



SOLVING PROBLEMS

(From an Owner's Perspective)

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WHAT ARE ENGINEERS SUPPOSED TO DO?

One definition of engineer:
"creative problem solvers"

Is solving problems what drew us
to the profession?

Are there engineers that hinder
problem solving?

When confronted with an
engineering problem, which one
are you?



WHAT ARE BRIDGE ENGINEERS SUPPOSED TO DO?

Bridge engineers always have a new problem over the horizon and we often need to solve them creatively

- Planning
- Design
- Construction
- In-service



WHAT DO WE NEED TO SOLVE PROBLEMS?

What we need are a will to solve a problem and we need tools.

Let's look at two accelerated bridge construction projects for examples

- Crossing the Rhine River
- Crossing Martin Branch

CROSSING THE RHINE RIVER

First bridge across the Rhine River on record built during the Gallic War, 55-53 BC, by Julius Caesar

Bridge length estimated between 460' and 1300' in overall length

23' to 30' wide bridge

River depth can be up to 30'

CROSSING THE RHINE RIVER



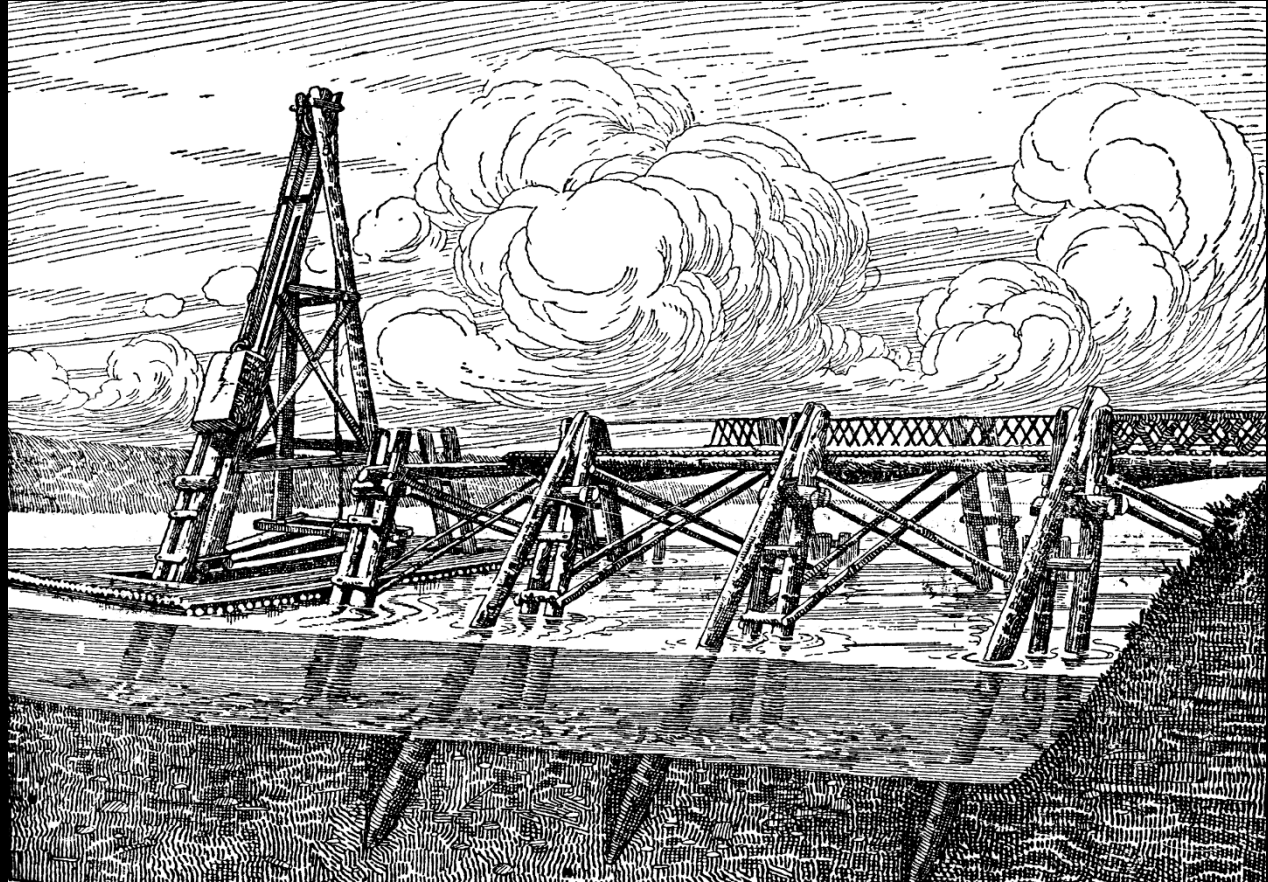
CROSSING THE RHINE RIVER

Built in 10 days

Caesar's engineers had a problem to solve. And they solved it.

They needed

- A will to solve the problem
- Would it have been easy to say "let's just use boats"?



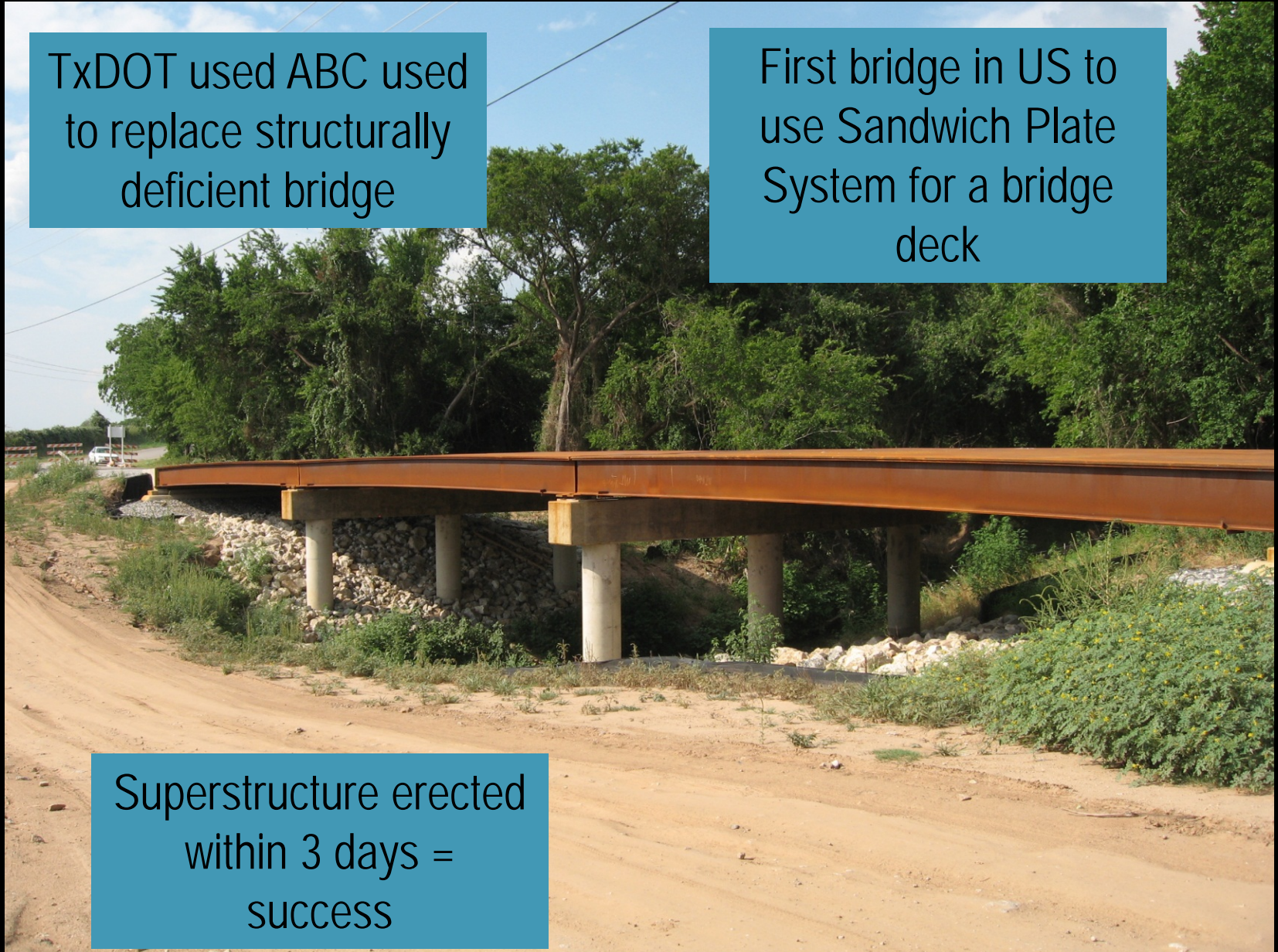
Clip art courtesy FCIT

CROSSING MARTIN BRANCH, TEXAS

TxDOT used ABC used to replace structurally deficient bridge

First bridge in US to use Sandwich Plate System for a bridge deck

Superstructure erected within 3 days = success



CROSSING MARTIN BRANCH, TEXAS



New tools are needed
for new problems

A new, innovative
product—SPS—is the
new tool that made this
success possible

TxDOT was willing to
use a new technology



WHAT DOES IT TAKE FOR BRIDGE OWNERS TO USE NEW TOOLS?

Is it fair to say bridge owners are slow to innovate?

Is reluctance just limited to bridge owners? What about contractors, consultant engineers, fabricators....?

Why are bridge owners reluctant? State DOTs have well-funded research programs that consistently look at new ways to do things and with new materials

Most of us are quick to accept new technology in our personal lives. We enthusiastically discuss and embrace new technology and new ways of doing things:

Mobile devices, streaming media, ride sharing, driverless cars?...

WHAT DOES IT TAKE FOR BRIDGE OWNERS TO USE NEW TOOLS?

Possible causes for our reluctance to use new tools

- Fear of failure
- Naysayers
- Risk without reward
- Preconceived notions
- Hard to get buy-in from all—NIMBY
- Restrictive policies
- “Not worth the trouble”



WHAT DOES IT TAKE FOR BRIDGE OWNERS TO USE NEW TOOLS?

More...

- "It's not in AASHTO"
- 1001 questions on the new product or material. How would existing tools stand up to the same scrutiny?
- Burned in the past?
- Costs—where will the \$ come from?
- Unsure of what's needed for PS&E
- Time is short—not enough to learn something new
- Industry pushback

WHAT DOES IT TAKE FOR OWNERS TO USE NEW TOOLS?

A will to solve engineering problems and a will to try new tools to solve them with. Fear is always there.

An indefatigable champion of the new tool (product, material or technology) is needed. Someone knowing difficulties can easily arise but is not afraid to address them when they do

A culture of innovation, a can-do attitude. Strong leadership

WHAT DOES IT TAKE FOR OWNERS TO USE NEW TOOLS?

Willing to pushback on industry pushback. Back to strong leadership

Funding. Always needed.

Time—can't try something new in too little time

Incentives or reward? Is this true?

The FHWA is there to help



WHAT DOES IT TAKE FOR US TO USE NEW TOOLS?

“I am an old man and have known a great many troubles, but most of them have never happened”—Mark Twain(?)

History remembers the problem solvers

Thank you for listening

