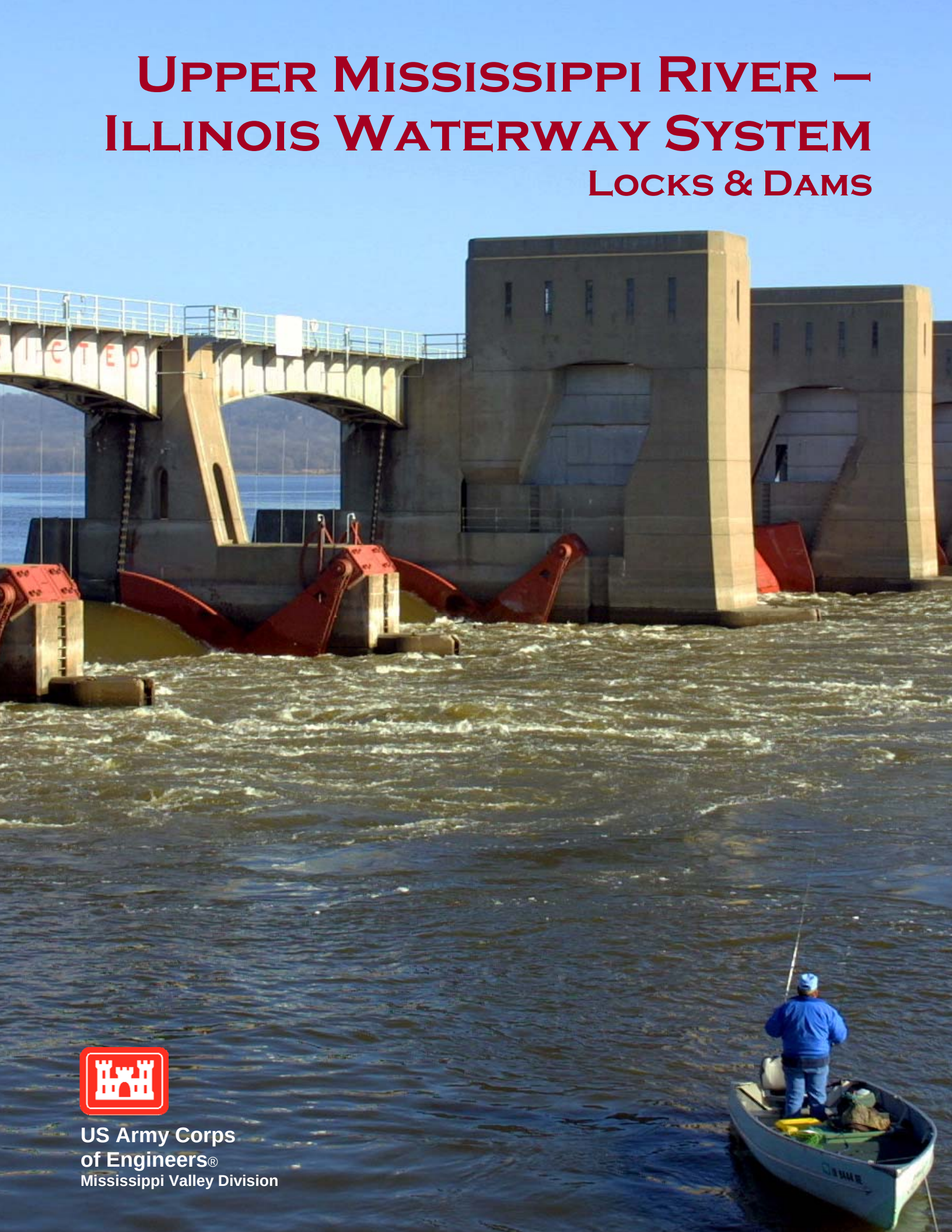
Upper Mississippi River – Illinois Waterway System

Locks & Dams



US Army Corps of Engineers®
Mississippi Valley Division

The Lock & Dam System

The Upper Mississippi River – Illinois Waterway System includes 37 locks and 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The 9-foot Channel Navigation Project was largely constructed in the 1930's and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system.

Index of Locks & Dams

Mississippi River

Illinois River & Waterway

US Army Corps of Engineers ®
St Paul District

Upper St. Anthony Falls (Minneapolis, Minnesota) Mississippi River

Construction:
Lock: 1959-1963
Dam: 1951
Congressional District: MN-5

Upper St. Anthony Falls (USAF) Lock and Dam is located at Mississippi River Mile 853.9, in Minneapolis, Minnesota, and is the northern most lock.

USAF Lock is located near the right descending bank and consists of a single lock chamber 56 feet wide by 400 feet long. The upper pool elevation is 799.2, tailwater elevation is 750.1, and the vertical lift is 49.1 feet. In addition to four lock miter gates, there is an upstream lock Tainter gate for passing flow through the lock chamber during high water. There is no auxiliary lock or provisions for one. There is a Visitor/Observation Center atop the central control station.

On the left descending bank there is a horseshoe dam with a chord dam downstream of the horseshoe and a concrete overflow spillway owned by Xcel Energy Center that ties into the Lock. On the right descending bank the Corps has a short non-overflow concrete dam between the Lock and the bank.

History/Significance

The lock was put into operation in September 1963. In 1937, Congress authorized a 4.6 mile extension of the 9-foot channel at its upstream end and two additional complexes were built in Minneapolis: the Lower St. Anthony Falls Lock and Dam, and the Upper St. Anthony Falls Lock and Dam. The construction of these complexes, also known as the Upper Minneapolis Harbor Development, extended the 9-foot channel over the St. Anthony Falls. Below the St. Anthony Falls, the narrow gorge of the Upper Mississippi River only allowed for a relatively small river terminal. By extending the 9-foot channel, the Upper Mississippi Harbor Development project permitted the construction of larger and more suitable river terminal sites above the falls.

St. Anthony Falls has a fall of 74 feet, and had historically been used to furnish waterpower for sawmills and flour mills in the area. To ascend the falls the Corps needed a 25-foot lift at the lower lock, and a 49.1-foot lift at the upper lock. The Lower St. Anthony Falls Lock and Dam project also replaced the original Northern States Power Company Dam, which had been built in 1897.

The Upper St. Anthony Falls Lock and Dam fixed concrete dam was built in 1951, when an existing timber dam was destroyed by flood. The timber dam had been constructed in the 1870s in an effort to protect the St. Anthony Falls from upstream progression. Since the concrete dam was in place, the Corps only needed to construct a navigation lock. But, with a rise of 49.1 feet, the lock was the highest lift on the river and an engineering challenge costing more than $18 million to build.

(More Information On The Reverse Side)

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	2,062,800	2004	1,494,539
2000	2,238,564	2005	1,154,000
2001	1,826,375	2006	1,315,770
2002	2,042,700	2007	998,770
2003	1,942,747	2008	942,300

Commodity Tonnage & Lockages (2008)

Coal	107,100	Subtotals:	
Petroleum	0		
Chemicals	18,000	Grain	0
Crude Materials	789,000	Steel	15,000
Manufactured Goods	15,000		
Farm Products	0	Lockages:	
Manufactured Machinery	11,700		
Waste Material	0	Boats:	3,367
Unknown	1,500	Cuts:	2,436

Current Maintenance Issues – Upper St. Anthony Falls

Item (Critical Rank Order)

Electrical Rehabilitation

TOTAL ESTIMATED COST $3,000,000

The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

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US Army Corps of Engineers ®
St Paul District

Lower St. Anthony Falls (Minneapolis, Minnesota) Mississippi River

Construction: 1950-1956
Congressional District: MN-5

Lower St. Anthony Falls (LSAF) Lock and Dam is located at Mississippi River Mile 853.3, in Minneapolis, Minnesota.

LSAF Lock is located along the right descending bank and consists of a single lock chamber 56 feet wide by 400 feet long with an upper pool elevation of 750.1, a tailwater elevation of 725.1, and a vertical lift of 25 feet. The lock uses miter gates on the downstream side and a lock Tainter gate on the upstream side for the purpose of passing flow through the lock chamber during high water. There is a partial auxiliary lock consisting of an upstream Tainter gate and short concrete riverwall section.

The movable dam has three Tainter gates (24 feet high by 56 feet long) and an auxiliary lock submersible Tainter gate (24 feet high by 56 feet long). Completing the dam system is a concrete non-overflow wall owned by the Corps and a short, earth embankment owned by Xcel Energy, both on the left descending bank.

History/Significance

The Lock was put into operation in September 1956. In 2007, the I-35 bridge tragedy occurred at the Lower St. Anthony Falls location.

In 1937, Congress authorized a 4.6 mile extension of the 9-foot channel at its upstream end and two additional complexes were built in Minneapolis: the Lower St. Anthony Falls Lock and Dam, and the Upper St. Anthony Falls Lock and Dam. The construction of these complexes, also known as the Upper Minneapolis Harbor Development, extended the 9-foot channel over the St. Anthony Falls. Below the St. Anthony Falls, the narrow gorge of the Upper Mississippi River only allowed for a relatively small river terminal. By extending the 9-foot channel, the Upper Mississippi Harbor Development project permitted the construction of larger and more suitable river terminal sites above the falls.

St. Anthony Falls has a fall of 74 feet, and had historically been used to furnish waterpower for sawmills and flour mills in the area. To ascend the falls the Corps needed a 25-foot lift at the lower lock, and a 49.1-foot lift at the upper lock. The Lower St. Anthony Falls Lock and Dam project also replaced the original Northern States Power Company Dam, which had been built in 1897.

(More Information On The Reverse Side)

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	2,067,100	2004	1,483,317
2000	2,237,267	2005	1,158,096
2001	1,814,488	2006	1,316,764
2002	2,041,840	2007	993,963
2003	1,930,812	2008	929,600

Commodity Tonnage & Lockages (2008)

Coal	110,100	Subtotals:	
Petroleum	0		
Chemicals	18,000	Grain	0
Crude Materials	778,500	Steel	12,000
Manufactured Goods	12,000		
Farm Products	0	Lockages:	
Manufactured Machinery	9,500		
Waste Material	0	Boats:	2,651
Unknown	1,500	Cuts:	1,956

Current Maintenance Issues – Lower St. Anthony Falls

Item (Critical Rank Order)

Electrical Rehabilitation
Repair Lock Wall
Dam End Sill Repair
Dam Bridge and Gate Painting
Horizontal Concrete Repair
Reconstruct Roadway between Locks

TOTAL ESTIMATED COST $8,570,000

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US Army Corps of Engineers ®
St Paul District

Lock & Dam 1 (Minneapolis, Minnesota) Mississippi River

Construction: 1907-1917 (original 6-foot channel lock)
1930-1932 (9-foot channel lock)
Congressional Districts: MN-5; MN-6

Description

Lock and Dam 1 is located at Mississippi River Mile 847.9, in Minneapolis, Minnesota. The original Lock construction was completed in 1917, reconstructed in 1929 with the main lock completed in May 1932. It was the only twin lock in the district.

The main lock is located along the right descending bank and consists of a lock chamber 56 feet wide by 400 feet long with an upper pool elevation of 725.1, a tailwater elevation of 687.2, and a maximum vertical lift of 37.9 feet. The auxiliary lock is immediately adjacent to the main lock but has only 7.5-foot of clearance over the downstream sill, and has been abandoned.

The dam consists of an Ambursen concrete overflow structure 574 feet long with a two-foot-high inflatable rubber dam along the top and a hydro power station located at the left descending bank abutment. The hydro power facility and rubber dam are both owned and operated by Brookfield Renewable Power.

History/Significance

The Corps of Engineers began constructing this installation in 1894 as part of the 5-foot channel project. The complex was later modified during the 1907 6-foot channel project. A hydroelectric plant located at the dam's east end provides power to a nearby Ford automobile factory.

The lock and dam complex is also referred to as the Twin Cities (Ford) Lock and Dam.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	2,071,900	2004	1,510,040
2000	2,257,182	2005	1,159,356
2001	1,829,855	2006	1,307,990
2002	2,045,895	2007	989,706
2003	1,958,970	2008	964,681

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	107,100	Subtotals:	
Petroleum	0		
Chemicals	18,000	Grain	0
Crude Materials	799,000	Steel	10,500
Manufactured Goods	12,000		
Farm Products	0	Lockages:	
Manufactured Machinery	25,281		
Waste Material	0	Boats:	5,177
Unknown	3,300	Cuts:	2,684

Current Maintenance Issues – Lock & Dam 1

Item (Critical Rank Order)

Riverward Lock Closure
Pedestrian Bridge Painting

TOTAL ESTIMATED COST: $3,500,000

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US Army Corps of Engineers ®
St Paul District

Lock & Dam 2 (Hastings, Minnesota) Mississippi River

Construction:
1928-1930 (original riverward lock)
1941-1948 (new, landward lock)
Congressional District: MN-2

Description

Lock and Dam 2 is upstream of Hastings, Minnesota, and is 815.2 miles above the confluence of the Mississippi and Ohio rivers.

The lock is 110 feet wide by 600 feet long. The dam consists of a concrete structure 722 feet long with 19 Tainter gates, 30 feet long. The dam has 4.4 megawatt power plant owned and operated by the city of Hastings. The site includes 3,000 feet of earth embankment.

History/Significance

The Corps remained committed to open-water navigation on the Upper Mississippi in 1925 when plans were made for a lock and dam complex at Hastings, Minnesota. However, this structure did not leave as much room for open-water maneuvering as the Moline and LeClaire installations. The Hastings complex, now known as Lock and Dam 2, only included a 100-foot-wide navigable pass adjacent to the lock. It also included 20 Tainter gates. In narrowing the space reserved for open-river navigation and using Tainter gates for the first time on the Upper Mississippi River, the Hastings Lock and Dam acted “as a sort of engineering link” between the Corps’ 6-foot channel structures and philosophy and its mature 9-foot channel structures and philosophy.

The original, riverward lock chamber was 110 feet by 500 feet and constructed from 1928-1930. Due to foundation conditions, some rotation of the original lock walls took place, which also affected the operation of the miter gates. Due to the foundation settlement problems, wall tilting and that the original lock chamber was of a non standard size, construction of a 110-foot by 600-foot landward lock chamber commenced in 1941. The new lock chamber was not completed until 1948 due to the suspension of all civil construction during World War II.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	11,539,700	2004	7,828,603
2000	10,860,047	2005	7,291,721
2001	8,583,954	2006	7,341,784
2002	10,574,988	2007	7,051,488
2003	8,861,479	2008	4,729,252

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	264,893	Subtotals:	
Petroleum	213,841		
Chemicals	1,019,267	Grain	1,019,913
Crude Materials	1,719,981	Steel	38,611
Manufactured Goods	247,720		
Farm Products	1,177,168	Lockages:	
Manufactured Machinery	70,653		
Waste Material	0	Boats:	5,496
Unknown	15,729	Cuts:	2,910

Current Maintenance Issues – Lock & Dam 2

Item (Critical Rank Order)

Vault Lead Paint and Mold Abatement
Embankment Rehabilitation - Non-Structural
Dam Bridge and Gate Painting
Tainter Valve Replacement

TOTAL ESTIMATED COST: $9,300,000

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The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

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US Army Corps of Engineers ®
St Paul District

Lock & Dam 3
(Welch, Minnesota)
Mississippi River

General Contractors:
Lock: Spencer, White & Prentis, Inc. New York, New York
Dam: A. Gutherie Co., St. Paul, Minnesota and
Hallett Construction Co., Crosby, Minnesota
Construction: 1935-1940
Congressional Districts: MN-2, WI-3

Description

Lock and Dam 3 is located at Mississippi River Mile 796.9 six miles upstream from Red Wing, Minnesota.

The main lock is located along the right descending bank and consists of a single lock chamber 110 feet wide by 600 feet long with an upper pool elevation of 675.0, a tailwater elevation of 667.0, and a vertical lift of 8.0 feet. There are miter gates at each end of the lock chamber. There is a partial auxiliary lock consisting of an upstream set of miter gates and a short concrete riverwall section. The lock foundations are set in sand, silt and clay.

The movable dam is 365 feet long and consists of four submersible roller gates (20 feet high by 80 feet long). The gates submerge to a depth of five feet and each gate has its own independent hoist machinery. Completing the dam system is a series of spot dikes along the left descending bank (Wisconsin side) and an earthen embankment approximately 2,200 feet long, located between the main lock and high ground on the Minnesota side. The gates and operating machinery were constructed and delivered to the site by Lakeside Bridge and Steel Company of Milwaukee, Wisconsin. The dam foundations are set in sand.

History/Significance

The lock opened in July 1938. Specific items of engineering significance include the exclusive use of submersible roller gates in the movable dam; the use of "Z" sheet piling in the abutment walls; and the replacement of all dam substrata. Prior to the construction of the dam, the Corps replaced approximately 200,000 cubic yards of unstable substrata with 130,000 cubic yards of river sand in order to provide a more stable foundation for the dam structure. The lock and dam elements of the complex were completed at a cost of $3,730,000. Fifty-three injuries took place during construction; no fatalities occurred.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	11,549,600	2004	7,824,551
2000	10,865,655	2005	7,300,671
2001	8,545,300	2006	7,338,218
2002	10,591,946	2007	7,057,358
2003	8,835,187	2008	4,732,120

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	266,837	Subtotals:	
Petroleum	213,841		
Chemicals	1,021,072	Grain	1,019,713
Crude Materials	1,723,140	Steel	38,561
Manufactured Goods	247,670		
Farm Products	1,176,968	Lockages:	
Manufactured Machinery	64,263		
Waste Material	0	Boats:	10,382
Unknown	18,329	Cuts:	4,187

Current Maintenance Issues – Lock & Dam 3

Item (Critical Rank Order)

Vault Lead Paint and Mold Abatement
Embankment Rehabilitation – Structural
Embankment Rehabilitation - Non-Structural
Guidewall Rehabilitation
Dam Bridge and Gate Painting

TOTAL ESTIMATED COST: $9,800,000

The Lock 3 facility has one of the worst outdraft conditions throughout the inland waterways system. A total of 65 outdraft-related navigation accidents have occurred at Lock and Dam 3 since 1963. On 11 occasions, these accidents have resulted in tows colliding with the gated part of the dam. The frequent collisions with the dam structure and the substandard structural embankments result in exposure to high risks related to the safety of towboat staff and related to potential environmental damages should the embankments fail. With FY 09 ARRA funding in the amount of $70,240,000, the Corps is in the process of addressing these issues by extending the upper guidewall 800 feet, modifying the channel, and strengthening the upper and lower embankments. This work is scheduled to be completed by September 2011.

The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

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US Army Corps of Engineers ®
St Paul District

Lock & Dam 4 (Alma, Minnesota) Mississippi River

General Contractors:
Lock: Ouillmette Construction & Engineering Co., Chicago, Illinois
Dam: United Construction Co., Winona, Minnesota
Construction: 1931-1938
Congressional Districts: MN-1, WI-3

Description

Lock and Dam 4 is located at Mississippi River Mile 752.8 in Alma, Wisconsin, about 90 miles below Minneapolis.

The main lock is located along the left descending bank and consists of a single lock chamber, 110 feet wide by 600 feet long with an upper pool elevation of 667.0, a tailwater elevation of 660.0, and a vertical lift of 7.0 feet. There are miter gates at each end of the lock chamber. There is a partial auxiliary lock consisting of an upstream set of miter gates and short concrete riverwall section. The foundation is piles in sand and gravel.

The dam consists of a concrete structure 1,357 feet long with six roller gates and 22 Tainter gates. The movable dam has six roller gates (20 feet high by 60 feet long), 18 non-submersible Tainter gates (15 feet high by 35 feet long), and four submersible Tainter gates (15 feet high by 35 feet long). Completing the dam system is an earthen embankment approximately 5,500 feet long, located between the movable dam and high ground on the Minnesota side of the river. The dam foundation consists of piles in sand and gravel.

History/Significance

The lock was put in operation in May 1935. At the time it was built, the dam's combination of roller and Tainter gates was believed to have been the first of its type to be constructed. Cold weather created several problems during construction of the complex. Approximately 120 timber pilings split and had to be pulled and replaced; engineers speculated that sap freezing in the green pilings may have caused the splitting. Ten major injuries, 296 minor injuries, and three deaths were reported during the construction of the dam.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	12,350,700	2004	8,575,017
2000	11,798,328	2005	8,054,094
2001	9,355,461	2006	8,238,928
2002	11,536,928	2007	7,842,780
2003	9,897,604	2008	5,314,060

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	276,517	Subtotals:	
Petroleum	216,841		
Chemicals	1,028,016	Grain	1,447,233
Crude Materials	1,842,793	Steel	43,061
Manufactured Goods	255,270		
Farm Products	1,610,523	Lockages:	
Manufactured Machinery	67,281		
Waste Material	0	Boats:	9,522
Unknown	16,829	Cuts:	3,774

Current Maintenance Issues – Lock & Dam 4

Item (Critical Rank Order)

Vault Lead Paint and Mold Abatement
Main Lock Apron Repairs
Embankment Rehabilitation – Structural
Riprap Repair Above & Below Dam
Guidewall Rehabilitation
Concrete Repairs

TOTAL ESTIMATED COST: $5,260,000

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US Army Corps of Engineers ®
St Paul District

Lock & Dam 5 (Minnesota City, Minnesota) Mississippi River

General Contractors:
Lock: Edward E. Gillen Co., Milwaukee, Wisconsin
Dam: Merritt-Chapman & Whitney Corp., Cleveland, Ohio
Construction: 1933-1939
Congressional Districts: MN-1, WI-3

Description

Lock and Dam 5 is located at Mississippi River Mile 738.1 in Minnesota City, Minnesota, 5.5 miles upstream of Fountain City, Wisconsin.

The main lock is located along the right descending bank and consists of a single lock chamber 110 feet wide by 600 feet long with an upper pool elevation of 660.0, a tailwater elevation of 651.0, and a vertical lift of 9.0 feet. There are miter gates at each end of the lock chamber. There is a partial auxiliary lock consisting of an upstream set of miter gates and short concrete riverwall section. The foundation consists of piles in sand and gravel.

The movable dam has six roller gates (20 feet high by 60 feet long), 24 non-submersible Tainter gates (15 feet high by 35 feet long), and four submersible Tainter gates (15 feet high by 35 feet long). The dam consists of a concrete structure 1,619 feet long and an earthen embankment approximately 18,500 feet long, located between the movable dam and high ground on the Wisconsin side of the river. The dam foundation is set on piles in sand.

History/Significance

The lock was put into operation in May 1935. Lock and Dam 5 was a group "A" priority, and the second installation completed in the St. Paul District. Typical of other 9-foot channel installations, the roller gates on Dam 5 were located in the main channel, where they could handle the greatest flooding and heavy ice flow conditions. One fatal accident, involving a private craft, occurred during the construction of the dam. In 1934, the site hosted a presidential visit by Franklin Roosevelt.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	12,771,200	2004	9,066,765
2000	12,048,853	2005	8,496,606
2001	9,487,157	2006	8,864,957
2002	11,791,323	2007	8,490,491
2003	10,085,159	2008	5,741,647

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	684,594	Subtotals:	
Petroleum	216,841		
Chemicals	1,027,076	Grain	1,456,233
Crude Materials	1,850,483	Steel	44,561
Manufactured Goods	260,770		
Farm Products	1,619,523	Lockages:	
Manufactured Machinery	64,031		
Waste Material	0	Boats:	5,220
Unknown	18,329	Cuts:	2,722

Current Maintenance Issues – Lock & Dam 5

Item (Critical Rank Order)

Vault Lead Paint and Mold Abatement
Main Lock Apron Repairs
Embankment Rehabilitation - Non-Structural
Dam Bridge and Gate Painting
Guidewall Rehabilitation
Reinstall Riprap at Guidewall
Repair Vertical Wall Joints Outside Lock Chamber
Install Alignment System

TOTAL ESTIMATED COST: $10,580,000

The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

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US Army Corps of Engineers ®
St Paul District

Lock & Dam 5A (Fountain City, Wisconsin) Mississippi River

General Contractors:
Lock: McCarthy Improvement Co., Davenport, Iowa
Dam: United Construction Co. Winona, Minnesota
Construction: 1934-1938
Congressional Districts: MN-1, WI-3

Description

Lock and Dam No. 5A is located at Mississippi River Mile 728.5 below Fountain City, Wisconsin, three miles above Winona, Minnesota.

The main lock is located along the right-descending bank and consists of a single lock chamber 110 feet wide by 600 feet long with an upper pool elevation of 651.0, a tailwater elevation of 645.5, and a vertical lift of 5.5 feet. There are miter gates at each end of the lock chamber. A partial auxiliary lock consists of an upstream set of miter gates and a short concrete riverwall section.

The movable dam is a concrete structure 682 feet long with five roller gates (20 feet high by 80 feet long) and five non-submersible Tainter gates (15 feet high by 35 feet long), located between the main lock and the railroad line along the left-descending bank. Completing the dam system is an earthen embankment approximately 22,000 feet long, between the main lock and high ground on the Minnesota side of the river, with a concrete overflow spillway 1,000 feet long.

History/Significance

The lock was put in operation in 1936. At the time of construction, the site consisted of low, swampy ground separated by three sloughs: Blackbird, Straight and Crooked sloughs. Many small lakes were in the area, interrupted by sections of relatively high ground. The site, located in the middle of the river channel, incorporated a number of islands into its earth dike system. The location of the complex in a slough in the left side of Islands 67 and 68 allowed for the main channel to serve an exclusive spillway function.

The original plan for the 9-foot channel system did not include this installation. However, due to pooling problems projected as a result of the construction of Lock and Dam No. 6 in conjunction with the City of Winona, this installation was designed and given a "B" priority.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	12,761,300	2004	9,056,299
2000	12,130,247	2005	8,495,316
2001	9,500,382	2006	8,845,481
2002	11,764,608	2007	8,534,287
2003	10,098,714	2008	5,720,567

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	684,594	Subtotals:	
Petroleum	216,841		
Chemicals	1,027,076	Grain	1,456,233
Crude Materials	1,833,983	Steel	44,561
Manufactured Goods	256,770		
Farm Products	1,619,523	Lockages:	
Manufactured Machinery	64,951		
Waste Material	0	Boats:	7,103
Unknown	16,829	Cuts:	3,364

Current Maintenance Issues – Lock & Dam 5A

Item (Critical Rank Order)

Vault Lead Paint and Mold Abatement
Main Lock Apron Repairs
Embankment Rehabilitation – Structural
Embankment Rehabilitation - Non-Structural
Dam Bridge and Gate Painting
Guidewall Rehabilitation
Install Alignment System

TOTAL ESTIMATED COST: $11,250,000

The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

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US Army Corps of Engineers ®
St Paul District

Lock & Dam 6 (Trempealeau, Wisconsin) Mississippi River

General Contractors:
Lock and Dam: Spencer, White & Prentix, Inc., New York, New York
Construction: 1933-1938
Congressional Districts: MN-1, WI-3

Description

Lock and Dam 6 is located at Mississippi River Mile 714.1 at Trempealeau, Wisconsin, 139 miles below Minneapolis.

The main lock is located along the left descending bank and consists of a single lock chamber 110 feet wide by 600 feet long with an upper pool elevation of 645.5, a tailwater elevation of 639.0, and a vertical lift of 6.5 feet. There are miter gates at each end of the lock chamber. A partial auxiliary lock consists of an upstream set of miter gates and a short concrete riverwall section.

The movable dam consists of an 893-foot-long concrete structure with five roller gates (20 feet high by 80 feet long) and 10 non-submersible Tainter gates (15 feet high by 35 feet long), and is located adjacent to the auxiliary lock. Completing the dam system is an earthen embankment approximately 1,600 feet long, located between the movable dam and high ground on the Minnesota side of the river, with a concrete overflow spillway 1,000 feet long.

History/Significance

The lock was put in operation in June of 1936. The Tainter gates in Dam 6 were the first in the St. Paul District to employ independent operating machinery instead of hoist car systems. During construction, the frozen river was sometimes used as a work base, as the ice was often 12 to 18 inches thick. Piles were dragged over the ice by teams of draft animals. The construction of Lock and Dam 6 also resulted in innovations in pile driving. Timber pilings – elm, maple, hickory, ash, oak, yellow birch, and pine – were driven by new, skid-type, pile drivers built on the job site by a contractor. A new method of keeping the pile drivers level was also developed by the contractor.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	15,791,200	2004	10,754,999
2000	14,877,036	2005	10,381,229
2001	11,956,278	2006	10,965,857
2002	14,449,692	2007	10,421,860
2003	12,250,381	2008	7,240,756

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	794,217	Subtotals:	
Petroleum	219,876		
Chemicals	1,311,836	Grain	2,415,732
Crude Materials	1,971,253	Steel	44,677
Manufactured Goods	270,972		
Farm Products	2,588,022	Lockages:	
Manufactured Machinery	67,039		
Waste Material	0	Boats:	4,988
Unknown	17,041	Cuts:	2,943

Current Maintenance Issues – Lock & Dam 6

Item (Critical Rank Order)

Vault Lead Paint and Mold Abatement
Main Lock Apron Repairs
Embankment Rehabilitation – Structural
Embankment Rehabilitation - Non-Structural
Guidewall Rehabilitation

TOTAL ESTIMATED COST: $6,150,000

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The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

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More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

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US Army Corps of Engineers ®
St Paul District

Lock & Dam 7
(La Crescent, Minnesota)
Mississippi River

General Contractors:
Lock: Nolan Brothers and Minneapolis Dredging Co., Minneapolis, Minnesota, and Dearborn Electrical Construction Company, Chicago, Illinois Dam: Warner Construction Company, Chicago, Illinois
Construction: 1933-1940
Congressional Districts: MN-1, WI-3

Description

Lock and Dam 7 is located at Mississippi River Mile 702.5 near La Crescent, Minnesota, 4.5 miles above LaCrosse, Wisconsin.

The main lock is located along the right descending bank and consists of a single lock chamber 110 feet wide by 600 feet long with an upper pool elevation of 639.0, a tailwater elevation of 631.0, and a vertical lift of 8.0 feet. There are miter gates at each end of the lock chamber. There is a partial auxiliary lock consisting of an upstream set of miter gates and short concrete riverwall section.

The movable dam consists of a concrete structure 940 feet long with five roller gates (20 feet high by 80 feet long), nine non-submersible Tainter gates (15 feet high by 35 feet long), and two submersible Tainter gates (15 feet high by 35 feet long), and is located adjacent to the auxiliary lock. Completing the dam system are two earthen embankment segments: the French Island embankment approximately 7,000 feet long, located between the movable dam and French Island, with a concrete overflow spillway 1,000 feet long; and the Onalaska embankment approximately 1,600 feet long, located between French Island and Onalaska, with a concrete overflow spillway 677 feet long.

History/Significance

The Lock was put in operation in April 1937.

Originally scheduled to be nearer to LaCrosse, this complex was relocated because of water level problems connected with the LaCrosse site. The design of the complex was heavily influenced by French Island, which was incorporated into the design as a natural dike, and the Dresbach Slough, which was reopened to provide the upper approach to the lock. The complex was built at a cost of $6,776,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	15,857,400	2004	10,786,169
2000	14,809,119	2005	10,391,612
2001	11,981,487	2006	10,931,036
2002	14,460,872	2007	10,429,410
2003	12,297,061	2008	7,258,768

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	785,717	Subtotals:	
Petroleum	219,876		
Chemicals	1,319,972	Grain	2,433,732
Crude Materials	1,949,901	Steel	44,677
Manufactured Goods	270,972		
Farm Products	2,606,022	Lockages:	
Manufactured Machinery	90,267		
Waste Material	0	Boats:	7,925
Unknown	16,041	Cuts:	3,636

Current Maintenance Issues – Lock & Dam 7

Item (Critical Rank Order)

Vault Lead Paint and Mold Abatement
Embankment Rehabilitation – Structural
Fixed Crest Ogee Crest Joint & Endsill Repair
Embankment Rehabilitation - Non-Structural
Guidewall Rehabilitation
Install Alignment System

TOTAL ESTIMATED COST: $6,325,000

The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

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More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

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US Army Corps of Engineers ®
St Paul District

Lock & Dam 8 (Genoa, Wisconsin) Mississippi River

General Contractors:
Lock: Jutton-Kelly Company, Milwaukee, Wisconsin
Dam: Siems-Helmers, Inc., St. Paul, Minnesota
Construction: 1933-1938
Congressional Districts: MN-1, WI-3

Description

Lock and Dam 8 is located at Mississippi River Mile 679.2 near Genoa, Wisconsin, 173.4 miles below Minneapolis.

The main lock is located along the left descending bank and consists of a single lock chamber 110 feet wide by 600 feet long with an upper pool elevation of 631.0, a tailwater elevation of 620.0, and a vertical lift of 11.0 feet. There are miter gates at each end of the lock chamber. There is a partial auxiliary lock consisting of an upstream set of miter gates and short concrete riverwall section. The foundation material consists of piles in sand, gravel and broken clay.

The movable dam consists of a concrete structure 934 feet long with five roller gates (20 feet high by 80 feet long), eight non-submersible Tainter gates (15 feet high by 35 feet long), and two submersible Tainter gates (15 feet high by 35 feet long), and is located adjacent to the auxiliary lock. Completing the dam system is an earthen embankment approximately 15,000 feet long, located between the movable dam and high ground on the Minnesota side of the river, with two submersible sheetpile cell spillways, 938 and 1,338 feet long, respectively. The foundation consists of piles in sand and gravel.

History/Significance

The Lock was put in operation in April 1937.

The design of Lock and Dam 8 was not dictated by unusual river hydrology so much as for the need for a lock and dam system at that point of the river so that the 9-foot channel system might function properly. Eighty-six accidents and one fatality occurred during dam construction; no accidents or fatalities were reported during construction of the lock. The complex was completed at an estimated cost of $7,728,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	16,826,200	2004	11,569,495
2000	15,877,048	2005	11,090,000
2001	12,773,176	2006	11,712,327
2002	15,331,794	2007	11,077,630
2003	13,160,824	2008	7,928,446

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	833,139	Subtotals:	
Petroleum	213,276		
Chemicals	1,348,196	Grain	2,683,262
Crude Materials	2,129,012	Steel	118,801
Manufactured Goods	429,458		
Farm Products	2,860,052	Lockages:	
Manufactured Machinery	95,272		
Waste Material	0	Boats:	4,529
Unknown	20,041	Cuts:	2,546

Current Maintenance Issues – Lock & Dam 8

Item (Critical Rank Order)

Vault Lead Paint and Mold Abatement
Embankment Rehabilitation – Structural
Lower Guidewall - Riprap Protection
Embankment Rehabilitation - Non-Structural
Dam Gate Painting
Guidewall Rehabilitation
Install Alignment System

TOTAL ESTIMATED COST: $10,050,000

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The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

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US Army Corps of Engineers ®
St Paul District

Lock & Dam 9
(Lynxville, Wisconsin)
Mississippi River

General Contractors:
Lock: Walter W. Magee Company, St. Paul, Minnesota
Dam: United Construction Company, Winona, Minnesota
Construction: 1936-1940
Congressional Districts: IA-4, WI-3

Description

Lock and Dam 9 is located at Mississippi River Mile 647.9 near Lynxville, Wisconsin, 205.1 miles below Minneapolis.

The main lock is located along the left descending bank and consists of a single lock chamber 110 feet wide by 600 feet long with an upper pool elevation of 620.0, a tailwater elevation of 611.0, and a vertical lift of 9.0 feet. There are miter gates at each end of the lock chamber. There is a partial auxiliary lock consisting of an upstream set of miter gates and short concrete riverwall section.

The movable dam consists of concrete structure 811 feet long with five roller gates (20-feet high by 80-feet long), six non-submersible Tainter gates (15 feet high by 35 feet long), and two submersible Tainter gates (15 feet high by 35 feet long), and is located adjacent to the auxiliary lock. Completing the dam system is an earthen embankment approximately 7,200 feet long, located between the movable dam and high ground on the Iowa side of the river, with a submersible sheetpile cell spillway 1,350 feet long.

History/Significance

The Lock was put in operation in July 1937.

Due to a good 6-foot channel and relatively trouble-free engineering and environmental characteristics, Lock and Dam 9 was a group "B" priority, and the second-to-last complex built by the St. Paul District. The complex was completed at an estimated cost of $8,287,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	18,820,900	2004	13,256,894
2000	17,742,027	2005	13,395,636
2001	14,549,356	2006	13,923,104
2002	17,352,121	2007	13,354,186
2003	14,995,775	2008	10,368,822

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,265,530	Subtotals:	
Petroleum	213,276		
Chemicals	1,348,939	Grain	2,681,017
Crude Materials	2,115,531	Steel	120,573
Manufactured Goods	439,300		
Farm Products	2,877,433	Lockages:	
Manufactured Machinery	91,772		
Waste Material	0	Boats:	4,170
Unknown	17,041	Cuts:	3,087

Current Maintenance Issues – Lock & Dam 9

Item (Critical Rank Order)

Vault Lead Paint and Mold Abatement
Embankment Rehabilitation – Structural
Fixed Crest Spillway Repairs
Embankment Rehabilitation - Non-Structural
Dam Gate Painting
Guidewall Rehabilitation

TOTAL ESTIMATED COST: $11,050,000

The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

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US Army Corps of Engineers ®
St Paul District

Lock & Dam 10 (Guttenburg, Iowa) Mississippi River

General Contractors:
Lock: Hanlon and Oakes, St. Paul, Minnesota
Dam: McCarthy Improvement Company, Davenport, Iowa
Construction: 1934-1937
Congressional Districts: IA-1, WI-3

Description

Lock and Dam 10 is located at Mississippi River Mile 615.0 in Guttenberg, Iowa.

The main lock is located along the right descending bank and consists of a single lock chamber 110 feet wide by 600 feet long with an upper pool elevation of 611.0, a tailwater elevation of 603.0, and a vertical lift of 8.0 feet. There are miter gates at each end of the lock chamber. There is a partial auxiliary lock consisting of an upstream set of miter gates and a short concrete riverwall section.

The movable dam consists of a concrete dam 763 feet long with four roller gates (20 feet high by 80 feet long), six non-submersible Tainter gates (20 feet high by 40 feet long), and two submersible Tainter gates (20 feet high by 40 feet long), and is located adjacent to the auxiliary lock. Completing the dam system is an earthen embankment approximately 4,600 feet long, located between the movable dam and high ground on the Wisconsin side of the river, with a concrete overflow spillway 1,200 feet long.

History/Significance

The Lock was put in operation in November 1937.

Built under the supervision and direction of the Rock Island District, Lock and Dam No. 10 was transferred to the St. Paul District's jurisdiction on October 1, 1939. The complex was completed at an estimated cost of $6,647,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	22,006,600	2004	15,185,622
2000	19,911,214	2005	15,820,251
2001	16,509,914	2006	16,426,337
2002	20,528,892	2007	15,642,174
2003	17,623,231	2008	11,851,569

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,239,342	Subtotals:	
Petroleum	207,276		
Chemicals	1,399,142	Grain	3,937,317
Crude Materials	2,223,337	Steel	120,684
Manufactured Goods	436,511		
Farm Products	4,223,894	Lockages:	
Manufactured Machinery	94,282		
Waste Material	0	Boats:	4,534
Unknown	27,785	Cuts:	3,098

Current Maintenance Issues – Lock & Dam 10

Item (Critical Rank Order)

Embankment Rehabilitation – Structural
Embankment Rehabilitation - Non-Structural
Dam Gate Painting
Guidewall Rehabilitation
Install Alignment System

TOTAL ESTIMATED COST $8,550,000

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The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

Point of Contact

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US Army Corps of Engineers ®
Rock Island District

Lock & Dam 11
(Dubuque, Iowa)
Mississippi River

General Contractors:
Lock: Warner Construction Company, Chicago, Illinois
Dam: Maxon Construction Company, Inc., Dayton, Ohio
Construction: 1934-1937
Congressional Districts: IA-1; WI-3

Description

Lock and Dam 11 borders on the northern edge of Dubuque, Iowa, and is 583 miles above the confluence of the Mississippi and Ohio rivers. A complex of islands and sloughs extends three-quarters of the way across the river from the Wisconsin shore. The Upper Mississippi River Wildlife and Fish Refuge occupies the land adjacent to the Wisconsin shore, both upstream and downstream from the dam.

The lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock. The maximum lift is 11 feet with an average lift of 9.4 feet. It takes approximately seven minutes to fill or empty the lock chamber.

The movable dam has 13 submersible Tainter gates (20-feet high by 60-feet long) and three submersible roller gates (20-feet high by 100-feet long). The roller gates submerge eight feet. The dam system also includes a 3,540-foot long, curved, non-overflow, earth and sand-filled dike. It takes nine hours for water to travel from Lock and Dam 10, in Guttenberg, Iowa, to Lock and Dam 11.

History/Significance

The lock opened in 1937. Dams 11 and 18 were designed concurrently, and were the first dams in the Rock Island District to employ submersible, elliptical Tainter gates. They were also the first dams in the District to use submersible roller gates.

Lock and Dam 11 was scheduled to be above Sprecht's Ferry, Iowa, but in 1933 was relocated to Dubuque. The acute unemployment in Dubuque led the government to begin construction on this complex before others of its class. During the peak of construction, the complex employed 901 people. The lock and dam elements of the complex were completed at a cost of $7,430,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	22,504,873	2004	15,769,584
2000	20,756,882	2005	16,347,999
2001	17,340,441	2006	17,048,863
2002	20,966,149	2007	16,228,148
2003	18,276,060	2008	12,428,007

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,704,657	Subtotals:	
Petroleum	181,776		
Chemicals	1,401,486	Grain	4,035,906
Crude Materials	2,229,080	Steel	126,984
Manufactured Goods	456,311		
Farm Products	4,332,700	Lockages:	
Manufactured Machinery	94,212		
Unknown	27,785	Boats:	4,332
		Cuts:	3,170

Current Maintenance Issues – Lock & Dam 11

Item (Critical Rank Order)

Repair or Replace Emergency Gates
L&D 11 Stage III Dam Rehabilitation - Major Rehabilitation
Systemic Miter Gate Replacement
Central Control Station Flood Proofing
Repair Roller End Shields & Seals
Bridge Crane Bulkhead Lifter Rehabilitation
Systemic Tainter Valve Replacement
Dam Rehabilitation Evaluation Report
Replacing 70-Yr Old Lock Pontoon Barges (Work Flats)
Bridge Crane Repairs to Lattice Boom & Crane Undercarriage

TOTAL ESTIMATED COST: $29,900,000

The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

Point of Contact

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US Army Corps of Engineers ®
Rock Island District

Lock & Dam 12
(Bellevue, Iowa)
Mississippi River

General Contractors:
Lock: James Stewart Corporation, Chicago Illinois
Dam: Warner Construction Company, Chicago Illinois
Construction: 1934-1938
Congressional Districts: IA-1; IL-16

Description

Lock and Dam 12 is 556.7 miles above the confluence of the Mississippi and Ohio rivers. The complex stretches across the river at a point where the bluffs on the Iowa side are very close to the river; a complex of islands and sloughs extends nearly three-quarters of the way across the river from the Illinois side. Bellevue State Park occupies the high ground on the Iowa side, while the urbanized area of Bellevue extends to the government-owned property on the flat land below the bluff. The Lost Mound Unit of Upper Mississippi River National Wildlife and Fish Refuge occupies the islands, slough, and small flat bottom areas on the Illinois side.

The lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock. The maximum lift is 9 feet with an average lift of 6 feet. It takes approximately 10 minutes to fill or empty the lock chamber.

The movable dam consists of seven submersible Tainter gates (20 feet high by 64 feet long) and three submersible roller gates (20 feet high by 100 feet long). The dam system also includes two, non-overflow, earth and sand-filled dikes; two transitional dikes; and a concrete-covered, ogee spillway, submersible earth and sand-filled dike. The foundation is set in sand, gravel, and silt. It takes eight hours for water to travel from Lock and Dam 11, in Dubuque, Iowa, to Lock and Dam 12.

History/Significance

The lock opened in 1938. During the peak of construction, a maximum of 1,217 men were employed at one time. The lock and dam elements of the complex were completed at a cost of $5,581,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	24,426,919	2004	17,350,487
2000	22,280,448	2005	17,672,950
2001	19,098,873	2006	18,655,930
2002	23,031,159	2007	17,681,771
2003	19,622,041	2008	13,299,444

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,509,838	Subtotals:	
Petroleum	123,676		
Chemicals	1,678,527	Grain	4,573,138
Crude Materials	2,471,078	Steel	136,553
Manufactured Goods	463,408		
Farm Products	4,921,245	Lockages:	
Manufactured Machinery	101,672		
Containers & Pallets	0	Boats:	3,102
Unknown	30,000	Cuts:	2,975

Current Maintenance Issues – Lock & Dam 12

Item (Critical Rank Order)

Repair or Replace Emergency Gates
Systemic Bulkhead Slots
Systemic Miter Gate Replacement
Repair Spillway
Major Rehabilitation Stage III Dam Repairs
Central Control Station Flood Proofing
Repair Roller End Shields & Seals - Dam
Systemic - Crane Rail Adjustments – Dam
Bridge Crane Bulkhead Lifter Rehabilitation
Systemic Tainter Valve Replacement
Dam Rehabilitation Evaluation Report
Replacing 70-year Old Lock Pontoon Barge (Work Flats)
Bridge Crane Repairs to Lattice Boom & Crane Undercarriage

TOTAL ESTIMATED COST: $27,200,000

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Point of Contact

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US Army Corps of Engineers ®
Rock Island District

Lock & Dam 13
(Fulton, Illinois)
Mississippi River

General Contractors:
Lock and Dam: McCarthy Improvement Company, Davenport, Iowa
Construction: 1935-1939
Congressional Districts: IA-1; IL-16

Description

Lock and Dam 13 is 522.5 miles above the confluence of the Mississippi and Ohio rivers. The complex stretches across the river at a point where the bluffs on the Iowa side are very close to the river; islands and chutes dot the river beneath the bluffs. Eagle Point Nature Center occupies the high bluff immediately above the lock and dam. A dense group of sloughs and islands extend out from the Illinois shore.

The lock dimensions are 110 by 600 feet with additional provisions for an auxiliary lock. The maximum lift is 11 feet with an average lift of 8.6 feet. It takes approximately 10 minutes to fill or empty the lock chamber.

The movable dam consists of 10 submersible Tainter gates, 20-feet high by 64-feet long; and three submersible roller gates, 20-feet high by 100-feet long. The Tainter gates are elliptical. The dam system also includes three non-overflow earth and sand-filled dikes; two transitional dikes; and a submersible earth and sand-filled dike. It takes 10 hours for water to travel from Lock and Dam 12, in Bellevue, Iowa, to Lock and Dam 13.

History/Significance

The Lock opened in 1939. Locks and Dams 13, 14 and 17 were designed and built concurrently. The site for the lock was inaccessible from the nearest highway. As a result, the general contractor constructed a dike road to the site through the sloughs, islands, and marshy bottom lands of the Illinois shore. A ferry had to be operated during the construction of the dam and central control station. It was also necessary to divert Johnson Creek so that it entered the river downstream from the lock site. The lock and dam elements of the complex were completed at a cost of $7,503,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	24,803,042	2004	17,729,645
2000	22,746,082	2005	18,028,251
2001	19,277,553	2006	19,078,754
2002	23,495,472	2007	18,030,735
2003	19,990,636	2008	13,595,495

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,511,948	Subtotals:	
Petroleum	123,676		
Chemicals	1,666,893	Grain	4,821,833
Crude Materials	2,483,078	Steel	136,553
Manufactured Goods	467,828		
Farm Products	5,195,440	Lockages:	
Manufactured Machinery	116,412		
Containers & Pallets	0	Boats:	2,853
Unknown	30,150	Cuts:	2,940

Current Maintenance Issues – Lock & Dam 13

Item (Critical Rank Order)

Repair or Replace Emergency Gates
Systemic Bulkhead Slots
Dam Concrete Repairs
Systemic Miter Gate Replacement
Central Control Station Flood Proofing
Repair Roller End Shields & Seals - Dam
Structural Repairs - Tainter and Roller Gates Exterior
Systemic - Crane Rail Adjustments - Dam
Bridge Crane Bulkhead Lifter Rehabilitation
Systemic Tainter Valve Replacement
Lock Checkpost Replacement
Dam Rehabilitation Evaluation Report
Replacing 70-Year Old Lock Pontoon Barge (Work Flats)
Bridge Crane Repairs to Lattice Boom & Crane Undercarriage
Flood Damage - Repair/Raise Entrance Road
New Water Supply Well
Scour Repair at Dam and Riverwall
Systemic - Standby Generator and Compressor Enclosures
New Maintenance Building

TOTAL ESTIMATED COST: $25,200,000

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Point of Contact

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US Army Corps of Engineers ®
Rock Island District

Locks & Dam 14
(Pleasant Valley, Iowa)
Mississippi River

General Contractors:
Lock and Dam: Central Engineering Company, Davenport, Iowa
Construction: 1935-1940
Congressional Districts: IA-1; IL-17

Description

Lock and Dam 14 is four miles below LeClaire, Iowa, and 493.3 miles above the confluence of the Mississippi and Ohio rivers. The site is also 3.6 miles below the head of the notorious, rock-bedded, Rock Island Rapids. The LeClaire Lock and the remains of the LeClaire Lateral Canal, built in 1921-1924 to bypass this treacherous stretch of river, are located along the Iowa shore.

The main lock's dimensions are 110 by 600 feet. The dimensions of the LeClaire Lock, which is used as an auxiliary lock, are 80 by 320 feet, with a low-water depth of eight feet at the upper sill and seven feet at the lower sill. The main lock's maximum lift is 11 feet with an average lift of 9.8 feet. It takes approximately eight minutes to fill or empty the main lock.

The movable dam has 13 non-submersible Tainter gates (20 feet high by 60 feet long) and four submersible roller gates (20 feet high by 100 feet long). The dam system also includes an earth and sand-filled dike. It takes nine hours for water to travel from Lock and Dam 13, in Fulton, Iowa, to Lock and Dam 14.

History/Significance

The lock opened in 1940. The Corps built the oldest elements of this complex between 1921 and 1924, during the six-foot channel project. As part of that channelization, the Corps built a longitudinal dam paralleling the Iowa shore from the head of the Rock Island Rapids at LeClaire, to the head of Smith's Island. The dam formed the riverward wall of the LeClaire Canal, by which vessels could bypass the rapids. The Iowa shore served as the canal's landwall. Most of the longitudinal dam was submerged when Dam 14 was built; however, a portion of the original canal near the dam is still used as a mooring and storage site. The lock and dam elements of the complex were completed at a cost of $6,439,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	30,839,734	2004	20,626,075
2000	28,348,136	2005	20,819,999
2001	24,264,635	2006	21,934,232
2002	28,428,345	2007	20,675,817
2003	24,224,248	2008	15,612,451

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,415,063	Subtotals:	
Petroleum	152,948		
Chemicals	2,146,586	Grain	5,627,009
Crude Materials	3,061,268	Steel	157,014
Manufactured Goods	480,905		
Farm Products	6,198,945	Lockages:	
Manufactured Machinery	109,852		
Waste Material	0	Boats:	5,437
Containers & Pallets	0	Cuts:	3,992
Unknown	46,884		

Current Maintenance Issues – Lock & Dam 14

Item (Critical Rank Order)

- Systemic Bulkhead Slots
- Systemic Miter Gate Replacement
- Repair Roller End Shields & Seals - Dam
- Structural Repairs - Tainter and Roller Gates Exterior
- Systemic - Crane Rail Adjustments - Dam
- Modify Downstream Approach
- Bridge Crane Bulkhead Lifter Rehabilitation
- Repair Miter Gate Speed Reducer
- Systemic Repair Auxiliary Lock Gates, Including New Bulkhead Slots
- Systemic Tainter Valve Replacement
- Dredge Main Lock Upstream Approach
- Dam Rehabilitation Evaluation Report
- Painting Under Dam Service Bridge
- Replacing 70-Year Old Lock Pontoon Barge (Work Flats)
- Bridge Crane Repairs to Lattice Boom & Crane Undercarriage
- Repairs to Auxiliary Lock 14 - Machinery Bases
- Upper Bullnose Repair
- Auxiliary Lock Valves Rehabilitation
- Main Lock Chamber - Armoring
- Systemic - Standby Generator and Compressor Enclosures

TOTAL ESTIMATED COST: $29,400,000

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Point of Contact

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US Army Corps of Engineers ®
Rock Island District

Locks & Dam 15
(Rock Island, Illinois)
Mississippi River

General Contractors:
Lock: Merritt-Chapman & Whitney Corporation, Duluth, Minnesota
Dam: D.A. Healy Company, Detroit, Michigan
Construction: 1931-1934
Congressional Districts: IA-1; IL-17

Description

In the heart of the Quad Cities, Locks and Dam 15 is 483 miles above the confluence of the Mississippi and Ohio rivers. The complex stretches across the Upper Mississippi River at one of its narrowest points which is also at the foot of the Rock Island Rapids. The complex extends from the northwest tip of the U.S. Army's Arsenal Island on the Illinois side, to a small area of flat-bottom land on the Iowa side. A roadway and railroad bridge, joining Davenport and Rock Island, spans the site.

The main lock is 110 feet wide by 600 feet long; the auxiliary lock is 110 by 360 feet. Both have a maximum chamber lift of 16 feet with an average of 13 feet and takes about seven minutes to fill or empty. Each lock gate weighs nearly 82 tons. The 1,203-foot-long movable dam is the largest roller dam in the United States consisting of 11 non-submersible 100-foot-long roller gates with 11 control houses. Nine gates are 19 feet 4 inches in diameter and two are 16 feet 2 inches. It takes three hours for water to travel from Lock and Dam 14, in Pleasant Valley, Iowa, to Lock and Dam 15.

History/Significance

The complex opened in 1934 and was the first 9-Foot Channel Project complex which served as a prototype for the whole system. Dam 15 is unusual among the Project as it is the only dam on the River made entirely of roller gates as it was constructed at the narrowest part of the channel and is subject to ice and debris jams; is built at a 16-1/2 degree angle to gain additional dam area for maintaining the nine foot navigation; employs roller gates that are non-submersible, of differing sizes, and of non-standard length; is not at a right angle to the river; includes no earthen embankment dike section; incorporates a power plant that generates electricity to operate its gates and valves; and uses an open-truss service bridge with a bulkhead-lifting crane on its lower chord. The complex is also unusual because the intermediate locks' wall encases a bridge swing span. The lock and dam elements of the complex were completed at a cost of $2,524,700.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	31,209,760	2004	20,948,490
2000	28,753,278	2005	20,991,007
2001	24,707,186	2006	21,942,068
2002	28,829,063	2007	20,880,043
2003	24,923,417	2008	15,635,867

(More Information on the Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,398,044
Petroleum	151,707
Chemicals	2,129,808
Crude Materials	2,761,227
Manufactured Goods	579,096
Farm Products	6,480,544
Manufactured Machinery	90,992
Waste Material	0
Containers & Pallets	0
Unknown	44,449

Subtotals:	
Grain	5,914,567
Steel	159,104

Lockages:	
Boats:	3,535
Cuts:	3,717

Current Maintenance Issues – Locks & Dam 15

Item (Critical Rank Order)

Rehabilitation of Bulkhead Hoist
Systemic Bulkhead Slots
Dam Gate Rehabilitation – Exterior
Hydropower Turbine Rehabilitation
Systemic Miter Gate Replacement
Repair Roller End Shields & Seals - Dam
Systemic Structural Repairs Service Bridge Dam
Replace/Rehabilitate Motors and Brakes for Roller Gates
Structural Repairs - Tainter and Roller Gates - Interior
Systemic Repair Auxiliary Lock Gates, Including New Bulkhead Slots
Systemic Tainter Valve Replacement
Lock Checkpost Replacement
Dam Rehabilitation Evaluation Report
Rehabilitate Concrete on River Wall, Erosion Repairs to Lower Guidewall
Bridge Crane Repairs to Lattice Boom & Crane Undercarriage
Tainter Valve Limit Switch Replacement and Relocation
Scour Repair
Davenport Seawall Interior Inspection
Rehabilitate Boat Dock
Construct Central Control Station /Visitor Center Addition

TOTAL ESTIMATED COST: $35,500,000

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Point of Contact

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US Army Corps of Engineers ®
Rock Island District

Lock & Dam 16
(Illinois City, Illinois)
Mississippi River

General Contractors:
Lock and Dam: Central Engineering Company, Davenport, Iowa
Construction: 1933-1937
Congressional Districts: IA-2; IL-17

Description

Lock and Dam 16 is about one mile upstream from Muscatine, Iowa, and 457.2 miles above the confluence of the Mississippi and Ohio rivers. The complex stretches across the river at a point where the valley is wide. The earthen embankment section of the dam straddles portions of Hog Island in the main channel.

The lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock. The maximum lift is nine feet with an average lift of 6.5 feet. It takes approximately seven minutes to fill or empty the lock chamber.

The movable dam has 12 non-submersible Tainter gates (20 feet high and 40 feet long), three submersible Tainter gates of the same dimensions, and four non-submersible roller gates (20 feet high and 80 feet long). The dam system also includes a linear, concrete capped, ogee spillway; and a submersible earth and sand-filled dike. It takes eight hours for water to travel from Lock and Dam 15, in Davenport, Iowa, to Lock and Dam 16.

History/Significance

The lock opened in 1937. Dam 16 was the last dam in the Rock Island District to employ non-submersible roller gates, as well as Tainter gates (submersible and non-submersible), which had steel sheeting on only one side. It was also the first dam in the District in which all the Tainter gates were operated by line shafts and motors housed in installations above each gate, rather than from locomotive hoist cars running on the dam's service bridge. The lock and dam elements of the complex were completed at a cost of $3,682,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	33,139,184	2004	21,279,884
2000	30,583,395	2005	21,350,740
2001	26,451,754	2006	22,708,972
2002	30,323,912	2007	21,598,027
2003	25,912,587	2008	16,494,518

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,791,286	Subtotals:	
Petroleum	187,885		
Chemicals	2,158,943	Grain	6,566,968
Crude Materials	2,517,550	Steel	195,281
Manufactured Goods	486,174		
Farm Products	7,173,661	Lockages:	
Manufactured Machinery	126,875		
Waste Material	400	Boats:	2,707
Containers & Pallets	0	Cuts:	3,387
Unknown	51,744		

Current Maintenance Issues – Lock & Dam 16

Item (Critical Rank Order)

- Systemic Bulkhead Slots
- Pier House Roof Repairs
- Systemic Miter Gate Replacement
- Damage-Overflow Spillway Concrete
- Repair Roller End Shields & Seals - Dam
- Systemic Structural Repairs - Tainter and Roller Gates - Exterior
- Systemic - Crane Rail Adjustments - Dam
- Systemic Structural Repairs Service Bridge Dam
- Structural Repairs - Tainter and Roller Gates – Interior
- Bridge Crane Bulkhead Lifter Rehabilitation
- Systemic Repair Auxiliary Lock Gates, Including New Bulkhead Slots
- Miter Gate Machinery/Gearbox Repair
- Systemic Tainter Valve Replacement
- Dam Rehabilitation Evaluation Report
- Replacing 70-Year Old Lock Pontoon Barge (Work Flats)
- Wave Damage and Upper End Approach Repair
- Bridge Crane Repairs to Lattice Boom & Crane Undercarriage
- Systemic - Standby Generator and Compressor Enclosures
- New Maintenance Building

TOTAL ESTIMATED COST: $32,600,000

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs of the aging infrastructure increase. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

Point of Contact

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US Army Corps of Engineers ®
Rock Island District

Lock & Dam 17
(New Boston, Illinois)
Mississippi River

General Contractors:
Lock: Massman Construction Company and Massman-Peterman Company, Kansas City, Missouri
Dam: Maxon Construction, Dayton, Ohio
Construction: 1935-1939
Congressional Districts: IA-2; IL-17

Description

Lock and Dam 17 is 437.1 miles above the confluence of the Mississippi and Ohio rivers. The complex stretches across a wide portion of river where there are several marshy islands. The Port Louisa National Wildlife Refuge and Odessa State Wildlife Management Area occupy the islands, marshes, and sloughs on the Iowa shore both upstream and downstream from the dam.

The lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock. The maximum lift is eight feet with an average lift of four feet. It takes approximately seven minutes to fill or empty the lock chamber.

The movable dam has eight submersible Tainter gates (20 feet high by 64 feet long) and three submersible roller gates (20 feet high by 100 feet long). The dam system also includes one non-overflow earth and sand-filled dike; two transitional dikes; and a submersible earth and sand-filled dike. It takes six hours for water to travel from Lock and Dam 16 in Muscatine, Iowa, to Lock and Dam 17.

History/Significance

The lock opened in 1939. The site was inaccessible from the nearest highway. As a result, the contractors for the lock had to construct a 3.7-mile-long entrance road. The remoteness of the site caused other problems. Not enough workers could commute to the job site from their homes. As a result, the Massman Construction Company and the Massman-Peterman Company built a workers' camp near the lock and dam site. This camp consisted of eleven 16-man bunk houses and a large mess hall. During the peak of construction in July 1936, 626 men were employed on the project. The lock and dam elements of the complex were completed at a cost of $4,164,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	34,170,210	2004	22,107,520
2000	31,375,823	2005	22,596,983
2001	27,451,332	2006	24,046,856
2002	31,631,819	2007	22,843,570
2003	27,171,584	2008	17,338,830

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	4,248,023	Subtotals:	
Petroleum	192,385		
Chemicals	2,288,704	Grain	6,888,974
Crude Materials	2,386,284	Steel	196,940
Manufactured Goods	494,603		
Farm Products	7,557,028	Lockages:	
Manufactured Machinery	119,659		
Waste Material	400	Boats:	2,023
Containers & Pallets	0	Cuts:	2,966
Unknown	51,744		

Current Maintenance Issues – Lock & Dam 17

Item (Critical Rank Order)

Systemic Bulkhead Slots
Concrete Repairs to Lock Monoliths
Pier House Roof Repairs
Systemic Miter Gate Replacement
Repair Roller End Shields & Seals - Dam
Systemic Structural Repairs - Tainter and Roller Gates - Exterior
Systemic - Crane Rail Adjustments - Dam
Bridge Crane Bulkhead Lifter Rehabilitation
Structural Repairs - Tainter and Roller Gates - Interior
Systemic Repair Auxiliary Lock Gates, Including New Bulkhead Slots
Systemic Structural Repairs Service Bridge Dam
Miter Gate Machinery/Gearbox Repair
Systemic Tainter Valve Replacement
Lock Rehabilitation Evaluation Report
Riprap Repair
Riverwall Concrete Horizontal Resurfacing
Dam Rehabilitation Evaluation Report
Bridge Crane Repairs to Lattice Boom & Crane Undercarriage
Flood Damage-Repair Sidewalk Upper/Lower Guidewall
Systemic - Standby Generator and Compressor Enclosures
Resurface Entrance Road
New Maintenance Building

TOTAL ESTIMATED COST: $34,100,000

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs of the aging infrastructure increase. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

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US Army Corps of Engineers ®
Rock Island District

Lock & Dam 18
(Gladstone, Illinois)
Mississippi River

General Contractors:
Lock: Maxon Construction Company, Dayton, Ohio
Dam: S.A. Healy Company, Chicago, Illinois
Construction: 1934-1937
Congressional Districts: IA-2; IL-17

Description

Lock and Dam 18 is 410.5 miles above the confluence of the Mississippi and Ohio rivers. The bottom lands on both shores are flat and punctuated by sloughs, marshes, and reefs. The river is dotted with low islands of various sizes. The Oquawka State Wildlife Refuge is adjacent to the lock and dam complex on the Illinois shore. The installation's esplanade interrupts a levee and functions as part of the Henderson River diversion that converted Turkey Island into an extension of the Illinois shore.

Lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock. Maximum lift is 9.8 feet with an average lift of 6.9 feet. It takes approximately 10 minutes to fill or empty the lock.

The dam is composed of 14 submersible Tainter gates (20 feet high by 60 feet long) and three submersible roller gates (20 feet high by 100 feet long). All gates submerge to a depth of eight feet. The dam includes a submersible earth and sand-filled dike, a non-overflow earth and sand-filled dike, and two transition dikes. It takes eight hours for water to travel from Lock and Dam 17, in New Boston, Illinois, to Lock and Dam 18.

History/Significance

The lock opened in 1937. Dams 11 and 18 were the first in the Rock Island District to employ submersible, elliptical Tainter gates. They were also the first two dams in the District to use submersible roller gates. This complex also involved the diversion of Henderson River so that it entered the Upper Mississippi immediately below the lock and dam. During the peak of construction in September 1934, the project employed 960 men as laborers and 74 men as supervisors. Average employment was 478 laborers and 44 supervisors.

The lock and dam elements of the complex were completed at a cost of $4,122,400.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	35,707,505	2004	23,015,891
2000	32,864,097	2005	23,602,042
2001	28,570,073	2006	25,262,995
2002	32,948,597	2007	24,193,022
2003	28,389,384	2008	18,661,036

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	4,300,188
Petroleum	201,485
Chemicals	2,340,981
Crude Materials	2,423,397
Manufactured Goods	487,567
Farm Products	8,716,995
Manufactured Machinery	132,079
Waste Material	400
Containers & Pallets	0
Unknown	57,944

Subtotals:	
Grain	8,041,012
Steel	200,116
Lockages:	
Boats:	2,237
Cuts:	3,246

Current Maintenance Issues – Lock & Dam 18

Item (Critical Rank Order)

- Dam Concrete Safety Repairs
- Systemic Bulkhead Slots
- Repair Dam Concrete
- Dam Rehabilitation Evaluation Report
- Systemic Miter Gate Replacement
- Repair Roller End Shields & Seals - Dam
- Systemic - Crane Rail Adjustments - Dam
- Bridge Crane Bulkhead Lifter Rehabilitation
- Structural Repairs - Tainter and Roller Gates - Interior
- Systemic Repair Auxiliary Lock Gates, Including New Bulkhead Slots
- Systemic Structural Repairs Service Bridge Dam
- Systemic Structural Repairs - Tainter and Roller Gates - Exterior
- Miter Gate Machinery/Gearbox Repair
- Systemic Tainter Valve Replacement
- Lock Rehabilitation Evaluation Report
- Replacing 70-Year Old Lock Pontoon Barge (Work Flats)
- Bridge Crane Repairs to Lattice Boom & Crane Undercarriage
- Repair Henderson River Bridge
- Systemic - Standby Generator and Compressor Enclosures
- Resurface Entrance Road (1,200')
- New Maintenance Building

TOTAL ESTIMATED COST: $51,900,000

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs of the aging infrastructure increase. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

Point of Contact

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US Army Corps of Engineers ®
Rock Island District

Lock & Dam 19
(Keokuk, Iowa)
Mississippi River

General Contractors:
Stage I: McCarthy Improvement Company, Davenport, Iowa
Stage II: Jones Construction Company, Charlotte, North Carolina
Stage III: Oil Gear Company, Milwaukee, Wisconsin
Stage IV: Evans Electrical Construction Company, Omaha, Nebraska
Construction: (1910-1914) 1952-1957
Congressional Districts: IA-2; IL-17

Description

Lock and Dam 19 is 364.2 miles above the confluence of the Mississippi and Ohio rivers. Privately built and owned, the dam was built in 1913 and includes 119 rectangular sliding gates.

The lock was constructed from 1952-1957. The main lock is 110 by 1,200 feet, twice the size of the standard 9-foot navigation channel lock. The Keokuk and Hamilton Water Power Company Lock (built between 1910 and 1914) is closed off by a permanent, steel pile, cell structure.

Maximum lift is 38.2 feet with an average lift of 36.3 feet. It takes approximately 10 minutes to fill; 9.25 minutes to empty the lock. It takes 12 hours for water to travel from Lock and Dam 18, in Gladstone, Illinois, to Lock and Dam 19.

History/Significance

The lock opened in 1957. The lock and dam complex was not built as part of the original 9-foot navigation channel project. The Des Moines Canal Bullnose was built from 1867-1870 as part of the Corps' 4-foot channel project. The Keokuk and Hamilton Water Power Company built the dam, power plant, dry dock, and original lock from 1910-1914.

The Corps built the 1,200-foot lock, control houses, utility building, and esplanade in four stages: Stage I – Construction of lock lower approach (1952-1954); Stage II – Lock construction (1954-1956); Stage III – Manufacture and delivery of electrical control equipment and upstream gate operating equipment (1954); Stage IV – Installation of power, control, and lighting system (1956-1957).

During the peak of construction, 415 people were employed. Elements of the lock and dam were listed on the National Register of Historic Places in 1978. The complex was completed at a cost of $37,909,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	35,803,139	2004	24,190,511
2000	34,097,581	2005	24,697,974
2001	30,128,512	2006	26,390,867
2002	34,914,721	2007	25,504,854
2003	29,827,673	2008	19,275,225

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,074,535	Subtotals:	
Petroleum	209,137		
Chemicals	2,424,609	Grain	9,655,755
Crude Materials	2,471,767	Steel	203,210
Manufactured Goods	501,318		
Farm Products	10,418,207	Lockages:	
Manufactured Machinery	129,709		
Waste Material	400	Boats:	2,231
Containers & Pallets	0	Cuts:	2,039
Unknown	45,544		

Current Maintenance Issues – Lock & Dam 19

Item (Critical Rank Order)

Concrete Work - Major Maintenance
Downstream Cell Replacement
Ice Gate Study
Rehabilitation to Lock Guard Gate
Sandblast and Paint Lock Guard Gate
Systemic Tainter Valve Replacement
Repair Lock Valve Intake Screens
Dewatering Guard Gate
Replacing 70-Year Old Lock Pontoon Barge (Work Flats)
Remove Rock to Modify Downstream Approach
Replace Roof and Brick Veneer on Lock Building
Rehabilitate Upper Control Buildings
Restore Old Lock and Drydock

TOTAL ESTIMATED COST: $51,200,000

As the structures and equipment approach the end of their project lives, breakdowns and failure of mechanical and electrical equipment become more frequent and expensive, with resultant delays and loss of revenue to commercial waterway users. The rehabilitation involves the navigation lock chamber and associated parts. Major work items include resurfacing the lock chamber, rehabilitation of Tainter valves, replacing and refurbishing the lock machinery, miter gates and overall site electrical systems. The rehabilitation was started in Fiscal Year 2003 with a Congressional add of $500,000. Funding for rehabilitation projects is normally provided through Construction General funds, and cost shared 50/50 with the Inland Waterways Trust Fund for the Major Rehabilitation portion of the work; and Operations & Maintenance funds used for the Major Maintenance portion of the work.

Stage I -- Upper gates repair is scheduled for completion in March 2008.

Stage II, Lock Rehabilitation and Miter Gate Replacement -- completed in 2006. After four months of operation, the lower land wall miter gate developed a grinding noise. In 2007, in-house crews repaired the gate. This emergency repair was not included in the Fiscal Year 2007 or 2008 budget, as a result it drew funds from Stage I.

Concrete resurfacing of the lock chamber is deferred (more than $30 million) due to Operations & Maintenance funding levels that will not permit completion of all major maintenance elements.

Potential unscheduled closures of 90 days have been estimated and associated with failures of mechanical equipment. Transportation impacts associated with a 90-day closure of Lock 19, outside of the winter closure, would approach $53 million. AmerenUE, a privately owned utility company, owns the adjacent navigation/hydroelectric dam.

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Lock & Dam 20
(Canton, Missouri)
Mississippi River

General Contractors:
Lock: Maxon Construction, Dayton, Ohio
Dam: S.A. Healy Company, Detroit, Michigan, and Davenport, Iowa
Construction: 1932-1935
Congressional Districts: MO-9; IL-17

Description

Lock and Dam 20 is 343.2 miles above the confluence of the Mississippi and Ohio rivers. The complex stretches across the river at a point where the valley is quite wide, about five-miles wide at the level of the lock and dam. A levee and the Gregory Diversion Ditch separate the complex from the town of Canton.

The lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock. The maximum lift is 10.5 feet with an average lift of 5.3 feet. It takes approximately seven minutes to fill or empty the lock chamber.

The movable dam has three non-submersible roller gates (20 feet high by 60 feet long), 34 non-submersible Tainter gates (20 feet high by 40 feet long), and six submersible Tainter gates (20 feet high by 40 feet long). The submersible Tainter gates submerge three feet. It takes six hours for water to travel from Lock and Dam 19, in Keokuk, Iowa, to Lock and Dam 20.

History/Significance

The lock opened in 1935. Dam 20 was the first dam in the Rock Island District to include Tainter gates. The plans originally called for all of the Tainter gates to be operated by hoist cars traveling on the dam's service bridge. However, the District modified two Tainter gates so they were individually operated by line shafts and motors housed in installations above each gate. This operating machinery worked so well that all subsequent Tainter gates in the 9-foot channel project, regardless of which district they were in, used line shafts and motors. Lock and Dam 20 was the first complex in the District on the Mississippi River to undergo major rehabilitation. The lock and dam elements of the complex were completed at a cost of $3,363,500.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	36,530,515	2004	25,228,357
2000	35,015,410	2005	25,564,051
2001	31,113,406	2006	27,584,821
2002	35,902,022	2007	26,423,478
2003	30,811,633	2008	20,080,492

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,171,946
Petroleum	204,385
Chemicals	2,400,313
Crude Materials	2,533,077
Manufactured Goods	485,672
Farm Products	11,083,996
Manufactured Machinery	156,819
Waste Material	400
Containers & Pallets	0
Unknown	44,084

Subtotals:	
Grain	10,287,100
Steel	208,165

Lockages:	
Boats:	2,510
Cuts:	3,515

Current Maintenance Issues – Lock & Dam 20

Item (Critical Rank Order)

Miter Gate Replacement
Lock Strut Arm Replacements and Traveling Kevel Rail Mule Replacements
Systemic Bulkhead Slots
Pier House Roof Repairs
Concrete Repairs to Lock and Dam 20 Steps
Structural Support Beam Repairs to Lock Machinery
Raise Gate/Valve Machinery
Bridge Crane Bulkhead Lifter Rehabilitation
Systemic - Crane Rail Adjustments - Dam
Structural Repairs - Tainter and Roller Gates - Interior
Initiate Rehabilitation Evaluation Report for Ice/Debris Gate
Systemic Structural Repairs Service Bridge Dam
Systemic Structural Repairs - Tainter and Roller Gates - Exterior
Miter Gate Machinery/Gearbox Repair
Systemic Tainter Valve Replacement
Lock Checkpost Replacement
Dam Rehabilitation Evaluation Report
Repair Lock Ladder Recesses
Repair Lock Armor Plates
Replacing 70-Year-Old Lock Pontoon Barge (Work Flats)
Lock Concrete Condition Survey and Repairs
Repairs to Guide Cells and Erosion Repairs at Lower Ends
Bridge Crane Repairs To Lattice Boom & Crane Undercarriage
Repair Upstream Landwall Bullnose
Replace Dam Decking
Repair Downstream Dam Bullnose
Control Station Repairs
Rehabilitation of Lock Roadway
Repair Canton Creek Bridge
Systemic - Standby Generator and Compressor Enclosures

TOTAL ESTIMATED COST: $41,600,000

The Water Resources Development Act of 2007 (WRDA 07) Title VIII authorized the dual-purpose navigation and ecosystem restoration plan for the Upper Mississippi River and Illinois Waterway. The new 1,200-foot lock, which will be located in the auxiliary lock chamber, will cost approximately $221,000,000. The design and construction of the new lock is dependent upon annual appropriations.

The 9-foot Navigation Project was largely constructed in the 1930s and includes 37 Locks and 1,200 miles of waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks require tows to split and lock through in two operations. This requires uncoupling barges which triples lockage times and exposes deckhands to safety risks.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs increase. Long-established programs for preventative maintenance have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

Point of Contact

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US Army Corps of Engineers ®
Rock Island District

Lock & Dam 21
(Quincy, Illinois)
Mississippi River

General Contractors:
Lock: Joseph Meltzer, Inc., New York, New York
Dam: McCarthy Improvement Company, Davenport, Iowa
Construction: 1933-1939
Congressional Districts: MO-9; IL-17

Description

Lock and Dam 21 is 324.9 miles above the confluence of the Mississippi and Ohio Rivers. The complex stretches across the river at a point where the valley is wide with flat bottom land on either side of the river. The city of Quincy, Illinois, lies on the low bluffs along the river just upstream from the complex.

Lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock.

The maximum lift is 10.5 feet with an average lift of 6.55 feet. It takes approximately seven minutes to fill or empty the lock chamber.

The movable dam has 10 submersible, elliptical Tainter gates (20 feet high by 64 feet long) and three submersible roller gates (20 feet high by 100 feet long). The dam system also includes two earth and sand-filled transitional dikes, and a submersible earth dike. It takes five hours for water to travel from Lock and Dam 20, in Canton, Missouri, to Lock and Dam 21.

History/Significance

Because Lock and Dam 21 was located adjacent to Quincy, which had acute unemployment, the complex was built before some of the other, higher priority locks and dams. The lock, central control station, and esplanade were completed by August 1935. At that point, however, no money was available to begin the dam. As a result, representatives from Quincy vigorously, and successfully, lobbied for federal money to construct the dam as a work relief project. The dam was completed in 1939. The lock and dam elements of the complex were completed at a cost of $4,155,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	37,863,139	2004	26,556,326
2000	36,449,116	2005	27,127,688
2001	32,874,457	2006	29,497,577
2002	37,208,243	2007	28,546,672
2003	32,025,867	2008	21,939,658

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,277,084	Subtotals:	
Petroleum	263,020		
Chemicals	2,668,704	Grain	10,603,032
Crude Materials	2,691,686	Steel	209,776
Manufactured Goods	507,684		
Farm Products	12,326,026	Lockages:	
Manufactured Machinery	159,730		
Waste Material	40	Boats:	2,376
Containers & Pallets	0	Cuts:	3,569
Unknown	45,684		

Current Maintenance Issues – Lock & Dam 21

Item (Critical Rank Order)

- Systemic Miter Gate Replacement
- Lock Strut Arm Replacements & Traveling Kevel Rail Mule Replacements
- Systemic Bulkhead Slots
- Dam Gate Rehabilitation – Exterior
- Concrete & Armor Repairs
- Dam Pierhouse Roof Repairs
- Repair Roller End Shields & Seals
- Structural Repairs - Roller & Tainter Gates – Interior
- Systemic - Crane Rail Adjustments
- Bridge Crane Bulkhead Lifter Rehabilitation
- Dam Piers Concrete Repairs
- Systemic Structural Repair Service Bridge Dam
- Resurface Horizontal Concrete Intermediate Wall & Riverwall
- Miter Gate Machinery/Gearbox Repair
- Systemic Tainter Valve Replacement
- Replacing 70-Year-Old Lock Pontoon Barges (Work Flats)
- Bridge Crane Repairs to Lattice Boom & Crane Undercarriage
- Systemic - Standby Generator & Compressor Enclosures
- New Maintenance Building

TOTAL ESTIMATED COST: $31,530,000

The Water Resources Development Act of 2007 (WRDA 07) Title VIII authorized the dual-purpose navigation and ecosystem restoration plan for the Upper Mississippi River and Illinois Waterway. The new 1,200-foot lock, which will be located in the auxiliary lock chamber, will cost approximately $322,000,000. The design and construction of the new lock is dependent upon annual appropriations.

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs of the aging infrastructure increase. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

Point of Contact

Rock Island District Corporate Communications Office
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US Army Corps of Engineers ®
Rock Island District

Lock & Dam 22
(Saverton, Missouri)
Mississippi River

General Contractors:
Lock: Joseph Meltzer, Inc., New York, New York
Dam: Massman Construction Company, Kansas City, Missouri
Construction: 1934-1939
Congressional Districts: MO-9; IL-17

Description

Lock and Dam 22 is 301.2 miles above the confluence of the Mississippi and Ohio rivers. Bluffs rise more than 200 feet above the river west of the lock; the valley is quite wide east of the complex.

The lock dimensions are 110 feet wide by 600 feet long with additional provisions for an auxiliary lock.

The maximum lift is 10.5 feet with an average lift of 7.5 feet. It takes approximately seven minutes to fill or empty the lock chamber.

The movable dam has nine non-submersible Tainter gates (25 feet high by 60 feet long), one submersible Tainter gate (25 feet high by 60 feet long), and three submersible roller gates (25 feet high by 100 feet long). Completing the dam system are two transition dikes and a submersible earth and sand-filled dike. It takes seven hours for water to travel from Lock and Dam 21, in Quincy, Illinois, to Lock and Dam 22.

History/Significance

The lock opened in 1939. It was on the submersible roller gates at Dam 22 that the Rock Island District introduced the Poiree dam trestles to mitigate scour problems. The trestles were subsequently used as a retrofit solution on other project dams. It was also on this dam's submersible roller gates that the St. Paul District Hydraulic Laboratory conducted tests that led to the design of stilling basins for roller gates. The Rock Island District incorporated an experimental design for a submersible roller gate with end shields and introduced a new type of non-submersible, truss-type Tainter gate in Dam 22. During the peak of construction, 959 people were employed on the installation. The lock and dam elements of the complex were completed at a cost of $3,943,000.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	38,074,304	2004	26,755,587
2000	36,812,642	2005	27,371,325
2001	33,336,062	2006	29,789,804
2002	37,567,046	2007	28,908,447
2003	32,229,405	2008	22,264,425

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,259,824	Subtotals:	
Petroleum	251,720		
Chemicals	2,631,039	Grain	10,870,513
Crude Materials	2,677,283	Steel	211,740
Manufactured Goods	673,698		
Farm Products	12,586,707	Lockages:	
Manufactured Machinery	134,830		
Waste Material	3,640	Boats:	2,227
Containers & Pallets	0	Cuts:	3,530
Unknown	45,684		

Current Maintenance Issues – Lock & Dam 22

Item (Critical Rank Order)

Systemic Miter Gate Replacement
Systemic Bulkhead Slots
Systemic Tainter Valve Replacement – Includes Rehabilitation Evaluation Report
Dam Gate Rehabilitation – Exterior
Repair Concrete and Protection Armor in Lock Chamber
Dam Pierhouse Roof Repairs
Repair Spillway
Repair Roller End Shields & Seals - Dam
Structural Repairs - Tainter and Roller Gates - Interior
Systemic - Crane Rail Adjustments – Dam
Bridge Crane Bulkhead Lifter Rehabilitation
Resurface Horizontal Surfaces of Bridge Piers
Systemic Structural Repairs Service Bridge Dam
Repair Upstream Riverwall Bullnose
Dam Rehabilitation Evaluation Report
Replacing 70-Year-Old Lock Pontoon Barge (Work Flats)
Repairs to Guide Cells and Erosion Repairs at Lower Ends
Bridge Crane Repairs To Lattice Boom & Crane Undercarriage
Damage-Repair Lower Landwall Vertical Concrete
Systemic - Standby Generator and Compressor Enclosures
New Maintenance Building

TOTAL ESTIMATED COST: $35,110,000

The Water Resources Development Act of 2007 (WRDA 07) Title VIII authorized the dual-purpose navigation and ecosystem restoration plan for the Upper Mississippi River and Illinois Waterway. The new 1,200-foot lock, which will be located in the auxiliary lock chamber, will cost approximately $232,000,000. The design and construction of the new lock is dependent upon annual appropriations.

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

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In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs of the aging infrastructure increase. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

Point of Contact

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US Army Corps of Engineers ®
St Louis District

Lock & Dam 24
(Clarksville, Missouri)
Mississippi River

General Contractor:
Lock and Dam: Central Engineering Company, Davenport, Iowa
Construction: 1936-1940
Congressional Districts: MO-9; IL-17

Description

Lock and Dam 24 is located at Mississippi River mile 273.4, 93.5 miles upstream of St. Louis. The pool length is 27.8 miles and accounts for 13,000 acres.

Lock dimensions are the standard 100 by 600 feet, with the upper gate bay section of an auxiliary lock. Average lift is 15 feet. Unlike Locks 25 and Old Locks 26, which are pile-founded structures built atop sand and gravel, Lock 24 is founded on durable shale. Because of the presence of a firm foundation material, the lock chamber is not floored and no lateral struts were provided to stabilize the intermediate and river walls.

The 1,340-foot long movable dam has 15 fully submersible Tainter gates, 25 feet high by 80 feet long, which pivot vertically to control water flow. The gates are raised and lowered by individual electric motors, connected by line shafting to link-chain hoists, located beneath the dam service bridge. The piers provide support for the Tainter gates and the steel deck girder service bridge that extends the length of the dam. The dam includes a 2,720-foot submersible dike.

A major rehab of Lock and Dam 24 was completed in 2005. This work consisted of replacing a large portion of the concrete in the lock chamber walls, walkways and work areas. Also, new gate and valve machinery was installed elevating the electrical components above the 1993 flood levels.

History/Significance

The lock was put into operation on May 12, 1940. This was the first dam on the 9-Foot Channel Project constructed without roller gates. The submersible, elliptical Tainter gates of Dam 24 represent the apex of gate design achieved during the project. At the time of their construction, the Corps believed these gates to be the largest Tainter gates ever constructed. Because of the large size of the Tainter gates, and the relatively ice-free conditions of this stretch of river, roller gates were eliminated entirely from the dam design. These Tainter gates were innovative that they rendered roller gate technology, the principle engineering feature in dam construction at the time, obsolete.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	39,296,994	2004	27,883,604
2000	38,697,993	2005	28,932,976
2001	34,785,352	2006	31,061,559
2002	38,864,614	2007	30,145,700
2003	33,761,938	2008	23,133,551

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,385,284	Subtotals:	
Petroleum	301,616		
Chemicals	2,763,179	Grain	11,086,785
Crude Materials	2,770,704	Steel	213,275
Manufactured Goods	912,775		
Farm Products	12,815,879	Lockages:	
Manufactured Machinery	135,330		
Waste Material	1,600	Boats:	2,372
Containers & Pallets	1,624	Cuts:	3,616
Unknown	47,184		

Current Maintenance Issues – Lock & Dam 24

Item (Critical Rank Order)

- Repair critical scour holes upstream of dam
- Replace Bulkheads, Dam Major Rehabilitation
- Install New Controls on Bulkhead Lifting Machinery
- Repair #4 Miter Gate
- Critical Signs – Fabricate and Install to Conform to Safety Standards (ARRA Funded)
- Modify Spare Miter Gates
- Install Chains and Sprockets on Dam Tainter Gates
- Install / Replace Dam Piezometers
- Replace Dam Motors
- Rehabilitate Bulkhead Crane Carriage
- Repair, Sandblast and Paint Service Bridge
- Culvert Valves Inspections

TOTAL ESTIMATED COST $13,807,000

An $85 million major rehabilitation was substantially completed at Lock and Dam 24 in 2003. Only remaining item is repair to tainter gate trunions which is waiting on analysis of ice flow load data.

The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, and consumers, and commodities investors.

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The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

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Point of Contact

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US Army Corps of Engineers ®
St Louis District

Lock & Dam 25
(Winfield, Missouri)
Mississippi River

General Contractor:
Lock and Dam: United Construction Company, Winona, Minnesota
Construction: 1935-1939
Congressional Districts: MO-2; IL-17

Description

Lock and Dam 25 is located at Upper Mississippi River mile 241.4. It is the third southern-most dam in the system on the Upper Mississippi River. The pool length is 32 miles and accounts for 18,000 acres.

The lock consists of a main lock, located against the east bank of Bradley Island, and the upper gate bay of an auxiliary lock. The main lock has the standard 110-foot-wide by 600-foot-long chamber. The average lift is 15 feet. Both the lock and the movable dam are pile-founded structures.

The 1,296-foot long movable portion of the dam has three submersible roller gate, 25 feet high by 100 feet long, and 14 submersible Tainter gates, 25 feet high by 60 feet long. The overflow dike length for is 2,566 feet.

Lock and Dam 25 consists of 14 Tainter gates which pivot vertically and are raised or lowered to control the depth of the water in the pool upstream of the dam. In times of high water, these gates are raised completely and the river flows almost unimpeded, allowing a more natural flow of the river. The three roller gates, located near the center of the dam, also restrict the water flow, but in a manner meant to reduce erosion.

History/Significance

The lock was put into operation on May 18, 1939.

The Tainter gates of Dam 25 represented a marked advance over those installed at Old Dam 26. The gates were fully submersible to a depth of nearly eight feet, more than twice that attained at Dam 26. Additionally, the streamlined spillway that characterized the dam gates was replaced by a riveted steel sheet that entirely covered the gate's steel framework, protecting it from ice damage and providing a smooth unobstructed surface for the water to pass over the gate in its submerged position.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	39,536,830	2004	27,894,562
2000	39,177,450	2005	29,043,655
2001	34,858,294	2006	31,026,288
2002	38,916,145	2007	30,204,744
2003	33,749,527	2008	23,244,934

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	3,358,954	Subtotals:	
Petroleum	315,701		
Chemicals	2,751,038	Grain	11,080,301
Crude Materials	2,853,001	Steel	208,527
Manufactured Goods	942,427		
Farm Products	12,820,899	Lockages:	
Manufactured Machinery	154,130		
Waste Material	1,600	Boats:	2,950
Containers & Pallets	0	Cuts:	3,929
Unknown	47,184		

Current Maintenance Issues – Lock & Dam 25

Item (Critical Rank Order)

Install Bulkhead Slots (ARRA Funded)
Install High Mast Lights
Replace Culvert Valve Machinery (ARRA Funded)
Replace Diesel Compressors (ARRA Funded)
Replace Bulkheads Dam Roller Gate
Saddledam Rehabilitation
Critical Signs – Fabricate and Install to Conform to Safety Standards (ARRA Funded)
Modify Spare Miter Gates
Install Chains and Sprockets on Dam Tainter Gates
Sandblast, Rebuild, and Paint Dam Roller Gates
Structural Repair to Dam Tainter Gates
Sandblast, Rebuild, and Paint or Replace Bulkheads
Bulkhead Crane - Drive Replacement
Spillway - Rehabilitation, Vegetation removal from Overflow dike
Replace Dam Motors
Repair Service Bridge -Sandblast, Paint
Concrete Repairs
Cleanout Forebay
Culvert Valves – Inspections
Sandblast and Repaint Lock Wall Bullnose
Replace Maintenance Facility

TOTAL ESTIMATED COST $18.258.000

A $52 million major rehabilitation was completed at Lock and Dam 25 in 1999. The lock has a scheduled closure from December 15, 2009 to March 15, 2010 to address backlog maintenance repairs: replacement of culvert valve machinery and installment of bulkhead slots. Phase I of the Dam Safety Modification Project has been approved and is under construction. This includes an $11 million repair to critical scour holes upstream of the dam.

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs of the aging infrastructure increase. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

Point of Contact

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US Army Corps of Engineers ®
St Louis District

Melvin Price Locks & Dam (Alton, Illinois) Mississippi River

General Contractors:
Lock: Joint venture of S.J. Groves & Sons Company, Minneapolis, Minnesota; Guy F. Atkinson Company, South San Francisco, California; and Dillingham Corporation, Pleasanton, California
Dam: Joint venture of S.J. Groves & Sons, Minneapolis, Minnesota; Guy F. Atkinson Company, South San Francisco, California; Ball Construction Company; and Black & Veatch
Construction: 1979-1990
Congressional Districts: MO-2; IL-12

Description

Melvin Price Locks and Dam is located at Mississippi River mile 200.5, two miles below the site of the old Locks and Dam 26 which was razed in 1990. It is approximately 20 miles above St. Louis. The pool length is 40.6 miles and accounts for 31,000 acres.

The complex has twin locks. The main lock is 110 by 1,200 feet; the auxiliary lock is 100 feet by 600 feet. The locks are U-shaped and supported on steel H-piles. The maximum lift is 24 feet.

The movable dam has nine, open-frame, non-submersible Tainter gates, each 42 feet high by 110 feet long. Individual, electrically operated, cable hoists are housed in pier-top operating houses. The 1,160-foot-long movable dam is supported by steel H-piles driven into bedrock.

History/Significance

The lock was put into operation on October 10, 1989. The complex is also known as Locks and Dam 26R and constitutes the first replacement of an original installation of the 9-Foot Channel Project.

The basic components of the complex are similar to those built in the 1930s. The most striking difference is the immense size of the new structure, which dwarfs the older installations. But the significance of the new installation is not limited to its colossal size. Throughout its design and construction, the Corps and various contractors engaged in an extensive program of computer-assisted design, testing, and evaluation to create a structure that represents the present state-of-the-art in river navigation control works.

Co-located with the lock is the National Great Rivers Museum, which opened in October 2003. The museum is a USACE Class A regional visitor center (one of 9), averaging over 80,000 visitors a year.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	77,580,836	2004	67,672,535
2000	77,120,885	2005	66,536,490
2001	75,870,386	2006	70,759,977
2002	79,037,946	2007	65,248,495
2003	72,442,623	2008	56,295,661

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	6,628,688
Petroleum	4,537,453
Chemicals	8,391,478
Crude Materials	8,152,264
Manufactured Goods	3,496,538
Farm Products	24,697,719
Manufactured Machinery	289,352
Waste Material	3,200
Containers & Pallets	0
Unknown	98,969

Subtotals:	
Grain	20,821,029
Steel	2,472,731
Lockages:	
Boats:	6,799
Cuts:	6,259

Current Maintenance Issues – (Melvin Price Locks and Dam)

Item (Critical Rank Order)

Lock Maintenance Bulkheads - Fracture Critical Weld Repairs
Perform Modifications to Deficiencies on Miter Gates (ARRA Funded)
Rehabilitate/Repower Emergency Bulkhead Crane
Rehabilitate Spur Dike
Miter Gate Direct Acting Cylinders - Replace Old Gear and Sector with Direct Acting
Rehabilitate and Paint Tainter Gates, Dam
Rehabilitate Miter Gate Cylinders
Upgrade CCTV Camera System
Concrete Repairs - Repair and Seal Top of Lock Walls (ARRA Funded)
Rehabilitate entire Project on Lock Walls Handrail Anchorage
Replace/Install Plastic Fenders or Wood on Miter Gates (ARRA Funded)
Critical Signs – Fabricate and Install to Conform to Safety Standards (ARRA Funded)
Repair Track System on Emergency Bulkhead Overhead Crane
Silt Removal on Auxiliary Lock (ARRA Funded)
Replace Mobile Hydraulic Crane
Upgrade Lock Wall Grating for Crane Access to Support Weight of Crane
Rehabilitate Trilateration Stations (ARRA Funded)
Inspect Culvert Valves
Upgrade Local Control Houses, Control Consoles and PLC
Rehabilitate Operator Tower Window

TOTAL ESTIMATED COST $9,464,000

The maintenance needs of the aging infrastructure are increasing at a rate much greater than the operations and maintenance funding provided for the system. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, and consumers, and commodities investors.

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Point of Contact

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US Army Corps of Engineers ®
St Louis District

Locks and Dam 27
(Granite City, Illinois)
Mississippi River

General Contractors:
Lock: River Construction Corporation
Dam: Unknown
Construction: 1947-1964
Congressional Districts: MO-1; IL-12

Description

Locks 27 is located at Mississippi River mile 185.5 near the southern end of the 8.4-mile long Chain of Rocks Canal. The dam is located at Mississippi River mile 190.2 immediately downstream from Homer Dike, Intake Towers 1 and 2 of the St. Louis Water Works, the Chain of Rocks Highway Bridge, and the Interstate Highway 270 Bridge. The pool length is 15.6 miles and accounts for 489 acres (canal only).

Locks 27 has twin locks, a main chamber and an auxiliary chamber. The main lock chamber is 1,200 feet long by 110 feet wide. The auxiliary chamber measures 600 feet long by 110 feet wide. Both locks were excavated to bedrock, which serves as the lock chamber floors.

The dam is 2,500 feet in length and is a non-movable low-water dam which extends entirely across the river.

History/Significance

The canal and locks were put into operation in February 1953.

Locks 27 is unique for several reasons. Constructed between 1946 and 1953, these locks are the only locks on the upper Mississippi River that are not directly attached to their respective dam. The dam is located several miles away on the river, whereas the locks are within the Chain of Rocks Canal. The dam itself is also unlike any of the other dams in the system. All other dams in the system were built to be moveable, so they could be adjusted according to the changing water level. Dam 27 is not so complex; it is a 2,500 foot non-movable low water fixed crest rock dam extending across the river and was designed to provide additional water depth at the lower gate sills of Lock 26. Constructed between 1959 and 1964, the dam has virtually no impact upon operations within the Chain of Rocks Canal or at Locks 27.

Since the locks are the last on the upper Mississippi River, they move more cargo than any other navigation structure on the River. This is why it incorporates two lock chambers, of which the main lock can accommodate a full tow of 15 barges.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	83,378,714	2004	71,169,714
2000	82,633,959	2005	68,369,897
2001	81,090,628	2006	73,361,655
2002	83,825,396	2007	67,714,832
2003	77,466,308	2008	58,545,560

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	6,309,071	Subtotals:	
Petroleum	6,997,940		
Chemicals	7,907,768	Grain	20,500,616
Crude Materials	8,046,448	Steel	2,778,103
Manufactured Goods	3,748,521		
Farm Products	25,161,726	Lockages:	
Manufactured Machinery	302,962		
Waste Material	3,100	Boats:	8,001
Containers & Pallets	0	Cuts:	7,549
Unknown	67,364		

Current Maintenance Issues – Locks & Dam 27

Item (Critical Rank Order)

Install Lift Gate Leaves Main (ARRA funded)*
Rehabilitate / Replace Culvert Valves (ARRA Funded)*
Install Bulkhead Slots
Install Replacement Walkway Bridge Aux
Install Replacement Walkway Bridge Main
Replace Miter Gate (ARRA funded)*
Install Lift Gate Leaves Aux
Rehabilitate/Replace Culvert Valve machinery (ARRA funded)*
Sill Stability Anchorage (ARRA funded)*
Replace Protection Cells (ARRA funded)*
Install Walkway Bridge Machinery
Rehabilitate Embedded Metals
Clean out and Replace Valves in Float Well Pits
Concrete Repairs - Repair and Seal Top of Lock Walls
New/Replacement I-Wall Control House - New/Replacement (ARRA funded)
Inspect Culvert Valves
Critical Signs - Fabricate and Install to Conform to Safety Standards (ARRA funded)
Install CCTV for Lock Operation
Paint Miter Gates, Auxiliary Lock
Modify Counterweight Basket
Replace and Demolish Obsolete Visitor Platform and construct adjacent maintenance facility
Rehabilitate Trilateration Stations

*Approved in Locks 27 Major Rehabilitation

TOTAL ESTIMATED COST: $12,121,000

American Recovery and Reinvestment Act of 2009 will completely fund the major rehabilitation of Locks 27.

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs of the aging infrastructure increase. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

Point of Contact

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US Army Corps of Engineers ®
Rock Island District

Thomas J. O'Brien (Chicago, Illinois) Calumet River

Construction: 1957-1960
Congressional District: IL-2

Description

Thomas J. (T.J.) O'Brien Lock and Dam is 326.0 miles above the confluence of the Illinois River with the Mississippi river at Grafton, Illinois. It is approximately 35 miles upstream of the Lockport Lock and Dam, in the southeastern portion of Chicago.

O'Brien is located at the entrance to Lake Michigan in Chicago. The facility is a unit of the Inland Waterway Navigation System and is one of eight such facilities between Chicago and Versailles, Ill. It is composed of a navigational lock, fixed dam, and controlling works.

O'Brien is a low-lift sector gate lock. It provides a maximum lift of five feet for traffic passing from Lake Michigan to the Calumet River. The lock chamber is 1,000-feet long by 110-feet wide. The dam is 296.75 feet long. The controlling works consist of four large vertical slide gates (10 feet square) located near the center of the dam to regulate water flow. There are also two sets of sector gates weighing 216 tons each at both the river and lake ends. These are unique on the Illinois Waterway and; consequently, there is no need for tunnels in the lock walls.

T.J. O'Brien Lock and Dam controls the movement of water between Lake Michigan and the Calumet River while maintaining navigation. The lock and dam are used for flood control and waterway flushing, and also function as components of the diversion control system.

History/Significance

The lock opened in 1960. The lock and dam elements of the complex were completed at a cost of $6,954,700. In 2007, the complex would have cost $66,400,000 to build.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	7,371,509	2004	9,674,528
2000	8,436,175	2005	9,048,078
2001	6,778,306	2006	9,482,367
2002	7,618,898	2007	7,294,890
2003	6,975,080	2008	6,822,254

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	2,426,000	Subtotals:	
Petroleum	411,200		
Chemicals	212,700	Grain	273,100
Crude Materials	1,644,600	Steel	1,375,518
Manufactured Goods	1,754,018		
Farm Products	314,700	Lockages:	
Manufactured Machinery	43,586		
Waste Material	3,600	Boats:	17,532
Unknown	11,850	Cuts:	6,309

Current Maintenance Issues – Thomas J. O'Brien

Item (Critical Rank Order)

Lock - Major Rehabilitation
Lock & Dam - Major Maintenance
Install New High Mast Lighting
Systemic Filling Valve Replacement
New Maintenance Building

TOTAL ESTIMATED COST: $34,200,000

After 48 years of service, reliability, and operation, problems are a recurring threat and have significant impacts to the navigation users. A plan to reduce the width of the Chicago River in the City of Chicago, near the Chicago Lock, has already rerouted the barge traffic using the Chicago Lock to the O'Brien Lock.

Although this will not cause a significant change in traffic flow, it does mean that O'Brien will be the only commercial access from the Illinois Waterway to Lake Michigan.

Frequent flooding and temperature extremes, combined with high usage, has resulted in significant deterioration of lock concrete and the decline of mechanical and electrical systems performance and reliability. The vertical concrete has deteriorated to the point that sections have had to be removed and/or threaten to fall into the lock chamber. Barges can become wedged under the armor, resulting in a dangerous situation for deck hands, lock personnel, and potential damage to the barges. Hazardous working conditions exist due to deteriorated horizontal concrete on the land and river walls of the lock chamber. The mechanical and electrical systems require constant patching and labor intensive repairs. Parts are difficult to obtain and have to be specially made in most cases. The probability of failure of the mechanical and electrical systems requiring extensive and expensive repairs in the next several years is very high. The potential at any time for an incident to occur due to deteriorated lock concrete, in which the lock had to be closed for more than a week, is very probable with the potential increasing every year the lock concrete is not rehabilitated.

A Rehabilitation Evaluation Report was approved in 2004, and we are awaiting a new construction start.

Significant features of the work include rehabilitation of the sector gate electric system, the lock electrical distribution system, and injection grouting of the lock land & river walls. The existing lock mechanical and electrical systems are original equipment installed in the 1960s. The electric power utility service was upgraded in 1998, but the other components have been in operation since the original construction of the lock. An electrical component failure of the lock electrical distribution system or the sector gate electrical system could result in lock failure, which could cause delays to navigation traffic. The sheet piling for the lock land wall and river walls have also been in service since the original construction of the lock. Should one of the sheet pile cells rupture, the lock would have an unscheduled closure to navigation for a minimum of 60 days. The repair costs are estimated at $530,000 and the transportation impacts associated with a 60-day closure would approach $18.1 million dollars. New lock dewatering bulkheads are needed to replace the old set of bulkheads that has been decommissioned due to age and deterioration.

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September 2009

US Army Corps of Engineers ®
Rock Island District

Lockport
(Lockport, Illinois)
Chicago Sanitary & Ship Canal

Construction: 1923-1933
Congressional District: IL-13

Description

Lockport Lock and Dam is 291.0 miles above the confluence of the Illinois River with the Mississippi river at Grafton, Illinois. The complex is two miles southwest of the city of Lockport, Illinois.

The lock is 110 feet wide by 600 feet long. Maximum vertical lift is 42.0 feet, the average lift is 39 feet. It averages 22.5 minutes to fill the lock chamber; 15 minutes to empty.

The Corps of Engineers controls the lock at Lockport. The Lockport Dam consists of the Metropolitan Water Reclamation District of Greater Chicago lock, powerhouse and associated controlling works. The Corps has no ownership of the controlling works; however, it has the responsibility to maintain the foundation, piers, dolphins and all the concrete at the Lockport Controlling Works and the gravity structure at the dam.

Rehabilitation of the lock was completed in 1989 at a cost of $22,681,000.

History/Significance

The lock opened in 1933. Lockport Lock was one of five designed and partially constructed by the state of Illinois over a period from 1923 to 1930. The complex was about 97 percent complete when construction was turned over to the federal government due to state financial difficulties.

The government, by the authority of the Rivers and Harbors Act of 1930, completed construction of the lock in 1933. The opening of the Lockport Lock coincided with the opening of the downstream Brandon Road, Dresden Island, Marseilles, and Starved Rock locks and dams. The total cost of the lock was $2,153,867, of which $2,020,259 was state funded and $133,608 was funded by the federal government.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	16,039,564	2004	17,341,066
2000	16,788,986	2005	16,929,707
2001	15,970,297	2006	17,253,650
2002	16,872,206	2007	13,507,517
2003	15,310,005	2008	12,460,893

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	1,699,283	Subtotals:	
Petroleum	1,945,905		
Chemicals	1,628,068	Grain	264,492
Crude Materials	4,969,091	Steel	1,231,956
Manufactured Goods	1,697,343		
Farm Products	406,223	Lockages:	
Manufactured Machinery	85,625		
Waste Material	3,100	Boats:	3,469
Containers & Pallets	4,500	Cuts:	3,378
Unknown	21,755		

Current Maintenance Issues – Lockport

Item (Critical Rank Order)

Channel Concrete Wall - Major Rehabilitation (ongoing, 35% complete – remaining $88 million partially funded by ARRA)
Lock Emergency Gate Hydraulic System Rehabilitation
Lock Emergency Gate Replacement
Systemic Miter Gate Replacement
Systemic Miter Gate Machinery Replacement
Bulkhead Design - Vertical Sluice Gate
Systemic Filling Valve Replacement
Replace Lock Controlling Works
Major Maintenance - Spillway Design & Construction
Power House Guide Wall Rehabilitation
New Maintenance Building

TOTAL ESTIMATED COST: $127,500,000

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs of the aging infrastructure increase. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors. Ongoing rehabilitation of the channel concrete wall will result in construction zones and width restrictions over the next two years.

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US Army Corps of Engineers ®
Rock Island District

Brandon Road (Joliet, Illinois) Des Plaines River

Construction: 1927 -1933
Congressional District: IL-11

Description

Brandon Road Lock and Dam is 286 miles above the confluence of the Illinois River with the Mississippi river at Grafton, Illinois. The complex is located 27 miles southwest of Chicago; 2 miles southwest of Joliet, Illinois, near Rockdale.

The lock is 600 feet long, 110 feet wide. Nominal lift is 34 feet with an average 19-minute lock chamber fill time; 15-minute emptying time. The dam is 2,391 feet long (exclusive of fixed embankment and river wall). It contains 21 operational Tainter gates (50 feet wide by 2 feet, 3-1/2 inches high), six sluice gates (7 feet, 9 inches wide x 8 feet, five inches high, bulkheaded closed), and 16 pairs of 16 feet high by 15 feet wide headgates (eight operational, eight bulkheaded closed).

From the upper limits of the city of Joliet to Brandon Road Lock and Dam, the Illinois Waterway is contained between concrete gravity walls which are from 15 to 40-feet high. The walls extend approximately three miles upstream from the lock and dam. Failure of these walls could result in flooding Joliet. Repair of the deteriorated walls and manholes was completed from 1985-1988. In 2007, the Corps began a multi-million dollar, multi-year program to repair and reinforce the walls to ensure their continued integrity.

History/Significance

The lock opened in 1933. Brandon Road Lock and Dam was one of five designed and partially constructed by the state of Illinois over a period from 1927 to 1930. The complex was about 70 percent complete when construction was turned over to the federal government due to state financial difficulties.

The government, by the authority of the Rivers and Harbors Act of 1930, completed construction of the lock in 1933. The lock and dam elements of the complex were completed at a total cost of $4,500,000, of which $2,031,683 were state funds and $2,434,748 were federal funds.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	16,073,774	2004	17,656,488
2000	16,939,884	2005	17,341,109
2001	16,418,031	2006	17,811,849
2002	17,177,894	2007	13,862,037
2003	15,784,153	2008	12,665,246

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	1,725,583	Subtotals:	
Petroleum	1,969,148		
Chemicals	1,633,958	Grain	264,292
Crude Materials	5,126,266	Steel	1,233,956
Manufactured Goods	1,694,843		
Farm Products	409,443	Lockages:	
Manufactured Machinery	75,850		
Waste Material	3,100	Boats:	3,529
Containers & Pallets	4,500	Cuts:	3,464
Unknown	22,555		

Current Maintenance Issues – Brandon Road

Item (Critical Rank Order)

Rehabilitation Evaluation Report
Tainter Gate Concrete Repairs
Systemic Miter Gate Replacement
Systemic Control Stand Replacement
Install New High Mast Lighting (ongoing, funded by ARRA)
Paint/Repair Service Bridge, Tainter Gate Section
Systemic Dam Machinery Replacement (Engineering & Design)
Systemic Filling Valve Replacement
Concrete Repairs Downstream I-Wall and Land Wall
Install Traveling Kevel and Remove Pier
New Maintenance Building

TOTAL ESTIMATED COST: $19,950,000

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs of the aging infrastructure increase. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

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US Army Corps of Engineers ®
Rock Island District

Dresden Island
(Morris, Illinois)
Illinois River

Construction: 1928-1930
Congressional District: IL-11

Description

Dresden Island Lock and Dam is 271.5 miles above the confluence of the Illinois River with the Mississippi river at Grafton, Illinois. The complex is 1-1/2 miles downstream from the mouth of the Kankakee River and about 15 miles southwest of Joliet, Illinois.

The complex consists of a gated concrete gravity dam. The total length of the lock and dam between abutments is about 1,320 feet. Lock dimensions are 110 feet wide by 600 feet long with a maximum lift of 22 feet. Average filling time of the lock chamber is 14 minutes; 12 minutes emptying time.

The dam consists of an arch dam section, a fixed spillway section, nine Tainter gates (60 feet wide by 17 feet high), 18 plugged headgates, and a 500-foot-long earthfill section with steel sheet pile cut-off wall connecting the headgate section to the Illinois and Michigan Canal embankment.

It takes two hours for water to travel from Brandon Road Lock and Dam to Dresden Island during flood or high flow conditions.

History/Significance

The lock opened in 1933. Dresden Island Lock and Dam was one of five designed and partially constructed by the state of Illinois over a period from 1928 to 1930. Excavation and masonry work began in December 1928. The complex was about 35 percent complete when construction was turned over to the federal government due to state financial difficulties.

The government, by the authority of the Rivers and Harbors Act of 1930, completed construction in 1933. The estimated cost was $2,306,000, however, the actual cost of the project was $3,915,964, of which $1,412,588 was funded by the state and $2,503,376 was funded by the federal government.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	17,761,340	2004	20,389,783
2000	18,835,137	2005	19,371,418
2001	18,876,400	2006	20,548,035
2002	18,712,254	2007	16,532,747
2003	18,556,711	2008	15,188,254

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	1,515,097	Subtotals:	
Petroleum	3,565,568		
Chemicals	2,600,250	Grain	276,199
Crude Materials	5,257,752	Steel	1,234,715
Manufactured Goods	1,648,951		
Farm Products	490,774	Lockages:	
Manufactured Machinery	80,075		
Waste Material	4,700	Boats:	3,683
Containers & Pallets	0	Cuts:	3,727
Unknown	25,077		

Current Maintenance Issues – Dresden Island

Item (Critical Rank Order)

Rehabilitation Evaluation Report
Rehabilitate Lock - I-wall Electrical Gallery
Replace Dam Gates
Systemic Miter Gate Replacement
Emergency Miter Gates for District Use
Systemic Miter Gate Machinery Replacement
Rehabilitate Tainter Gate Piers 6 and 7 (Engineering & Design)
Systemic Control Stand Replacement
Install New High Mast Lighting (ongoing, funded by ARRA)
Systemic Dam Machinery Replacement (Engineering & Design)
Systemic Filling Valve Replacement
Construct Submergible Tainter Gate
Replace Standby Generator
Repair Upstream Guidewall and Mooring Cell
New Maintenance Building

TOTAL ESTIMATED COST: $25,800,000

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs of the aging infrastructure increase. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

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US Army Corps of Engineers ®
Rock Island District

Marseilles
(Marseilles, Illinois)
Illinois River

General Contractors:
Lock: Green and Sons Company, Chicago, Illinois &
Independent Bridge Company, Pittsburgh, Pennsylvania
Marseilles Canal: Callahan Construction Company, St. Louis, Missouri
Construction: 1920-1933
Congressional District: IL-11

Description

Marseilles Lock is 244.6 miles above the confluence of the Illinois River with the Mississippi river at Grafton, Illinois, at the foot of Bells Island. Marseilles Dam is 2.5 miles upstream of the lock at the head of Bells Island.

The lock and dam is located southwest of Marseilles, Ill., near Illini State Park. The Marseilles Canal, adjacent to the left bank of the Illinois, extends from the dam to the lock. There are hydroelectric generating facilities at the dam.

The lock is 110 feet wide by 600 feet long. The maximum lift is 24.5 feet with an average lift lower than 24 feet. It takes an average of 15 minutes to fill the lock chamber; 10 minutes to empty it.

The dam is a fixed, gated-concrete, gravity dam. The main dam is 598.5-feet long with eight submersible Tainter gates (60-feet wide, 16-feet high, 25-foot radius) and Ogee spillway at Ice Chute. The gates are remotely controlled by the lockmaster at the lock. The South Channel Headrace dam is 111-feet long with one Tainter gate. The North Channel Headrace dam is 206-feet long with two Tainter gates. It takes six hours for water to travel from Dresden Island Lock and Dam to Marseilles during flood or high flow conditions.

History/Significance

The Marseilles complex was one of five begun by the state of Illinois in 1920. The dam was about 95 percent complete when construction was turned over to the federal government due to state financial difficulties. The lock was completed, except for the steel work, in August 1923. The contract for the lock gates, valves and lower approach wall was let in 1927.

Marseilles Dam was completed in 1933 at a cost $3,079,372, of which $1,796,372 was funded by the state and $1,283,000 was funded by the government.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	19,155,838	2004	21,754,394
2000	20,237,408	2005	20,139,348
2001	20,886,084	2006	21,043,379
2002	20,132,588	2007	17,221,068
2003	19,619,082	2008	15,657,070

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	1,611,365	Subtotals:	
Petroleum	3,463,125		
Chemicals	2,856,859	Grain	888,797
Crude Materials	4,817,024	Steel	1,202,697
Manufactured Goods	1,604,962		
Farm Products	1,160,359	Lockages:	
Manufactured Machinery	115,149		
Waste Material	3,100	Boats:	3,978
Containers & Pallets	0	Cuts:	3,774
Unknown	25,127		

Current Maintenance Issues – Marseilles

Item (Critical Rank Order)

- Systemic Miter Gate Replacement
- Causeway Concrete Repairs
- Rebuild Miter Gate Machinery
- Lock Concrete and Steel Repairs
- Install New High Mast Lighting
- Systemic Control Stand Replacement
- Systemic Dam Machinery Replacement (Engineering & Design)
- Systemic Filling Valve Replacement
- Lock and Dam Slope Protection Channel
- Repair Electrical Cable Trenches
- Repair Bank Scour
- Repair Concrete Upper Right Guidewall
- Lower Guidewall Rehabilitation
- Replace Standby Generator
- Remove Abandoned Lock Control House
- Sheet Piling Wall Construction
- Lock Wall Concrete Repairs
- New Maintenance Building

TOTAL ESTIMATED COST: $27,000,000

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More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

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US Army Corps of Engineers ®
Rock Island District

Starved Rock (Ottawa, Illinois) Illinois River

General Contractors:
Woods Brothers Construction Company, Lincoln, Nebraska &
Independent Bridge Company, Pittsburgh, Pennsylvania
Construction: 1926-1933
Congressional Districts: IL-11

Description

Starved Rock Lock and Dam is 231.0 miles above the confluence of the Illinois River with the Mississippi river at Grafton, Illinois. The lock and dam is located about 1.5 miles southeast of Utica, Ill.

The dam is a gated, concrete, gravity dam, 1,280 feet long. A 680-foot-long Tainter gate section contains 10 Tainter gates. The headgate section contains 30 headgates that were plugged with concrete in 1982. The 52-foot-long ice chute section of the dam includes a 52-foot-long inoperable Tainter gate. The lock is the standard 600 feet long by 110 feet wide. The maximum lift is 18.5 feet with an average lift of 17 feet. It takes approximately 12 minutes to fill the lock chamber; nine minutes to empty.

It takes two hours for water to travel from Marseilles Lock and Dam to Starved Rock during flood or high flow conditions.

History/Significance

The lock opened in 1933. Starved Rock Lock and Dam was one of five designed and partially constructed by the state of Illinois over a period from 1926 to 1930. The original contractor, selected in 1923, failed to appear for the signing of the contract documents. Land litigation issues were resolved in 1925 and a second contract was awarded in 1926. Starved Rock Lock and Dam was about 95 percent complete when construction was turned over to the federal government due to state financial difficulties.

The government, by the authority of the Rivers and Harbors Act of 1930, completed construction of the lock in 1933. The lock and dam elements of the complex were completed at a total cost of $4,462,737, of which $3,577,419 were state funds and $885,318 were federal funds.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	21,384,458	2004	23,796,648
2000	22,377,658	2005	22,070,208
2001	23,300,035	2006	23,187,461
2002	22,432,189	2007	19,052,616
2003	21,837,185	2008	17,038,590

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	1,487,044	Subtotals:	
Petroleum	3,531,954		
Chemicals	3,021,353	Grain	1,793,167
Crude Materials	5,110,550	Steel	1,229,720
Manufactured Goods	1,655,307		
Farm Products	2,103,079	Lockages:	
Manufactured Machinery	101,300		
Waste Material	4,700	Boats:	4,173
Containers & Pallets	0	Cuts:	3,959
Unknown	23,303		

Current Maintenance Issues – Starved Rock

Item (Critical Rank Order)

Lock - Concrete Repairs
Rehabilitation Evaluation Report
Systemic Miter Gate Replacement
Remove Mooring Cell
Steam Line and Boiler Replacement (ongoing)
Rebuild Miter Gate Machinery
Floating Mooring Bit Concrete Repairs
Install New High Mast Lighting
Replace Tainter Gates
Systemic Dam Machinery Replacement (Engineering and Design)
Systemic Filling Valve Replacement
Submersible Tainter Gate Construction
Repair Lower Riverwall Bullnose
Repair Upstream Guidewall
Lower Guidewall Concrete Repairs
Replace Standby Generator
New Maintenance Building

TOTAL ESTIMATED COST: $35,000,000

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs of the aging infrastructure increase. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

Point of Contact

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US Army Corps of Engineers ®
Rock Island District

Peoria
(Creve Coeur, Illinois)
Illinois River

Construction: -1939
Congressional Districts: IL-18

Description

Peoria Lock and Dam is 157.7 miles above the confluence of the Illinois River with the Mississippi river at Grafton, Illinois. The lock and dam is located four miles downstream of Peoria, Ill.

The lock is the standard 600-feet long by 110-feet wide. The maximum lift is 11 feet with an average lift of six feet. It takes ten minutes to fill or empty the lock chamber. The dam is a Chanoine wicket dam, the navigable pass type. Overall length of the dam is 570 feet. The movable dam is 432-feet long containing 108 wickets (3.75-feet wide, 16.42-feet high, 0.25-foot gap between wickets). The dam includes a single 84-foot-long submersible Tainter gate.

From 1987-1990, a major rehabilitation changed the physical components of the dam and operating procedures by replacing 26 of the original 134 wickets with a single 84-foot long submersible Tainter gate adjacent to the lock wall.

It takes two days for water to travel from Starved Rock Lock and Dam to Peoria.

History/Significance

The lock opened in 1939. Following the Supreme Court's decree of April 21, 1930, limiting the diversion of water from Lake Michigan, a new navigation plan was developed calling for removing four old locks and dams at Henry, Copperas Creek, LaGrange and Kampsville; new locks at Peoria and LaGrange, and a dam on the Mississippi River at Alton, Missouri, to provide the required navigation depth from the mouth of the Illinois to LaGrange. The lock is used only during low and moderate river flows when the wicket dams are raised to maintain the nine-foot navigation depth. During high flows, the wickets are lowered and open river conditions prevail.

Peoria is one of only two wicket dams on the Illinois Waterway. The lock and dam elements of the complex were completed at a cost of $3,381,030.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	31,143,398	2004	32,321,149
2000	31,730,582	2005	29,734,319
2001	33,668,096	2006	30,514,817
2002	32,080,328	2007	26,391,793
2003	31,878,067	2008	23,483,059

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	2,572,426	Subtotals:	
Petroleum	3,610,934		
Chemicals	4,323,775	Grain	4,971,473
Crude Materials	4,737,417	Steel	1,445,215
Manufactured Goods	1,886,049		
Farm Products	6,196,435	Lockages:	
Manufactured Machinery	111,746		
Waste Material	10,800	Boats:	3,889
Containers & Pallets	0	Cuts:	4,034
Unknown	33,477		

Current Maintenance Issues – Peoria

Item (Critical Rank Order)

Cut Bulkhead Slots
New Maintenance Building
Permanently Close Butterfly Valves
Add Guide Cells
Repair Horizontal Concrete & Riprap above Weir
Motor Vessel Sangamon Replacement
Emergency Stackable Miter Gates
Systemic Filling Valve Replacement
Paint Tainter Gate, Service Bridge and Machinery
Systemic Miter Gate Replacement

TOTAL ESTIMATED COST: $22,900,000

The Water Resources Development Act of 2007 (WRDA 07) Title VIII authorized the dual-purpose navigation and ecosystem restoration plan for the Upper Mississippi River and Illinois Waterway. The new 1,200-foot lock, which is located landside, will cost approximately $262,000,000. The design and construction of the new lock is dependent upon annual appropriations.

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s and extends down the Upper Mississippi River from Minneapolis-St. Paul to its confluence with the Ohio River and up the Illinois Waterway to the Thomas J. O'Brien Lock in Chicago. It includes 37 Locks and approximately 1,200 miles of navigable waterway in Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint which triples lockage times and exposes deckhands to increased accident rates.

More than 580 manufacturing facilities, terminals, and docks ship and receive tonnage in the Upper Mississippi River basin. In 2005, the system moved more than 160 million tons of commercial cargo worth roughly $28.5 billion. Grains (corn and soybeans) dominate traffic on the system. Other commodities, mainly cement and concrete products, comprise the second largest group. A modern 15-barge tow transports the equivalent of 1,050 large semi-trucks (26,250 cargo tons, 875,000 bushels, or 17,325,000 gallons). Annually, the project generates an estimated $1 billion of transportation cost savings compared with the operation and maintenance costs of approximately $115 million.

In constant dollar terms, operations and maintenance funding for the system has been largely flat or declining for decades, while maintenance needs of the aging infrastructure increase. This is adversely affecting reliability of the system. Long-established programs for preventative maintenance of major lock components have essentially given way to a fix-as-fail strategy, with repairs sometimes requiring weeks or months to complete. Depending on the nature of a lock malfunction, extended repairs can have major consequences for shippers, manufacturers, consumers, and commodities investors.

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US Army Corps of Engineers ®
Rock Island District

LaGrange
(Versailles, Illinois)
Illinois River

Construction: 1936-1939
Congressional Districts: IL-18

Description

LaGrange Lock and Dam is 80.2 miles above the confluence of the Illinois River with the Mississippi river at Grafton, Illinois, 7.8 miles below Beardstown, Illinois.

LaGrange Lock and Dam consists of a 1,066-foot-long dam and a 110-foot-wide by 600-foot-long lock. The maximum lift is 10 feet with an average lift of 4.5 feet. It takes approximately 10 minutes to fill or empty the lock chamber.

LaGrange uses a Chanoine wicket dam, the navigable pass type. The wicket section is 436 feet long containing 109 wickets. Each wicket is 3.75 feet wide by 14.92 feet high, with a .25-foot gap between wickets. From 1987-1991, a major rehabilitation changed the physical components of the dam and operating procedures by replacing 26 of the original 135 wickets with a single 84-foot long submersible Tainter gate adjacent to the lock wall.

It takes 24-36 hours for water to travel from Peoria Lock and Dam to LaGrange during flood or high flow conditions.

History/Significance

The lock opened in 1939. Following the Supreme Court's decree of April 21, 1930, limiting the diversion of water from Lake Michigan, a new navigation plan was developed calling for removing four old locks and dams at Henry, Copperas Creek, LaGrange and Kampsville; new locks at LaGrange and Peoria, and a dam on the Mississippi River at Alton, Illinois, to provide the required navigation depth from the mouth of the Illinois to LaGrange. The lock is used only during low and moderate river flows when the wicket dams are raised to maintain the nine-foot navigation depth. During high flows, the wickets are lowered and open river conditions prevail.

LaGrange is one of only two wicket dams on the Illinois Waterway. The lock and dam elements of the complex were completed at a cost of $2,744,592.

Annual Tonnage (10-Year Historical)

Year	Tons	Year	Tons
1999	35,59,7851	2004	34,681,667
2000	35,164,245	2005	31,708,944
2001	36,729,826	2006	32,903,584
2002	35,858,094	2007	29,046,034
2003	35,136,029	2008	26,690,243

(More Information On The Reverse Side)

Commodity Tonnage & Lockages (2008)

Coal	1,640,338	Subtotals:	
Petroleum	3,547,872		
Chemicals	4,671,493	Grain	8,067,608
Crude Materials	4,928,080	Steel	1,470,904
Manufactured Goods	1,913,290		
Farm Products	9,874,133	Lockages:	
Manufactured Machinery	61,542		
Waste Material	13,700	Boats:	2,853
Containers & Pallets	0	Cuts:	3,177
Unknown	39,795		

Current Maintenance Issues – LaGrange

Item (Critical Rank Order)

Lock - Major Rehabilitation
Lock - Major Maintenance
Systemic Miter Gate Replacement
Permanently Close Butterfly Valves
Add Guide Cells
Paint Dam Tainter Gate, Service Bridge, and Machinery
Motor Vessel Beardstown Replacement
Emergency Stackable Miter Gates
Systemic Filling Valve Replacement
Office and Maintenance Building

TOTAL ESTIMATED COST: $78,800,000

The Water Resources Development Act of 2007 (WRDA 07) Title VIII authorized the dual-purpose navigation and ecosystem restoration plan for the Upper Mississippi River and Illinois Waterway. The new 1,200-foot lock, which is located landside, will cost approximately $261,000,000. The design and construction of the new lock is dependent upon annual appropriations.

For more than 65 years, the lock has been exposed to multiple freeze/thaw cycles and flooding, causing a gradual but incessant degradation of the lock components. Frequent flooding and temperature extremes, combined with high usage, has resulted in significant deterioration of lock concrete and the decline of mechanical and electrical systems performance and reliability. The vertical concrete has deteriorated to the point that sections have had to be removed and/or threaten to fall into the lock chamber. Barges can become wedged under the armor, resulting in a dangerous situation for deck hands, lock personnel, and potential damage to the barges. Hazardous working conditions exist due to deteriorated horizontal concrete on the land and river walls of the lock chamber. The mechanical and electrical systems require constant patching and labor intensive repairs. Parts are difficult to obtain and have to be specially made in most cases. The probability of failure of the mechanical and electrical systems, requiring extensive and expensive repairs, in the next several years is very high. The potential at any time for an incident to occur due to deteriorated lock concrete, in which the lock had to be closed for more than a week, is very probable with the potential increasing every year the lock concrete is not repaired. In 2004, an expert panel concluded that the lock concrete was in need of rehabilitation at the earliest possible opportunity.

Bulkhead slots are needed on the downstream end of the lock to allow for lock dewatering with bulkhead sections. As there are currently no bulkhead sections available on the Illinois Waterway, a set would need to be purchased under this project for lock dewatering during the rehabilitation. A Rehabilitation Evaluation Report was approved in 2005 with an estimated total cost of $64 million. A preliminary schedule of work was developed with construction spanning over a three year period. Three lock closures will be required of approximately 30 days each with two of the three closures involving lock dewatering.

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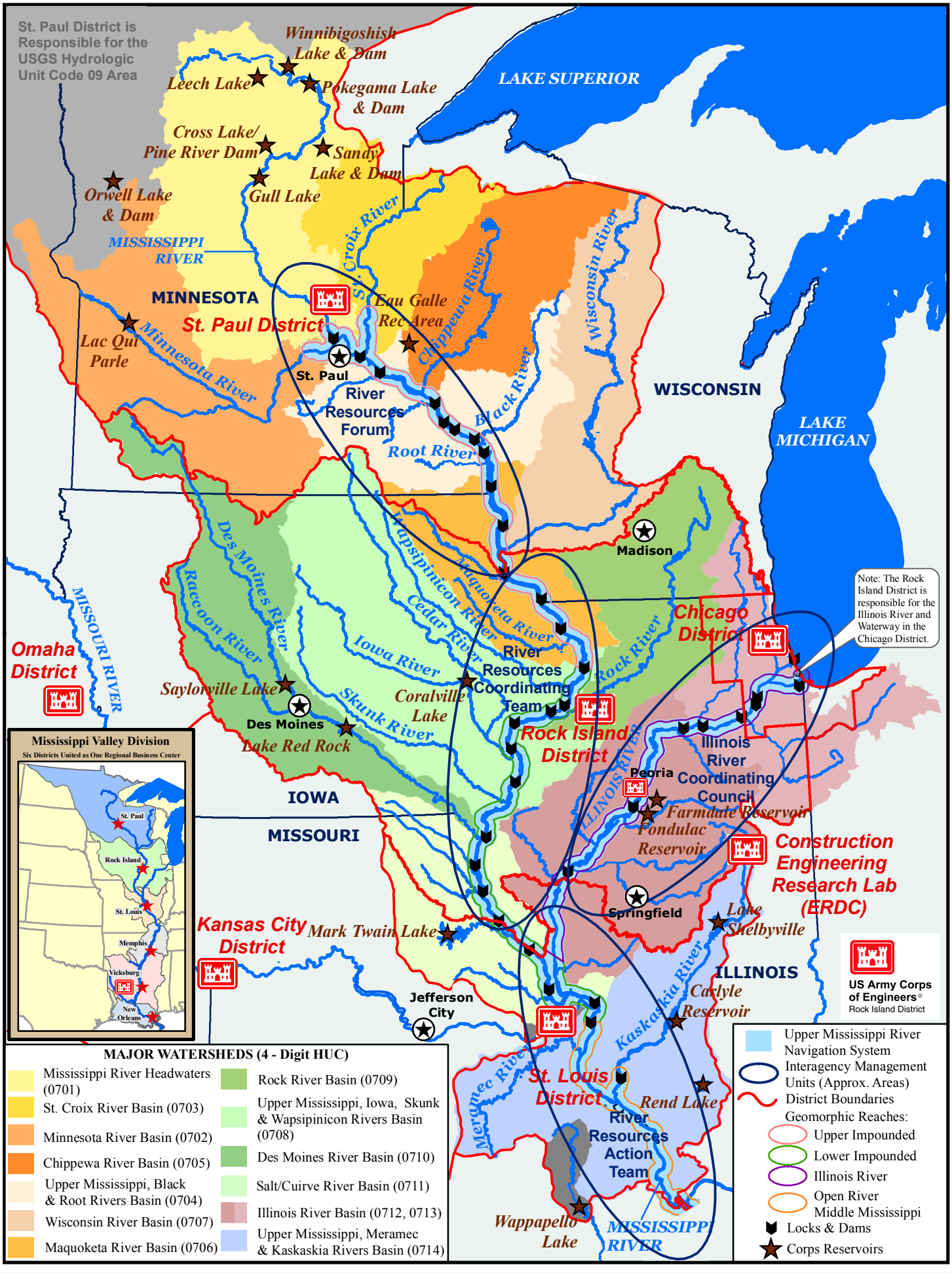
September 2009

The Upper Mississippi River Basin

U.S. Geological Survey Hydrologic Unit Code (HUC) 07



US Army Corps of Engineers®
Mississippi Valley Division

The Upper Mississippi River System

The Upper Mississippi River System (UMRS) is a vital part of our national economy and a valuable ecological resource. The system includes the Upper Mississippi River from Minneapolis, Minnesota, to Cairo, Illinois; the Illinois Waterway from Chicago to Grafton, Illinois; and navigable portions of the Minnesota, St. Croix, Black and Kaskaskia Rivers. The UMRS ecosystem encompasses the entire floodplain area and associated physical, chemical, and biological components. The Upper Mississippi River – Illinois Waterway (UMR-IWW) navigation system includes 1,200 miles of 9-foot navigation channel, 37 lock and dam sites, and thousands of channel training structures. The 1,200 miles of 9-foot channel created by the locks and dams allow waterway traffic to move from one pool to another providing an integral regional, national, and international transportation network.

The existing 9-foot Channel Navigation Project was largely constructed in the 1930s. The system's 600-foot locks do not accommodate today's modern tows without splitting and passing through the lock in two operations. This procedure requires uncoupling barges at midpoint, which triples lockage times and exposes deckhands to increased accident rates.

The Future

Ensuring the economic, environmental and social prosperity and sustainability of the UMRS will require a concentrated and continued investment along with purposeful and collaborative river stewardship and management. The UMR-IWW navigation system requires three major elements to ensure sustainability: (1) continuous regular operations and maintenance ($120 million/year), (2) periodic major rehabilitation of Locks and Dams ($65 million/year) and (3) efficiency and modernization improvements authorized under the Navigation and Ecosystem Restoration Program (NESP) ($150-200 million/year). The UMRS ecosystem is comprised of hundreds of thousands of acres of bottomland forests, islands, backwaters, side channels and wetlands that support a nationally significant assemblage of birds, mammals, amphibians, reptiles, mussels, fish and plants. It is a place for this and future generations to learn how to restore and maintain a "living river" in the face of an ever growing human population. The lessons learned in more than a half century of study and application of large river function, form and restoration have provided us with the necessary tools, knowledge and experience to effectually protect, preserve and enhance environmental conditions necessary for ecological health and sustainability of this national treasure.

The recently authorized Navigation and Ecosystem Sustainability Program is a long-term program to provide for navigation efficiency and environmental sustainability, and ecosystem restoration for the Upper Mississippi River System over a 50-year period. The primary opportunities are to reduce or eliminate commercial traffic delays and improve the national and regional economic conditions while restoring, protecting, and enhancing the environment. The primary goal of the program (authorized by Congress in the Water Resources Development Act of 2007) is implementation of an integrated, dual-purpose plan to ensure the economic and environmental sustainability of the UMRS.

The program includes a long-term framework for navigation efficiency improvements and ecosystem restoration. The program includes small-scale structural and nonstructural measures; new 1,200-foot locks at seven sites; lock extensions; appropriate measures to avoid, minimize, and mitigate for environmental impact; and system-wide ecosystem restoration projects. NESP will be implemented through an adaptive management and anticipatory engineering approach that will include checkpoints requiring future reporting to the Administration and Congress, and will be administered by the Corps of Engineers in full collaboration and partnership with the other federal and state agencies and stakeholders involved in management of the Upper Mississippi River System.

For More Information

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September 2009