Innovations in Reinforced Concrete Pipe

Pre-1920s

1842
First recorded installation of concrete pipe in Mohawk, NY

1867
Joseph Monir is the first person to patent reinforced concrete

1896
First jacking project takes place

1896
France begins utilizing reinforcement in concrete pipe

1900
First tamp machines are developed for RCP production

1905
Reinforced concrete pipe is introduced in America

1907
American Concrete Pipe Association is formed

1920s-1930s

1930
ASTM C76 is first published

1930
ASTM Committee C13 is formed

1939
O-Ring rubber gasket joint is patented

Industry Advancements

- Modern admixture technology starts with basic air-entrainment agents, retarders, accelerators and water reducers
- Fly ash begins being used as a supplemental cementitious material
- Precasters can produce highly customized products

1940s-1950s

1950
Cen Vi-Ro production process is developed utilizing centrifugal, vibration and roller processes, allowing rapid manufacture

1952
Elliptical pipe is invented by Edward P. Washabaugh

1958
Heger research on reinforcement in concrete pipe

1959
ASTM C443 is created for rubber gasket joints for RCP and manholes

Industry Advancements

- Pipe jacking becomes a popular installation method
- Use of rubber gasket joints becomes widespread
- Concrete admixtures become widely used throughout the industry
- Introduction of liners for use in some sanitary sewer systems

American Concrete Pipe Association

1960s-1970s

1963
Double wrap version of automated cage production is developed

1969
First use of dry-cast concrete

c. 1970
Precast concrete box sections are developed

1970
Quadrant reinforcement optimization is added to ASTM C-76

1972
Offset step joint is introduced

1975
Superplasticizers, or “high range water reducers,” are developed for use in concrete mixtures

1980s-1990s

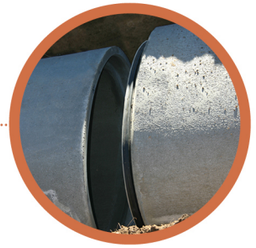
1982
PIPECAR and BOXCAR design softwares are introduced

1984
Thrust forces on buried concrete pipe are analyzed using SPIDA

1984
First microtunneling project in the U.S. takes place

1985
Outer to inner steel cage ratio is reduced

1986
Self-consolidating concrete is developed



1989
Pre-lubricated gaskets save contractors time in the field

1993
New standard installations are incorporated in ASCE Standard 15

1995
Gasketed joints for box culvert sections become available

1997
ACPA Q-cast program is developed

2000s and Beyond

2000
ASTM C1479 is created for installation of precast pipe using standard installations

2000
Gasketed joints for elliptical and arch pipe become available

2006
Quality School, which serves as a tool for the precast industry’s workforce to become more technically talented, is launched

2008
Research program leads to the reduction of steel required in RCB top slab

2008
ACPA Research and Education Foundation is formed to develop and fund research that supports the goals of ACPA and provide educational grants

2009
Creation of Fill Height Tables meeting LRFD

2010
Eriksson Culvert software

2010
First curved microtunneling project

2011
ASTM C1675 is created for RCB installation

2017
Eriksson Pipe software

2017
ASTM C1840 for Inspection and acceptance of installed RCP

Industry Advancements

- Robotic processes greatly increase production capabilities