2023

LORAIN COUNTY BRIDGE REPORT
LORAIN COUNTY ENGINEER
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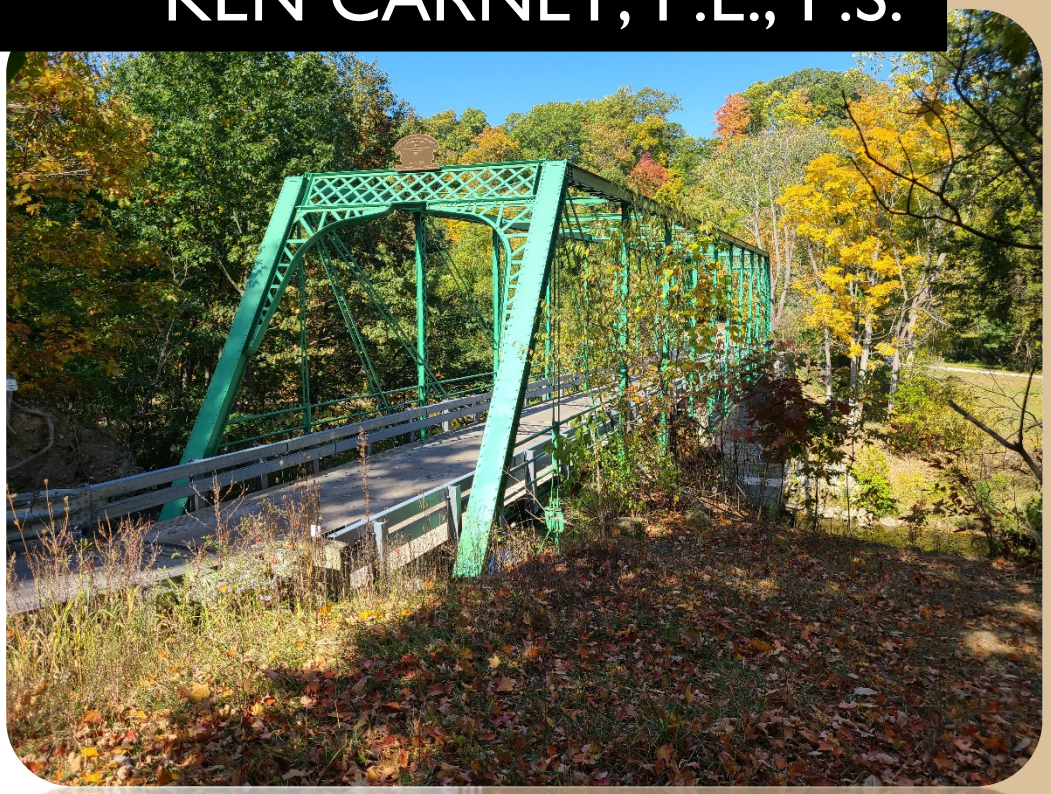

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1/29/2024

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INTRODUCTION

In accordance with Section 5543.20 of the Ohio Revised Code the County Engineer annually inspects and reports the condition of all bridges on the county and township roads outside of municipalities and bridges within municipalities on some former county roads.

A bridge, in Ohio, is defined as a structure with a clear span of ten (10) feet or more, measured along the centerline of the roadway. The Lorain County Engineer's Office is currently responsible for the inspection and maintenance of 235 bridges. Within ninety (90) days of each bridge inspection, the County Engineer reports the condition of each bridge to the Ohio Department of Transportation (ODOT). ODOT maintains a master inventory of every bridge in the State and reports the data to the Federal Highway Administration on an annual basis. In total, the State of Ohio has approximately 45,000 bridges that are inspected by various counties, municipalities and ODOT, the second largest inventory of all states. Roughly sixty percent of the bridges in the state of Ohio are maintained by County Engineers.

BACKGROUND

After the collapse of the Silver Bridge, 1967 Point Pleasant, West Virginia, the United States Congress added a section to the Federal-Aid Highway Act of 1968 to establish a National Bridge Inspection Standard. Ohio established its own inventory and reporting in 1973 to fulfill these requirements.

The collapse of the I-35W Bridge in Minneapolis on August 1, 2007 brought the next big change to the County Bridge Program. After the collapse, the County Engineers Association, ODOT and the Federal Highway Administration (FHWA) reached an agreement in 2009 that all federal bridges (bridges 20 ft. or greater) must have a load analysis performed by October 1, 2013. Lorain County performed an analysis on each of their federal bridges to meet this requirement.

Since then, the requirements have continually been updated by FHWA and ODOT. All federal structures maintained by the County have been load rated for Special Hauling Vehicles, and Emergency vehicles. These vehicles were made legal by state standards after 2013. And finally, the County is in the process of updating load ratings and the entire bridge inventory as a result of FHWA releasing the Specifications for the National Bridge Inventory (SNBI). This Standard was released in March of 2022.

LORAIN COUNTY BRIDGE FACTS

- There are 235 bridges on the Lorain County bridge inventory. The Lorain County Engineer's office is responsible for inspecting each one on a yearly basis (at a minimum) and maintaining them.
- 122 of the structures are over 20 feet in length, which is the length that the Specifications for the National Bridge Inventory requires inspection for. All other structures are between 10- and 20-foot span, which are required to be inspected annually by the State of Ohio.
- 44 years is the average age of the bridge decks of the structures that Lorain County is responsible for. It is worth noting that many of the abutments are actually much older than the decks as many decks have been replaced with the reuse of the old abutments.
- The county annually inspects all bridges on the current bridge inventory as required by the ORC. As part of this inspection, a report is made, and bridges are rated on a scale from 9-0 which is considered their General Appraisal number. With 9 being excellent condition, and 0 being failed. See sheet 6 of this report for a summary of ratings.
- There are 13 federal structures with weight restriction limits throughout the County, four of which are scheduled to be replaced by 2025. Of the remaining ten, two are closed (Waterfall Drive No. 0017 and Oberlin-Elyria Rd No. 00.00(Historical)), and two have been recently rehabbed and are in low volume traffic locations (Gore Orphanage No. 2092 and Dean Road No. 0103). One recent rating (Sugar Ridge Rd) is the result of updating ratings for newer, heavier vehicles. The remaining six have a general appraisal (GA) rating of 5-6 (fair to satisfactory) but were designed for loads much less than the heavy loads that we currently have to consider.
- Longest bridge under County responsibility - 305 feet, East 31st Street, within the City of Lorain over the Black River. This structure is also the only structure in Lorain County that requires a Dive Inspection be performed due to the depth of the Black River at this location.
- Oldest known bridge - Garfield Road east of Quarry Road, sandstone arch built 1883. There are 8 other sandstone arches still in-service throughout the county built around the same time.

RECENT HISTORY

Since 2012, the Lorain County Engineer's office has made a concentrated effort to improve our bridge inventory. In that time our office has replaced or completed major rehabilitations on over 49 bridges. In the last seven years alone (since 2016) the County Engineer's Office, with multiple funding partners, has completed 38 major bridge projects for a total cost of $15.6 million. It is critical that this effort continues in order to keep up with the aging infrastructure in Lorain County.

TYPES OF BRIDGES

Lorain County Bridges consist of several different types, using a variety of materials such as concrete, steel, sandstone and timber. All of the bridges that Lorain County Engineer's Office are responsible for have been classified below based on the superstructure (deck) make-up. The following shows the various bridge types throughout the County

PRE-STRESSED BOX BEAMS

- 79 (33%) bridges are pre-stressed box beam decks
- Beams are pre-cast in factory, shipped to site, and set adjacent to each other
- Used regularly since the 1960's
- Usually the most economical structure with spans of 30-90 feet.
- Can span up to 120 feet.

Crook St Bridge #0104

Construction of Pitts Rd Bridge #0466

CULVERT TYPE STRUCTURES

- 35 (15%) bridges are classified as culverts, which are structures under fill.
- Usually made of concrete or structural steel plating.
- Concrete casted segments pushed together, common today for structures less than 16 feet in span.

CONCRETE SLAB

- 63 (27%) bridges are concrete slab decks.
- Typically less than 30 feet in span.
- Majority on our inventory built 1930's-1950's (many now being replaced in kind)
- Abutments either concrete or combination of concrete and sandstone.

Construction of Peck Wadsworth Rd Bridge #0668

East 31st Street Bridge #0069

STEEL BEAM

- 29 (12%) bridges have steel beam superstructures.
- Beams can have concrete or steel decking with asphalt driving surfaces
- Can be single or multi-span. The East 31st street bridge (305 ft. length) is a multi-span steel beam bridge.
- Most commonly used in Lorain County from the 1950's-1960's.
- Abutments usually concrete capped piles.

TRUSS TYPE STRUCTURES

- 9 (4%) bridges are classified as truss structures.
- Range in span from 40-170 feet.
- Very common late 1950's early 1960's.
- Load is carried by the truss arches to the abutments.
- Abutments usually concrete on steel H piles.
- Steel components painted or galvanized.

Parsons Rd Bridge #0782

Garfield Rd Bridge #0452

(Built in 1883)

ARCH TYPE STRUCTURES

- 11 (5%) bridges classified as arches.
- Most made of sandstone between 1880 and early 1900's.
- Can be constructed of steel plates bolted together or concrete.
- Some of the sandstone arches have been widened using steel plating or concrete.

MISCELLANEOUS STRUCTURE TYPES

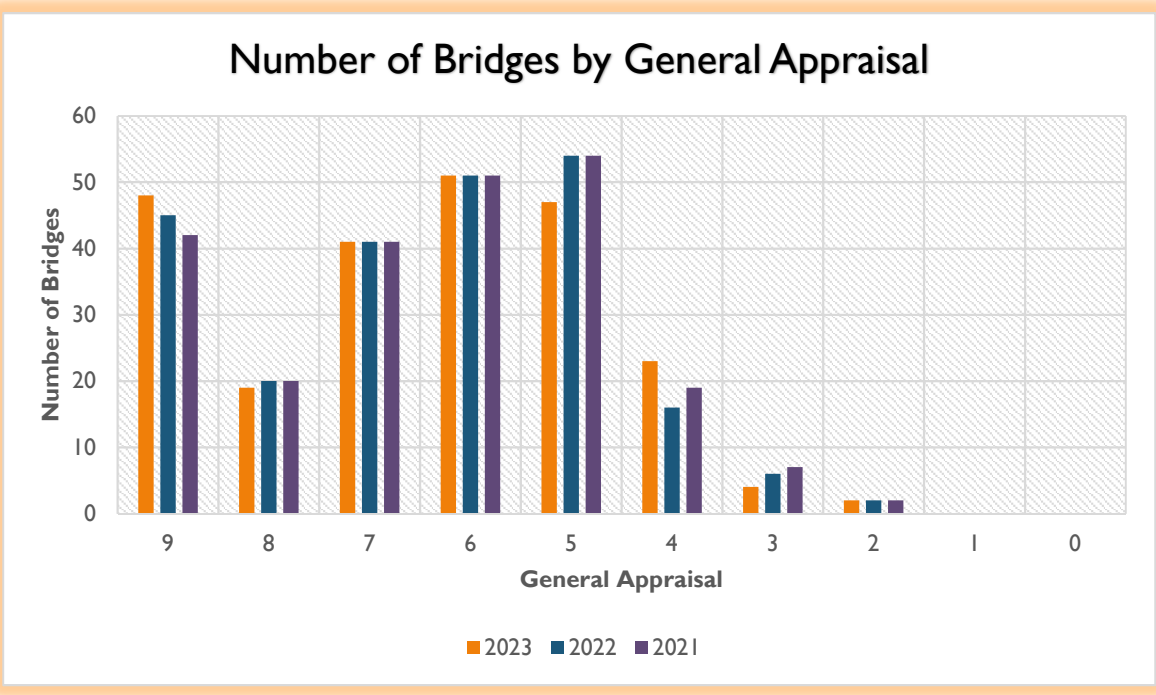
- 9 (4%) bridges utilize either girder floor systems (abandoned RR bridges) or variations of the above structure types.

Tee-Beam Structure
Kolbe Rd Bridge #0154

CURRENT BRIDGE GENERAL APPRAISAL RATINGS

The General Appraisal rating for a bridge compares the physical condition of the bridge to its condition when the bridge was brand new. It does not consider adequacy of design, only condition of structural elements of the bridge, the stream channel and the roadway improvements. The adequacy of design is determined through the sufficiency rating of the bridge and the load ratings. The below table shows the County bridge general appraisal ratings from the last three years, as well as from 2014 to show the progression of the inventory as a whole over the last 9 years.

General Appraisal	Description	2023 Bridges	2022 Bridges	2021 Bridges	2014 Bridges
9	Excellent Condition	48	45	42	20
8	Very Good Condition	19	20	20	25
7	Good Condition	41	41	41	52
6	Satisfactory Condition	51	51	51	54
5	Fair Condition	47	54	54	33
4	Poor Condition	23	16	19	26
3	Serious Condition	4	6	7	9
2	Critical Condition	2	2	2	7
1	"Imminent Failure" Condition	0	0	0	1
0	Failed	0	0	0	0



REVIEW OF GENERAL APPRAISAL RATINGS

A review of the number of bridges by general appraisal shows two things. One, is that the County's efforts to replace structures within the last 9 years is evident as the number of bridges rated a "9" or excellent has more than doubled since 2014. The second piece of noteworthy information is that even though the County has made these efforts, they must continue. It is clear that the infrastructure is aging at a rate that is greater than the rate we have been able to replace or rehabilitate the structures. This is seen when reviewing the number of bridges rated as a "4" this year (43.8% increase from 2022). There is a large portion of bridges rated "5" or below, and these bridges are going to continue to degrade. Careful consideration shall be given to which bridges are worsening quicker than others and acting with maintenance and/or replacement efforts will continue to be critical. I am confident that the Lorain County Engineer's Office will continue to extend every effort possible to replace structures and find funding available for this work to maximize County tax dollars.

BRIDGE PROJECTS COMPLETED 2023

Bridge	Description	Location	Cost
Oberlin Rd Bridge #0644	Superstructure Replacement	Amherst Township	$412,419
North Ridge Rd Bridge #0349	Superstructure Replacement	Brownhelm Township	$245,000
Capel Rd Bridge #0609	Complete Structure Replacement	Columbia Township	$185,300
Hughes Rd Bridge #0255	Superstructure Replacement	Pittsfield Township	$200,000
Middle Ridge Rd Bridge #0423	Complete Structure Replacement	City of Amherst	$248,870
Annis Rd Bridge #0085	Superstructure Rehabilitation	South Amherst Village	$20,280
			$1,311,869

ANTICIPATED BRIDGE PROJECTS 2024

Bridge	Description	Location	Cost
Gore Orphanage Rd Bridge #1535	Complete Structure Replacement & Retaining Wall Replacement	Henrietta Township	$4,184,000
Chestnut Ridge Rd Bridge #0531	Complete Structure Replacement	City of North Ridgeville	$338,000
Peck Wadsworth Rd Bridge #0783	Complete Structure Replacement	Wellington Township	$1,128,000
			$5,650,000