BRIDGE WORK
IN DARKE COUNTY, OHIO

OUR REALITY STATEMENT:

" TRYING TO DO THE IMPOSSIBLE,
WITH THE INADEQUATE,
FOR THE BENEFIT OF THE
UNAPPRECIATIVE"

Darke County Greenville, Ohio

Population : 53,000

Area: 600 sq. miles

- **OUR STATISTICS ARE A LOT OF 5'S:**

- **521 miles of county roads**
- **531 bridges >10' on county and township roads**
- **541.5 miles of township roads**
- **$5.2 Million Annual Operating Budget (with no permissive taxes, general fund money or local revenue)**

DARKE COUNTY BRIDGES

- 531 bridges over 10’ span (423 with 20’ and greater spans)
- Most county bridges in Ohio and 10th in nation
- 615,591 square feet of bridge deck
- 409 new bridges have been built (336 by County employees), in Darke County since 1976.
- Oldest Bridge (truss) built in 1881 = 136 years
- Average age of 531 bridges: 35 years
- Sufficiency Ratings:
  - 383 - Excellent (90 -100) = 72.1%
  - 128 - Good (70 -90) = 24.1%
  - 16 - Fair (50 -70) = 3.0%
  - 4 - Poor (0 - 50) = 0.8%
- Avg. sufficiency rating of 531 bridges: 92.6%
- 122 bridges currently remain in service from 40-136 years old.

BRIDGE TYPES AND NUMBERS IN DARKE COUNTY.

TYPE	TOTAL	BUILT SINCE 1976	REMAINING 40 – 136 YEARS
PRESTRESSED CONCRETE	290	281	9
CAST-IN-PLACE SLAB	72	2	70
STEEL BEAM	61	47	14
PRECAST CONCRETE BOX	43	39	4
STEEL TRUSS	30	27	3
CONCRETE (OTHER)	18	0	18
PRECAST CONCRETE BEAM	7	7	0
STEEL OR ALUMINUM ARCH	5	5	0
MASONRY ARCH	4	0	4
TIMBER	1	1	0
TOTAL	**531**	**409**	**122**

REHABILITATION AND NEW CONSTRUCTION

OVER THE PAST SEVEN YEARS WE HAVE CONCENTRATED HEAVILY ON REHABILITATION OF EXISTING STEEL AND CONCRETE SLAB BRIDGES TO EXTEND THEIR SERVICE LIFE.

DURING THIS TIME WE HAVE REHABILITATED 33 BRIDGES AND CONSTRUCTED 24 NEW BRIDGES.

REHABILITATION (STEEL): REMOVAL OF TIMBER OR STEEL DECK, CLEANING AND/OR PAINTING OF STRUCTURAL STEEL WITH REPAIRS AS NECESSARY, INSTALLATION OF NEW TIMBER DECK WITH WATERPROOFING AND 3-1/2” AVG. ASPHALT SURFACE.

(MULTIPLE SPAN CONCRETE SLABS): REMOVAL OF ASPHALT AND ALL DETERIORATED CONCRETE ON DECK SIDES, SET STAY-IN-PLACE STEEL FORMS, INSTALL NEW CONCRETE, WATERPROOFING AND ASPHALT SURFACE.

NEW BRIDGES

18 WERE TOTAL REPLACEMENTS

6 WERE NEW SUPERSTRUCTURES ON EXISTING ABUTMENTS.

OF THE 24 NEW BRIDGES IN THE LAST SEVEN YEARS: (AVG. COST/SQ. FT. SHOWN)

7-STEEL BEAM WITH TIMBER DECK ON NEW ABUTMENTS ($92)
5-STEEL BEAM-TIMBER DECK ON EXISTING ABUTMENTS ($63)
8-PRECAST CONCRETE BOX STRUCTURES ($80)
3-PRESTRESSED CONCRETE BEAM ON NEW ABUTMENTS ($95)
1-3 SPAN CONCRETE SLAB ON NEW PIERS AND EXISTING ABUTMENTS ($205) By Contract

83% HAVE BEEN EITHER STEEL BEAM/TIMBER WITH SPANS FROM 18-85 FEET AND WIDTHS FROM 24-32 FEET.

OR

PRECAST CONCRETE BOXES: SPANS 10-14 FEET AND RISES 4-8 FEET, WITH OVERALL LENGTHS FROM 48-78 FEET.

WHY STEEL BEAMS WITH TIMBER DECKS?

- ERECTION CAN BE DONE WITH EXCAVATOR
- STEEL FABRICATION CAN BE DONE IN-HOUSE
- TIMBER STRIP DECK (3”X6”), WHILE LABOR-INTENSIVE, CAN BE PERFORMED RELATIVELY QUICKLY WITHOUT SPECIALIZED EQUIPMENT.
- NON-WATERPROOFED (NON-CREOSOTE) TIMBER DECKS HAVE PROVEN TO LAST 35-40 YEARS.
- BRIDGE TYPE IS EASY TO INSPECT, EVALUATE, AND EASY TO REPAIR AND MAINTAIN WITH COUNTY PERSONNEL.

LESSONS LEARNED IN STEEL/TIMBER DECK CONSTRUCTION

- **GALVANIZING IS THE ONLY WAY TO GO!**
  (all structural elements including bolts, cleats, nails, etc.)

- **WATERPROOFING SHOULD BE WORTH THE COST AND EFFORT**

- **MAXIMUM EFFICIENCY WITH IN-HOUSE FABRICATION**

- **TIMBER INSTALLATION/REPLACEMENT CAN BE DONE WITH LIMITED TOOLS AND EQUIPMENT.**

SUPERSTRUCTURES FOR THE COMING YEAR ARE FABRICATED FROM JANUARY THRU MARCH. (BETWEEN SNOW PLOWING) THIS YEAR WE HAD PLENTY OF TIME TO PREPARE FOUR BRIDGES.

EACH BRIDGE IS COMPLETELY ASSEMBLED THEN DIS-ASSEMBLED BEFORE BEING GALVANIZED. THIS BRIDGE HAS 11 W18X55 BEAMS AT 2.6 FT. SPACING AND WILL BE COVERED WITH A TIMBER STRIP DECK WITH WATERPROOFING AND A VARYING ASPHALT THICKNESS FROM 2”-5”.

ERECTION OF SUPERSTRUCTURE CAN BE DONE WITH AN EXCAVATOR.

Waterproofing membrane (geo-tac) is “sandwiched” between two layers of asphalt concrete. (2” thick at edge and 5” thick at center) The material cost is about 70 cents per square foot.

TYPICAL NEW GALVANIZED STEEL SUPERSTRUCTURE ON EXISTING ABUTMENTS.

COSTS OF STEEL/TIMBER BRIDGES IN 2016

NEW SUPERSTRUCTURE ON NEW ABUTMENTS

SPAN X WIDTH	ABUTMENT TYPE	COST/SQ. FT.	TOTAL COST
31’ X 24’	FOOTER & WALL	$74	$ 59,675
28’ X 24’	FOOTER & WALL	$67	$ 53,437
37’ X 28’	CAPPED PILE	$68	$ 90,811
18’ X 28’	FOOTER & WALL	$117	$ 79,402

PROJECT DURATIONS: 30-49 CALENDAR DAYS

REHABILITATION OF STEEL BEAM BRIDGES (35-40 YEARS OLD)

WITH NEW DECK, WATERPROOFING AND ASPHALT SURFACE (3-1/2”)

SPAN X WIDTH	STEEL TYPE	COST/SQ. FT.	TOTAL COST
60’ X 24’	A588/CORTEN	$19	$ 26,679
60 X 24’	A588/CORTEN	$20	$ 34,056
18’X 24’	A36/PAINTED	$39	$ 20,349

PROJECT DURATIONS: 16-21 CALENDAR DAYS