



## Project Details

Year: 2008  
Span: 28'-10"  
Rise: 7'-6"  
Width: 45'  
Skew: 5°  
Arches: 23 carbon fiber tubes  
2'-0" spacing  
12" diameter  
Headwall: composite sheet pile with  
geo-grid mechanically  
stabilized earth



Owner: MaineDOT  
Engineer: University of Maine  
Orono, ME  
Contractor: Stetson & Watson  
Pittsfield, ME

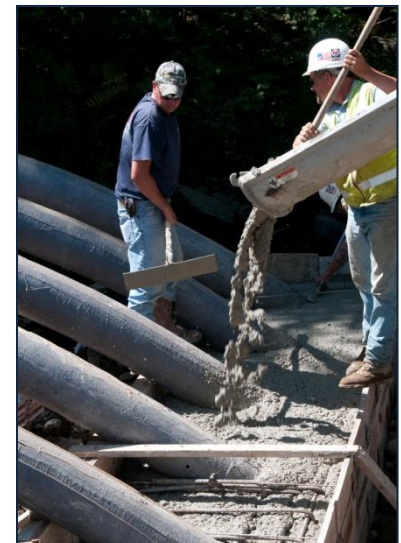
## Highlight

The Neal Bridge was the **first bridge in the world** constructed using concrete filled fiber reinforced polymer (FRP) arches. This pilot project was a result of the cooperation of the MaineDOT and the University of Maine's AEWC Advanced Structures and Composites Center, culminating years of research and laboratory structural testing.



## Project Details

Year:	2009
Span:	27'-7"
Rise:	4'-5"
Width:	25'
Skew:	15°
Arches:	9 carbon fiber tubes 3'-0" spacing 12" diameter
Headwall:	corrugated composite panels with geo-grid mechanically stabilized earth
Owner:	Town of Anson, Maine
Engineer:	Advanced Infrastructure Technologies Orono, ME
Contractor:	Gardner Construction Enterprises, Inc. Bangor, ME



## Highlight

The town of Anson required that the bridge be completed prior to the beginning of the school year so buses could avoid lengthy rerouting. Even though the beginning of construction was delayed until mid-August the bridge was replaced start to finish in **twelve working days** and open to traffic by the first day of school.



**ADVANCED  
INFRASTRUCTURE**  
TECHNOLOGIES

# Royal River Bridge Auburn, Maine



## Project Details

Year: 2010  
Span: 38'-0"  
Rise: 9'-6"  
Width: 38'  
Skew: 15°  
Arches: 13 carbon fiber tubes  
3'-1" spacing  
12" diameter  
Headwall: cast-in-place concrete and  
precast modular gravity wall



Owner: MaineDOT  
Engineer: Kleinfelder •SEA  
Augusta, ME  
Contractor: Wyman & Simpson, Inc.  
Richmond, ME

## Highlight

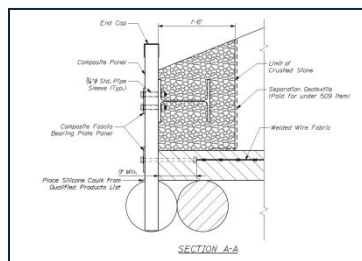


This project was selected as a national 2011 **Engineering Excellence Grand Award** winner by the American Council of Engineering Companies (ACEC).



## Project Details

Year: 2010  
 Span: 28'-6"  
 Rise: 6'-0"  
 Width: 34'  
 Skew: 19°  
 Arches: 12 carbon fiber tubes  
 2'-11" spacing  
 12" diameter  
 Headwall: composite panels with  
 through ties



## Highlights

- The Jenkins Bridge utilized an **innovative composite headwall** design that allowed the voided composite headwall panels to be installed rapidly and provide a corrosion resistant means of soil retention.
- The first year in service an ice floe completely dammed up this bridge opening, however the bridge withstood the **extreme hydraulic forces** with no negative results.



## Project Details

Year: 2010  
 Span: 44'-6"  
 Rise: 6'-10"  
 Width: 12'  
 Skew: 0°  
 Arches: 3 carbon fiber tubes  
 5'-6" spacing  
 12" diameter  
 Headwall: not applicable



Owner: Penobscot Snowmobile Club  
 Hermon, ME  
 Engineer: Advanced Infrastructure  
 Technologies  
 Orono, ME  
 Contractor: Gardner Construction  
 Enterprises  
 Bangor, ME

## Highlights

- When a car drove off the road and struck a nearby snowmobile bridge in Hermon the Penobscot Snowmobile Club chose to replace the former wooden structure with a composite arch bridge. Designed for snowmobile groomer and snow loads this solution proved an **economical and durable** option for the snowmobile club.
- The bridge was constructed in **four working days**.
- The deck is an 8" roughened reinforced concrete slab.



## Project Details

Year:	2010
Span:	47'-7"
Rise:	11'-0"
Width:	45'
Skew:	0°
Arches:	16 carbon fiber tubes 2'-11" spacing 15" diameter
Headwall:	cast-in-place concrete and precast modular gravity walls



Owner:	MaineDOT
Engineer:	Kleinfelder•SEA Augusta, ME
Contractor:	Stetson & Watson Pittsfield, ME

## Highlights

- Perkins Bridge was the first bridge constructed with 15" diameter tubes. With only 25% more carbon fiber than their 12" alternatives these arches provide **twice the bending strength**.
- Each pre-filled arch weighed about **250 pounds**.
- All sixteen arches were delivered to the jobsite in three packaged units and **quickly unloaded** with a lightweight boom truck and nylon lifting straps.



## Project Details

Year:	2011
Span:	54'-2"
Rise:	12'-0"
Width:	55'
Skew:	30°
Arches:	22 carbon fiber tubes 2'-8" spacing 15" diameter
Headwall:	mechanically stabilized earth retaining wall with inextensible reinforcement straps and precast concrete facing panels
Owner:	MaineDOT
Engineer:	Kleinfelder•SEA Augusta, ME
Contractor:	CPM Constructors Freeport, ME



## Highlights

- **First new-construction** design with these arches
- **Largest in the world** composite arch bridge
- **First roadway overpass** utilizing composite arch tubes
- This bridge allows farm equipment and local traffic to pass beneath the highway instead of crossing the road greatly increasing the safety of the 55mph roadway.



## Project Details

Year: 2011  
Span: 37'-7"  
Rise: 5'-7"  
Width: 36'  
Skew: 30°  
Arches: 15 carbon fiber tubes  
2'-6" spacing  
12" diameter  
Headwall: mechanically stabilized earth retaining wall with geo-grid reinforcement and composite facing panels



Owner: MassDOT  
Engineer: Greenman-Pedersen, Inc.  
Stoneham, MA  
Contractor: R. Bates & Sons, Inc.  
Clinton, MA



## Highlights

- MassDOT elected to use the composite arch bridge system as part of the **Accelerated Bridge Program** for the replacement of the Scott Reservoir Outlet bridge.
- **Gov. Patrick Deval** visited the construction project to publically support the first use of this technology in the state of Massachusetts.
- **Composite headwall components** were prefabricated off site and shipped to the jobsite in four pieces.





## Project Details

Year:	2011
Span:	23'-8"
Rise:	6'-0"
Width:	26'
Skew:	0°
Arches:	6 carbon fiber tubes 4'-9" spacing 12" diameter
Headwall:	composite sheet pile with through ties



## Highlights

- Constructed at the base of Mt. Washington, the highest peak in the Northeast, the NHDOT bridge to a maintenance lot is exposed to **extreme conditions** including flash flooding and huge snow fall levels.
- This design spaced arches at the greatest distance to date requiring **only six tubes** for the 26' wide bridge.
- NHDOT elected to internally design and construct the **composite sheet pile headwall**.