include routine and special inspections. Special inspections are performed when a structure's condition warrants more frequent inspections according to Bridge Management Division inspection procedures.

At the beginning of the 2014 state bridge inspection cycle, the Bridge Management Division began using the recently updated AASHTO Elements that are described in the *AASHTO Manual for Bridge Element Inspection, 1st Edition, 2015 Interim Revisions*. These elements include National Bridge Elements, which improve the standardized data reported to FHWA and Bridge Management Elements, which assist agencies with more specific bridge inspection data. The transition to these new elements was a two-year process that was completed in June 2016. As part of this transition process, the Bridge Management System has been completely overhauled, modernizing a system that has been relatively untouched since 2005.

Underwater (UW) inspections are performed on a five-year cycle. UW inspections are required on bridges that are continuously under four feet of water or more. Two years ago, the inspection program performed 60 UW inspections on bridges that met these conditions. The next cycle of UW inspections will occur in 2019.

4.1.1 NBIS 23 Metrics

The Bridge Management Division ensures compliance with FHWA requirements related to managing the existing inventory of bridges. NBIS and 23 Code of Federal Regulations (CFR) §650 discuss several of the requirements. The Bridge Management Manual documents the UDOT policy and procedures (including submission requirements) to comply with the following FHWA requirements:

- Bridge inspection program (e.g., qualifications, inspection frequencies)
- Plan of action for scour critical bridges
- Critical findings
- Quality control/quality assurance
- Bridge inventory (e.g., maintenance of and annual submission to FHWA)
- Load rating

The Bridge Management Division and FHWA hold quarterly meetings to discuss the status on each of the FHWA requirements. The meetings address subjects such as scheduled bridge inspections for the next three months. The Bridge Management Division is currently compliant on all 23 metrics.

In 2010, Congress directed FHWA to make more significant progress in improving its oversight of bridge conditions and safety. In response, FHWA overhauled the Metrics for the Oversight of the National Bridge Inspection Program. The publication presents 23 metrics, which address the following topics:

- State DOT organization and record keeping
- Qualifications of NBI personnel
- Bridge inspection frequency and procedures
- Load rating and bridge posting

One fundamental goal of the FHWA metrics is to set minimum requirements for FHWA reviews to promote a data driven, risk based approach to oversight during annual NBIS compliance reviews. The metrics are intended to present:

- Clear and uniform expectations for all states
- Consistent criteria for judging each metric
- Compliance determination based upon the criteria for each metric

4.2 BRIDGE REPLACEMENT/REHABILITATION PROGRAM

The Bridge Replacement/Rehabilitation Program funds structures that require major structural work, major safety defects, or complete replacement. The Rehabilitation and Replacement List prioritizes these types of structures based on vulnerability (i.e., risk), criticality (i.e., importance), condition, and load rating. This program addresses structures with the poorest condition in the inventory.

Structures built prior to 2000 were typically designed to meet a service life of 50 years. Structures built prior to 1967 are expected to be nearing the end of the service life. There are at least 250 state owned structures that will require consideration for replacement or rehabilitation in the near future, based on condition assessment. Each decade approximately 300 to 400 bridges will be nearing the end of the service life. These structures will also need to be considered for replacement or rehabilitation. In 2016, UDOT rehabilitated two bridges and designed and awarded the rehabilitation of ten bridges to be constructed in 2017. Table 4-1 shows the projects in the 2017-2020 Bridge Replacement/Rehabilitation Program.

Yr	Rgn	County	Route	PIN	Structure Number	Project Location	Concept
2017	1	Box Elder	SR-240	11476	0F-24	SR-240 over I-15, Honeyville Interchange	Bridge Replacement
	2	Salt Lake	I-215	9419	1C-617	I-215 over SR-201	Bridge Replacement
					3C-617		Bridge Replacement
			US-89	11419	1D-672	US-89 (Beck Street); Northbound Ramp to I-15	Major Rehabilitation
	3	Utah	SR-75	11475	0C-454	SR-75 over UPRR, Springville	Deck Replacement and Major Rehabilitation
					0C-468	SR-75 Bridge over County Road and UPRR	Rehabilitation
	4	Garfield	SR-12	13797	0C-322	Dry Wash Bridge at Henrieville	Rehabilitation

Table 4-1
FY 2017-2020 Bridge Replacement/Rehabilitation Projects

Yr	Rgn	County	Route	PIN	Structure Number	Project Location	Concept
2018	1	Box Elder	SR-102	12389	0D-820	SR-102 over West Canal, South of Thatcher	Bridge Replacement
		Weber	SR-39	12446	0D-634	SR-39 over Ogden River, near Grey Cliffs	Bridge Replacement
					0F-381	SR-39 over Ogden River, near the mouth of the canyon	Rehabilitation
					0F-598	SR-39 over Ogden River, below Pine View Dam	Rehabilitation
			I-84	14348	2F-93	I-84 EB at the Uintah Interchange	Deck Replacement
					4F-93	I-84 WB at the Uintah Interchange	Deck Replacement
	2	Summit	Local	13796	0C-338	Toll Gate Canyon Interchange Bridge	Rehabilitation
			I-84	12445	2C-475	I-84 EB to I-80 EB, Echo Interchange	Deck Replacement and Major Rehabilitation
2018 (Continued)	2	Tooele	SR-36	13794	0C-583	Tooele Interchange Bridge in Lakepoint	Bridge Replacement
	3	Duchesne	SR-311	12390	0C-72	SR-311 over Strawberry River, North of Duchesne	Bridge Replacement
		Wasatch	SR-113	12444	0D-470	SR-113 over Provo River, near Midway	Substructure Rehabilitation
	4	Carbon	SR-55	13799	0C-682	West Price Connection Bridge over UPRR	Deck Replacement
		Garfield	Local	12448	017045V	Hole in the Rock Road over Alvey Wash	Culvert Replacement
						Hole in the Rock Road over Twenty Mile Wash	
		Millard	I-70	14354	2C-467	I-15 SB Ramp to I-70 EB	Parapet/Overhang Replacement and Minor Rehabilitation
					4C-543	I-70 WB Ramp to I-15 SB	Parapet/Overhang Replacement and Minor Rehabilitation
					2F-193	I-70 EB at Cove Fort Interchange	Minor Rehabilitation
					4F-193	I-70 WB at Cove Fort Interchange	Minor Rehabilitation

Table 4-1 (Continued)
FY 2017-2020 Bridge Replacement/Rehabilitation Projects

Yr	Rgn	County	Route	PIN	Structure Number	Project Location	Concept
2019	1	Morgan	Local	12624	029014D	5800 East over Weber River at Devil's Slide	Bridge Replacement
	2	Salt Lake	I-80	13323	2C-438	I-80 EB Bridge over the UPRR at Blackrock	Bridge Replacement
					4C-438	I-80 WB Bridge over the UPRR at Blackrock	Bridge Replacement
			SR-266	13800	0F-115	Jordan River Bridge on 4500 South Street	Rehabilitation and Parapet Replacement
			Local	14355	0C-629	4100 South over I-215	Rehabilitation
				14398	035031F	9200 West at Kennecott Bonneville Gate	Replacement
					035033F	3500 South 8900 West Magna	Replacement
		Summit	SR-65	13324	0C-566	East Henefer Interchange	Bridge Rehabilitation
					0D-772	Weber River Bridge at Henefer	Pending Scope and Estimate Report
2020	1	Weber	SR-53	14263	0C-655	24th Street Viaduct, Ogden	Feasibility Study
			I-84	14264	2C-476	I-84 EB over UPRR and Weber River	Feasibility Study
					4C-476	I-84 WB over UPRR and Weber River	Feasibility Study

Table 4-1 (Continued)
FY 2017-2020 Bridge Replacement/Rehabilitation Projects

4.3 BRIDGE PRESERVATION PROGRAM

The Bridge Preservation Program is a proactive program aimed at preserving structures in a state of good repair. Bridge preservation is defined as actions or strategies that prevent, delay, or reduce deterioration of bridges or bridge elements, restore the function of existing bridge elements, keep bridges in good condition, and extend service life. Preservation actions may be preventive or condition driven. The Bridge Preservation Program implements activities that aid in extending the life of a bridge for relatively limited cost. Funding can be used for stand-alone projects or bridge work combined with established Region projects. In 2016, UDOT applied preservation treatments to 16 bridges and designed and awarded a contract for an bridge preservation on an additional 24 bridges, to be completed in 2017. Table 4-2 shows the projects in the 2017-2018 Bridge Preservation Program.

Yr	Rgn	County	Route	PIN	Structure Number	Project Location	Concept
2017	1	Box Elder	Local	13524	0F-473	County Gravel Pit Road over I-84	Thin Bonded Polymer Overlay, Pothole Patching
					0F-472	Bothwell Interchange over I-84	Thin Bonded Polymer Overlay, Pothole Patching
			SR-102		0C-542	West Tremonton Interchange on I-84	Hydrodemolition and Thin Bonded Polymer Overlay
			I-15		1F-184	I-15 NB over Iowa String Road	Thin Bonded Polymer Overlay, Pothole Patching
			I-84		2F-184	I-15 SB over Iowa String Road	Thin Bonded Polymer Overlay, Pothole Patching
			I-15		1F-316	I-15 NB over County Road and UPRR	Thin Bonded Polymer Overlay, Pothole Patching
					3F-316	I-15 SB over County Road and UPRR	Thin Bonded Polymer Overlay, Pothole Patching
					1F-179	I-15 NB over County Road near Tremonton	Thin Bonded Polymer Overlay, Pothole Patching
					3F-179	I-15 SB over County Road near Tremonton	Thin Bonded Polymer Overlay, Pothole Patching
					1C-462	I-15 NB over North Malad River	Hydrodemolition and Thin Bonded Polymer Overlay
					3C-462	I-15 SB over North Malad River	Hydrodemolition and Thin Bonded Polymer Overlay
	3	Juab	I-15	13159	1F-454	I-15 NB over Deer Crossing, North of Mills Jct.	Polymer Overlay
					3F-454	I-15 SB over Deer Crossing, North of Mills Jct.	Polymer Overlay
					1F-433	I-15 NB over Sage Valley Access Road	Polymer Overlay
					3F-433	I-15 SB over Sage Valley Access Road	Polymer Overlay
					1F-453	I-15 NB over Lampson Canyon Access	Polymer Overlay
					3F-453	I-15 SB over Lampson Canyon Access	Polymer Overlay
					1F-437	I-15 NB over Wide Canyon Access	Polymer Overlay
					3F-437	I-15 SB over Wide Canyon Access	Polymer Overlay
					1F-434	I-15 NB over Valley Drainage Channel	Polymer Overlay

Table 4-2
FY 2017-2018 Bridge Preservation Projects

Yr	Rgn	County	Route	PIN	Structure Number	Project Location	Concept
2017 (Continued)	3 (Cont.)	Juab (Cont.)	I-15 (Cont.)	13159 (Cont.)	3F-434	I-15 SB over Valley Drainage Channel	Polymer Overlay
					1F-429	I-15 NB over County Road, South of Nephi	Replace Thin Bonded Polymer Overlay with Thin Bonded Polymer Overlay
					3F-429	I-15 SB over County Road, South of Nephi	Replace Thin Bonded Polymer Overlay with Thin Bonded Polymer Overlay
					1F-449	I-15 NB over UPRR at the South Nephi Interchange	3" Concrete and Polymer Overlay
					1F-450	I-15 NB off ramp at the South Nephi Interchange	3" Concrete and Polymer Overlay
					3F-448	I-15 SB over UPRR at the South Nephi Interchange	3" Concrete and Polymer Overlay
					1C-714	I-15 NB at the South Nephi Interchange	3" Concrete and Polymer Overlay
					3C-714	I-15 SB at the South Nephi Interchange	3" Concrete and Polymer Overlay
					1C-718	I-15 NB at the East Nephi Interchange	Replace Thin Bonded Polymer Overlay with Thin Bonded Polymer Overlay
					3C-718	I-15 SB at the East Nephi Interchange	Replace Thin Bonded Polymer Overlay with Thin Bonded Polymer Overlay
					1F-443	I-15 NB over 700 North in Nephi	Polymer Overlay
					3F-443	I-15 SB over 700 North in Nephi	Polymer Overlay
		Uintah	US-191	12609	0F-721	US-191 over Ashley Creek, north of Vernal	Polymer Overlay, Parapet Surface Repair
	4	Grand	US-191	14178	0D-590	Moab Main Street over Mill Creek	Pothole Patching and Polyester Concrete Overlay
		Sevier	I-70	13804	2C-683	I-70 EB over Shingle Creek	Hydrodemolition and Thin Bonded Polymer Overlay
					4C-683	I-70 WB over Shingle Creek	Hydrodemolition and Thin Bonded Polymer Overlay
					2C-684	I-17 EB over Fish Creek	Hydrodemolition and Thin Bonded Polymer Overlay

Table 4-2 (Continued)
FY 2017-2018 Bridge Preservation Projects

Yr	Rgn	County	Route	PIN	Structure Number	Project Location	Concept
2017 (Continued)	4 (Cont.)	Sevier (Cont.)	I-70 (Cont.)	13804 (Cont.)	4C-684	I-17 WB over Fish Creek	Hydrodemolition and Thin Bonded Polymer Overlay
					2C-685	I-70 EB over Mill Creek	Hydrodemolition and Thin Bonded Polymer Overlay
					4C-685	I-70 WB over Mill Creek	Hydrodemolition and Thin Bonded Polymer Overlay
					2F-402	I-70 EB at Clear Creek Summit Imterchange	Hydrodemolition and Thin Bonded Polymer Overlay
					4F-402	I-70 WB at Clear Creek Summit Interchange	Hydrodemolition and Thin Bonded Polymer Overlay
					2F-403	I-70 EB over Access Road West of Clear Creek	Hydrodemolition and Thin Bonded Polymer Overlay
					4F-403	I-70 WB over Access Road East of Clear Creek	Hydrodemolition and Thin Bonded Polymer Overlay
					2F-439	I-70 EB over Clear Creek	Hydrodemolition and Thin Bonded Polymer Overlay
					4F-439	I-70 WB over Clear Creek	Hydrodemolition and Thin Bonded Polymer Overlay
					2F-494	I-70 EB over Clear Creek	Hydrodemolition and Thin Bonded Polymer Overlay
					2F-495	I-70 EB over Clear Creek, at Clear Creek Canyon	Hydrodemolition and Thin Bonded Polymer Overlay
		Wayne	SR-24	12603	0E-355	SR-24; Sulpher Creek Culvert in Capitol Reef Park	Scour Repair
2018	1	Box Elder	SR-30	13518	0F-266	SR-30 over I-84, West Snowville Interchange	Deck Preservation
			Local		0F-264	I-84 Snowville Interchange	Deck Preservation
			I-84		2F-279	I-84 EB over Deep Creek	Deck Preservation
					4F-279	I-84 WB over Deep Creek	Deck Preservation
					2D-646	I-84 EB at the East Snowville Interchange	Deck Preservation
					4D-646	I-84 WB at the East Snowville Interchange	Deck Preservation

Table 4-2 (Continued)
FY 2017-2018 Bridge Preservation Projects

Yr	Rgn	County	Route	PIN	Structure Number	Project Location	Concept
2018 (Continued)	1 (Cont.)	Box Elder (Cont.)	I-84 (Cont.)	13518 (Cont.)	I-84 (Cont.)	I-84 EB over Hansel Valley Farm Road	Deck Preservation
					4D-647	I-84 WB over Hansel Valley Farm Road	Deck Preservation
					2F-245	I-84 EB at the Hansel Valley Interchange	Deck Preservation
					4F-245	I-84 WB at the Hansel Valley Interchange	Deck Preservation
					2F-246	I-84 EB at the East Rattlesnake Interchange	Deck Preservation
					4F-246	I-84 WB at the East Rattlesnake Interchange	Deck Preservation
		Davis	SR-108	12415	0F-582	SR-108 West Freeport Center Bridge	Polyester Concrete Overlay and Pothole Patching
					0F-581	SR-108 Railroad Bridge Adjacent to Freeport Center	Polyester Concrete Overlay and Pothole Patching
		Davis	I-15	13793	1C-302	I-15 SB ramp to US-89 SB	Repaint Superstructure
	2	Salt Lake	I-15	12443	1F-661	I-15 NB over North Temple and UTA	Polyester Concrete Overlay
					3F-661	I-15 SB over North Temple and UTA	Polyester Concrete Overlay
					1C-880	I-15 NB over South Temple and UPRR	Polyester Concrete Overlay
					3C-880	I-15 SB over South Temple and UPRR	Polyester Concrete Overlay
					1F-660	I-15 NB over 200 South	Polyester Concrete Overlay
					3F-660	I-15 SB over 200 South	Polyester Concrete Overlay
					1F-659	I-15 NB over I-80 WB at 300 South	Polyester Concrete Overlay
					3C-878	I-15 SB over I-80 WB at 300 South	Polyester Concrete Overlay
					1C-875	I-15 NB over SR-267	Polyester Concrete Overlay

Table 4-2 (Continued)
FY 2017-2018 Bridge Preservation Projects

Yr	Rgn	County	Route	PIN	Structure Number	Project Location	Concept
2018 (Continued)	2 (Cont.)	Salt Lake (Cont.)	I-15 (Cont.)	12443 (Cont.)	3C-875	I-15 SB over SR-267	Polyester Concrete Overlay
					1F-658	I-15 NB over 800 South	Polyester Concrete Overlay
					3F-658	I-15 SB over 800 South	Polyester Concrete Overlay
			I-80	12418	2C-631	I-80 EB Ramp to North Temple	Polyester Concrete and Pothole Patching, Parapet Surface Repair
					2C-732	4800 W. to I-80 EB	Polyester Concrete Overlay
			SR-172		0F-344	SR-172 Bridge over the Salt Lake & Garfield Track	Polyester Concrete Overlay
			SR-154		2C-633	SR-154 SB to I-80 EB ramp over SR-154	Pothole Patching, Membrane, and Overlay
					2C-637	SR-154 SB to I-80 EB ramp over I-80	Pothole Patching, Membrane, and Overlay
			SR-186		4C-917	Airport Entrance Ramp bridge	Pothole Patching and Thin Bonded Polymer Overlay
					4F-415	SR-186 over Surplus Canal	Pothole Patching and Thin Bonded Polymer Overlay
			I-80		2C-710	I-80 EB Bridge over SL&GW near Airport	Polyester Concrete Overlay
					4C- 710	I-80 WB Bridge over SL&GW near Airport	Polyester Concrete Overlay
					0F-419	Surplus Canal Bridge on I-80 near Airport	Pothole Patching, Membrane, and Overlay
					4F-36	I-80 WB ramp to SLC Airport over Surplus Canal	Pothole Patching, Membrane, and Overlay
					2C-624	I-80 EB off ramp over I-80 and Surplus Canal	Pothole Patching, Membrane, and Overlay
		Salt Lake	I-80	14344	2C-956	I-80 EB over 300 East	Repair and Seal Joints
					4C-956	I-80 WB over 300 East	Repair and Seal Joints
					2C-957	I-80 EB over 500 East	Repair and Seal Joints
					4C-957	I-80 WB over 500 East	Repair and Seal Joints
					2C-960	I-80 EB over 600 East	Repair and Seal Joints
					4C-960	I-80 WB over 600 East	Repair and Seal Joints

Table 4-2 (Continued)
FY 2017-2018 Bridge Preservation Projects

Yr	Rgn	County	Route	PIN	Structure Number	Project Location	Concept
2018 (Continued)	2 (Cont.)	Salt Lake (Cont.)	I-80 (Cont.)	14344 (Cont.)	4C-961	I-80 WB on ramp from 700 East	Repair and Seal Joints
					2C-962	I-80 EB off ramp to 700 East	Repair and Seal Joints
					2C-958	I-80 EB over 700 East	Repair and Seal Joints
					4C-958	I-80 WB over 700 East	Repair and Seal Joints
					2C-959	I-80 EB over 900 East	Repair and Seal Joints
					4C-959	I-80 WB over 900 East	Repair and Seal Joints
					2C-963	I-80 EB over Highland Drive	Repair and Seal Joints
					4C-963	I-80 WB over Highland Drive	Repair and Seal Joints
					2C-964	I-80 EB off ramp to 1300 East	Repair and Seal Joints
		Tooele	I-80	12442	2C-239	I-80 over Skull Valley Drainage Channel	Paint Superstructure
					4C-239	I-80 over Skull Valley Drainage Channel	Paint Superstructure
	4	Kane	US-89	12439	0C-204	US-89 over Long Valley Creek, north of Glendale	Paint Superstructure

Table 4-2 (Continued)
FY 2017-2018 Bridge Preservation Projects

4.3.1 Painted Steel Protection Systems

The Bridge Management Division is in the process of developing a program to address the protective paint system on steel superstructures. Table 4-3 shows the current quantities of painted steel elements in each condition state.

Description	Quantity (SF)	Percent	Repair Action
Condition State 1	12,404,559	77.41%	None
Condition State 2	2,676,696	16.70%	Spot paint trouble areas such as beam ends
Condition State 3	505,565	3.16%	Repaint
Condition State 4	436,937	2.73%	Repaint
Total	16,023,757	100%	

Table 4-3
Painted Steel Superstructure Condition Summary

The historical trend of painted steel superstructure elements in Utah is shown in Figure 4-1.

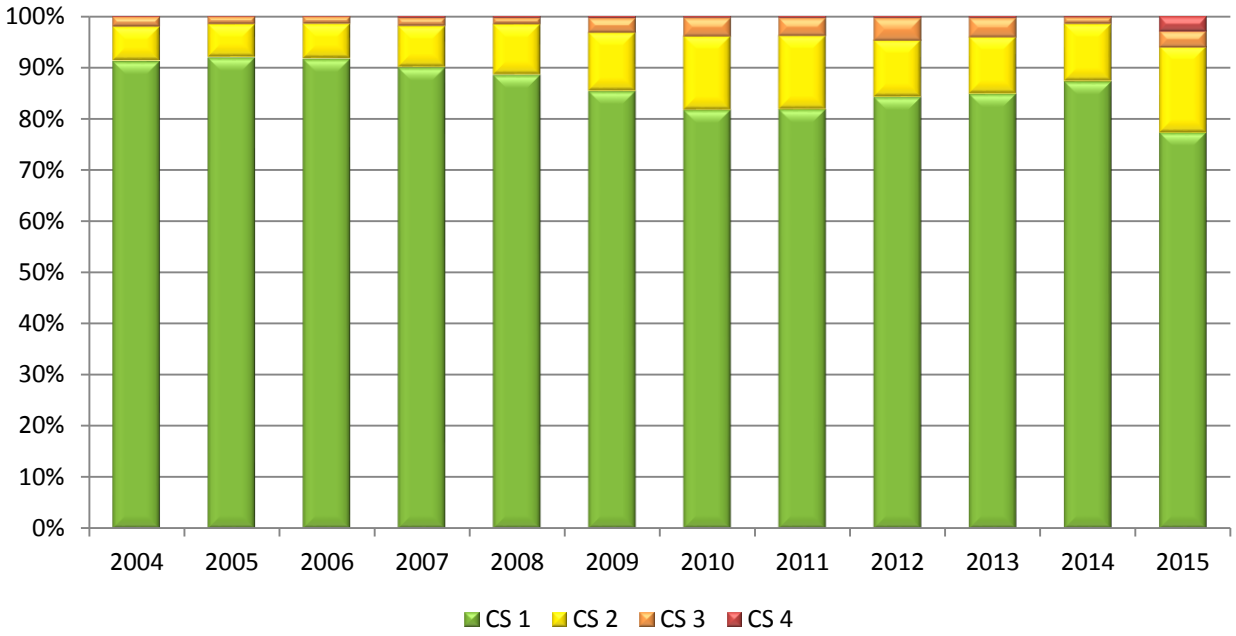


Figure 4-1
Painted Steel Superstructure by Year and Condition State

4.3.2 Concrete Deck Protection

The Structures Division has been applying protective overlays to bridge decks for many years. Initially, asphalt overlays were applied mostly due to asphalt pavement adjacent to the bridge and to address rideablility issues, as opposed to addressing bridge protection.

Recent developments in asset management strategies have led to improved performance and extended service life in bridge decks. One such strategy is to apply thin-bonded polymer overlays to existing bare concrete bridge decks. Another strategy is to apply a thin, low-permeability rigid overlay such as polyester concrete. Table 4-4 provides the current information on bridges without any overlay protection.

Description	Quantity (SF)	Percent	Repair Action
Condition State 1	2,976,968	71.6%	Apply a protective overlay
Condition State 2	1,162,732	28.0%	Program structural patch and a protective overlay
Condition State 3	18,275	0.4%	Perform structural patch and apply a protective overlay
Condition State 4	0	0.0%	Replace upper portion of deck and apply a protective overlay
Total	4,157,974	100%	

Table 4-4
Bare Concrete Deck Condition Summary

The historical trend of bare concrete deck elements in Utah is shown in Figure 4-2.

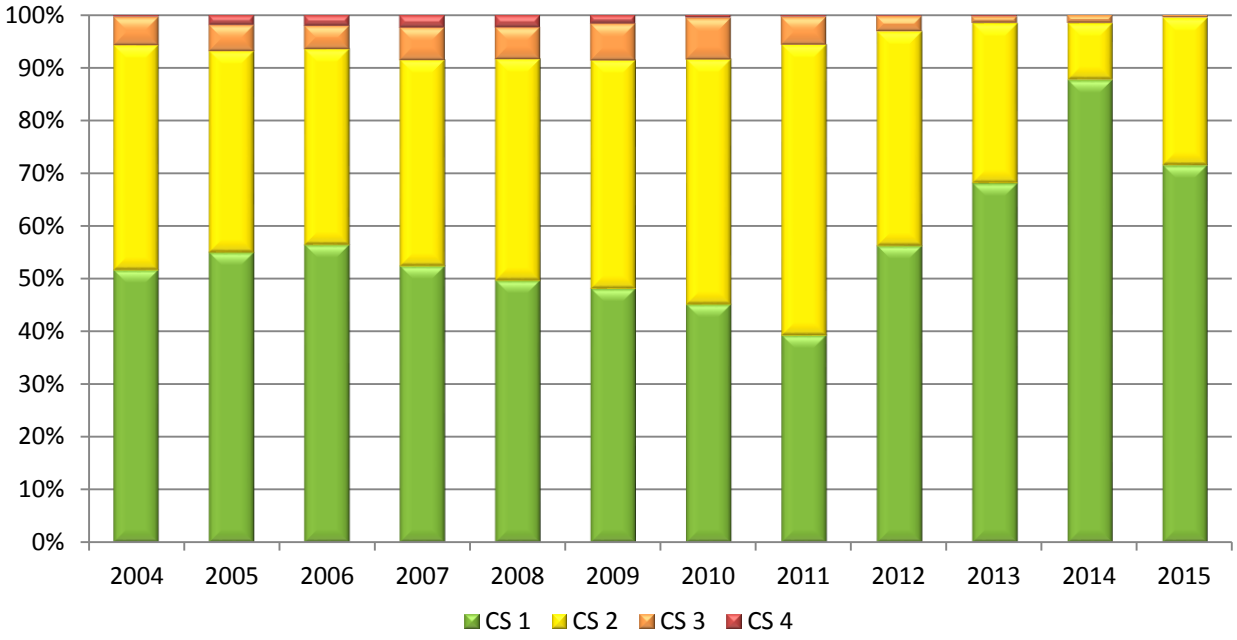


Figure 4-2
Bare Concrete Decks by Year and Condition State

4.4 OFF-SYSTEM BRIDGE PROGRAM

All local public agency bridges not included in the Federal Aid Highway System are eligible for federal funding through the Joint Highway Committee (JHC). The JHC is composed of representatives from Utah counties and cities and is responsible for the local public agency projects within the Off-System Bridge Program. A bridge will be considered for replacement or preservation in accordance with the Bridge Management Manual. Table 4-5 shows the current projects in the program.

Structure Number(s)	Region	Location	Year Programmed
029003C	1	Stoddard Lane over Weber River, Morgan County	In Design
013005C 013064C	3	Bridges near Tabiona	Under Construction
005012C 005033C 005037D	1	Bridges in Cache County	Under Construction
013007C	3	Reconstruct Bridge near Tabiona	2016
043046C	2	Hoytsville Bridge, Summit County	2016
053019C	4	Rockville Bridge over the Virgin River, Rockville	2016

Table 4-5
Off-System Bridge Program

4.5 MAINTENANCE PROGRAM

The Bridge Maintenance Program was initiated to quickly fix observed bridge deficiencies. The program is intended to address common deficiencies through a bridge procurement contract with dedicated bridge funding. This process allows the work to be performed much sooner than waiting to add the work to the next unfunded year on the Bridge Replacement/Rehabilitation Program or the Bridge Preservation Program. Bridge contractors submit unit prices for several simple work items before the specific bridge or the extent of the work is known. Since many of the recurring bridge deficiencies are consistent with these simple work items, engineers can now quickly identify a number of bridges to address and direct the contractor to do the work at the pre-determined price.

The focus of this program is on patching potholes in concrete bridge decks, patching delaminated areas of thin bonded polymer overlays, and patching asphalt overlays. These three deficiencies are carefully tracked through the Bridge Inspection Program and with the assistance of region personnel. Work on any one bridge may be minor, but when possible, several bridges with similar deficiencies and in close proximity are bundled into one project. The procurement contract can also be used to provide waterproofing membrane with asphalt overlays, deck seals, and bridge parapet repair.

This work is done in close coordination with each region to provide the necessary administration, construction oversight, and material testing. When necessary, the construction oversight and material testing are completed with a consultant engineer. Either the Structures Division or the region performs the administration.

4.6 LOAD RATING PROGRAM

The Bridge Management Division has currently completed a program to load rate all state and locally owned structures. An ongoing effort will be in place to update load ratings as needed and to mitigate for load postings on the state highway system. A bridge load rating is defined as the safe live load carrying capacity of a bridge. This program promotes safety of the traveling public, provides accurate data to support and allocate funding, assists in the development of a programmatic permit truck routing system, and more effectively evaluates higher truck load permits. Table 4-6 shows all of the state owned structures that are load posted. The total structure count is based on public (non-private) structures.

Bridge ID	Location	Facility Carried	Feature Intersected	Posting
0A-385	1 mile east of Ivie Creek Interchange	SR-76	Unnamed Wash	Tandem Group 34,000 lb
0A-387	1.5 miles west of Fremont Junction Interchange	SR-72	Post Hollow Wash	Tandem Group 34,000 lb
0A-446	North of Mayfield	SR-137	Twelve Mile Wash	Tandem Group 34,000 lb

Table 4-6
Load Posted, State Owned Structures

4.7 SCOUR PROGRAM

The goal of the scour program is to allocate funding for projects to address structures that are scour critical. These funds are spent to identify and mitigate scour hazards to minimize the risk associated with bridge failures due to scour. This work will reduce future maintenance costs associated with scour. The established program has been incorporated into the Bridge Preservation Program.