

→ PROJECT REVIEWS



**PIANC Workshop
15-16th October 2009**

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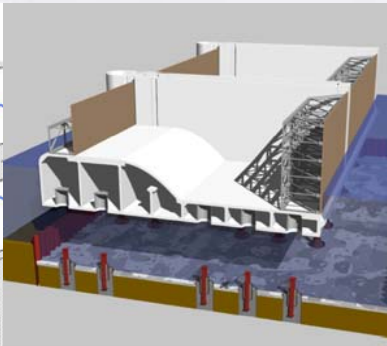
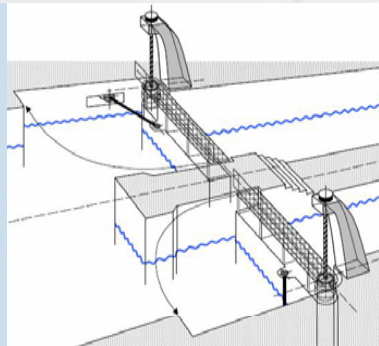
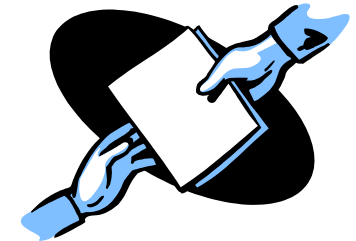
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PROJECT REVIEWS

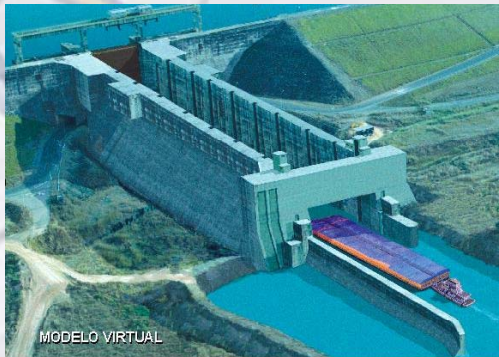
- A valuable asset of Report 106 is the detailed collection of case studies.
- A selection of 56 projects worldwide containing facts, photographs and technical drawings.
- A summary is mentioned in the report.
- The full reviews are available on the enclosed DVD. (65 MB, 750 pages !!)





PROJECT REVIEWS

- Innovative features or unusual aspects.
- good view of type of innovations and state of technology.
- Illustrate the subjects covered in the report.





PROJECT REVIEWS

- How to find these within report 106 ?
 - Chapter 2
 - Summary table (in the back of Chapter 2)
 - List of files at DVD
 - Contact the author or responsible organizations.



SUMMARY TABLE (CHAPTER 2)

Project Reviews	Hydraulics		O & M				Environmental				Design / Construction					Misc.				
	Filling and Emptying Systems	Water Management (Water Saving Basins)	Energy Management	Life Cycle Cost	Maintenance	Vessel Operations and Impact	Silt and Debris Mitigation	Environmental Concerns	Salt Water Intrusion	Ice Control	Fish Mitigation	Design Guidance	Lock Size, Cycle & Capacity.; Vessel Geometry, Lock cycle	Struct Systems – Fdns, Lock Walls, approaches	New Materials	Gates – materials, systems, type	Construction Means and Methods	Renovation, Rehab & Size Modifications	Lock Equipment	Communications – 3D modeling
1	1-01	Kallo Sea Lock			PT	PT					PT					UT	UT			
2	1-03	Self-Propelled Floating Lock													AC					
3	1-04	High-Rise Navigation Lock	AC												AC					
4	1-05	Van Cauwelaert Lock					PT								PT		PT			
5	2-01	Tucurui Lock		PT								PT								
6	2-02	Lajeado Lock	PT									PT								
7	3-02	Grand Canal	PT									PT								PT
8	3-04	Jinjitan	PT																	PT
9	3-05	Mengli	PT																	
10	3-06	Qiaogong	PT																	PT
11	3-08	Three Gorges	PT									PT	PT		PT					
12	4-01	Juankoski Canal			PT		PT						PT			PT		PT		
13	4-02	Keitele	PT		PT	PT	PT					PT	PT							
14	4-03	Saarikoski																PT		
15	4-04	Saimaa				PT	PT				PT				PT				PT	
16	5-01	Composite Miter Gates - Golbey			PT	PT					PT			PT	PT		PT			
17	5-02	Composite Vertical Lift Gate				NC									NC	NC				
18	5-03	Gate Protection - Rhone lock			PT		PT				PT		PT	PT	PT					
19	5-04	Horizontal Translation Gate									PT				PT					
20	5-05	Rhone Chautagne et Belley					UT				PT									
21	5-06	Rhone Locks Stoplogs Protection				PT													PT	
22	5-07	Seine-Nord Europe	PT	PT		PT									PT	UT				
23	5-08	Rhone Fish Ladder Lock	PT							UT										

Impression of the Summary table



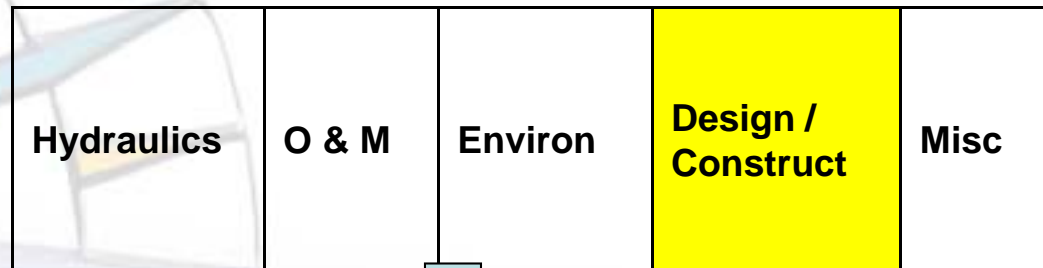
CATEGORIES

- PT: Proven technology
- UT: Unproven technology
- NC: New Concept
- AC: Advanced concept

PT	¹ Proven Technology (PT) – The feature has been built and validated by time and experience
UT	² Unproven Technology (UT) – The feature has been built but it has not yet been validated by time and experience.
NC	³ New Concept (NC) – The feature is currently in the design process, but has not yet been built.
AC	⁴ Advanced Concept (AC) – the feature is been evaluated and/or tested in the research stage.



AREAS OF INNOVATION



Aspects:

- Hydraulics: Filling and emptying, water saving.
- Ops & Maintenance: Energy, LCC, Vessel ops & impact.
- Environmental: General, salt water, ice control, fish migration
- Design & Construct: Structure, materials, gates, construction methods.
- Miscellaneous: Lock equipment, communic, 3D models, public safety



SOME TYPICAL EXAMPLES

These examples give a short overview of the different types of locks and of the different types of innovation as can be found in the Chapter Project Reviews and on the available DVD.

WG29 - LOCK INNOVATIONS



UK - Falkirk Wheel (10-04)



Areas of Innovation

Hydraulic	O & M	Environ	Design / Construct	Misc
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Lock Dimensions

Length	22	Lift:	33.5m
Width:	6	Depth	1.5

D = 35 metres.

No actual lock (a ship lift), but characteristic for its principle, its aesthetic design and its multiple purpose, which includes tourism.

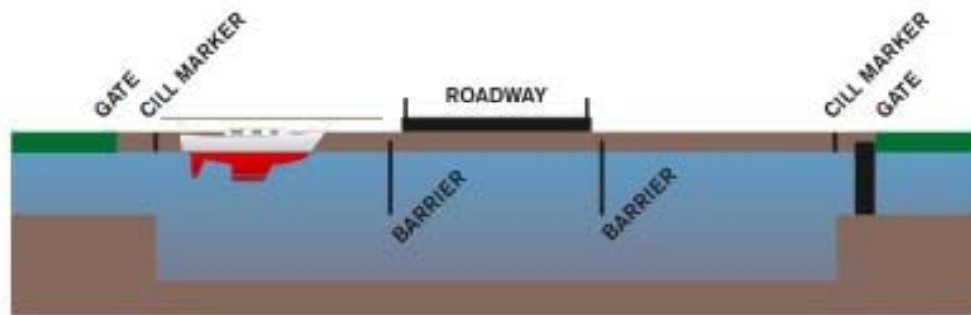
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WG29 - LOCK INNOVATIONS



UK - Dalmuir Drop Lock (10-03)



An innovative use of existing techniques can be seen at the Drop Lock. Vessels are temporarily lowered, just to cross the road underneath.

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Areas of Innovation

Hydraulic	O & M	Environ	Design / Construct	Misc
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Lock Dimensions

Length		Lift:	
Width:		Depth	



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FIN - Juankoski Canal (4-01)



Areas of Innovation

Hydraulic	O & M	Environ	Design / Construct	Misc
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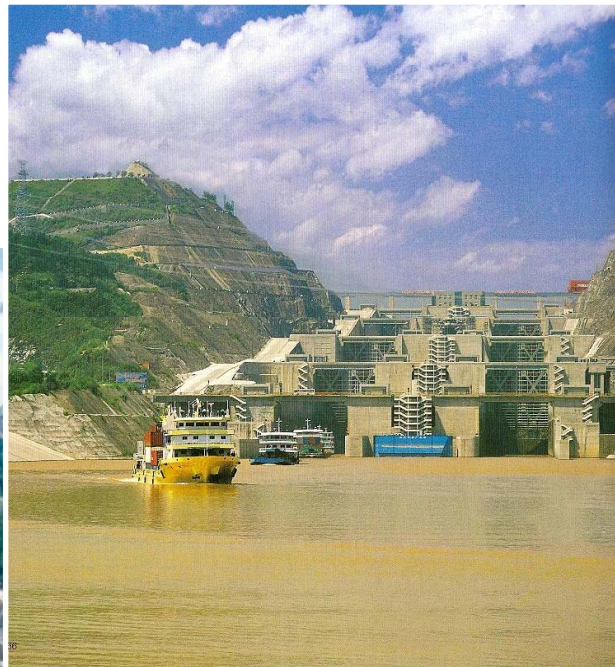
Lock Dimensions

Length	35 m	Lift:	6 - 6.5 m
Width:	8 m	Depth	2.4 m

Where locks are built in rock, concrete walls do not always need to be used.

In those cases it is possible to use only a floating pontoon to moor the ships during lockage.

China – Three Gorges



Areas of Innovation

Hydraulic	O & M	Environ	Design / Construct	Misc
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Lock Dimensions

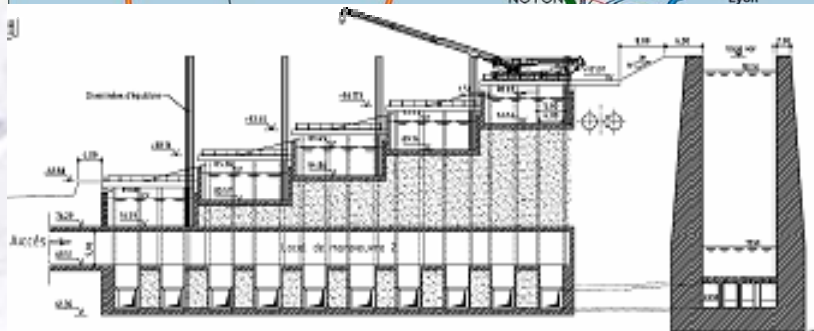
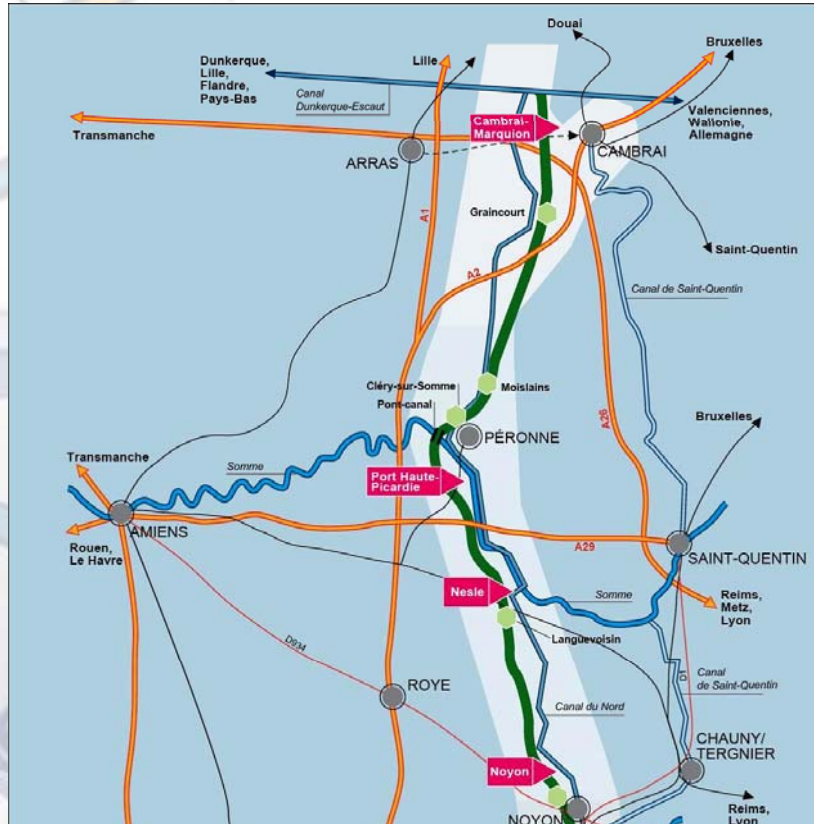
Length:	1,621.0 m	Lift:	113.0 m
Width:	34.0 m	Depth:	5.0 m

With a total lift of 113 m and a max. water head of 45.2 m, the Three Gorges locks are in height the largest locks in the world.

Apart from its dimensions, also the Filling and Emptying system and the prevention of Cavitation are major innovative aspects.



France - Seine-Nord Europe



Areas of Innovation

Hydraulic	O & M	Environ	Design / Construct	Misc
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(Lock) Dimensions

Length	106 km	Lift:	15 - 30 m
Width:	12.5 m	Depth	

A new canal of 106 km long with 7 standardized locks will become an important connection between France and Northern Europe.

The major challenge in this project is the Water Resources Management.

- Water saving basins
- Pumping plants
- Watertight canal



Panama - Canal Expansion



Areas of Innovation

Hydraulic	O & M	Environ	Design / Construct	Misc
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Lock dimensions

Length	1281 m	Lift:	27m
Width:	55 m	Depth	18.3 m

Third Lock Project in Panama

- Three-step locks,
- Each with 3 water saving basins
- Side F/E system
- fresh and salt water on lock limits
- 365 / 24 / 7 uninterrupted use



Belgium - Self Propelled Floating Gate

Areas of Innovation

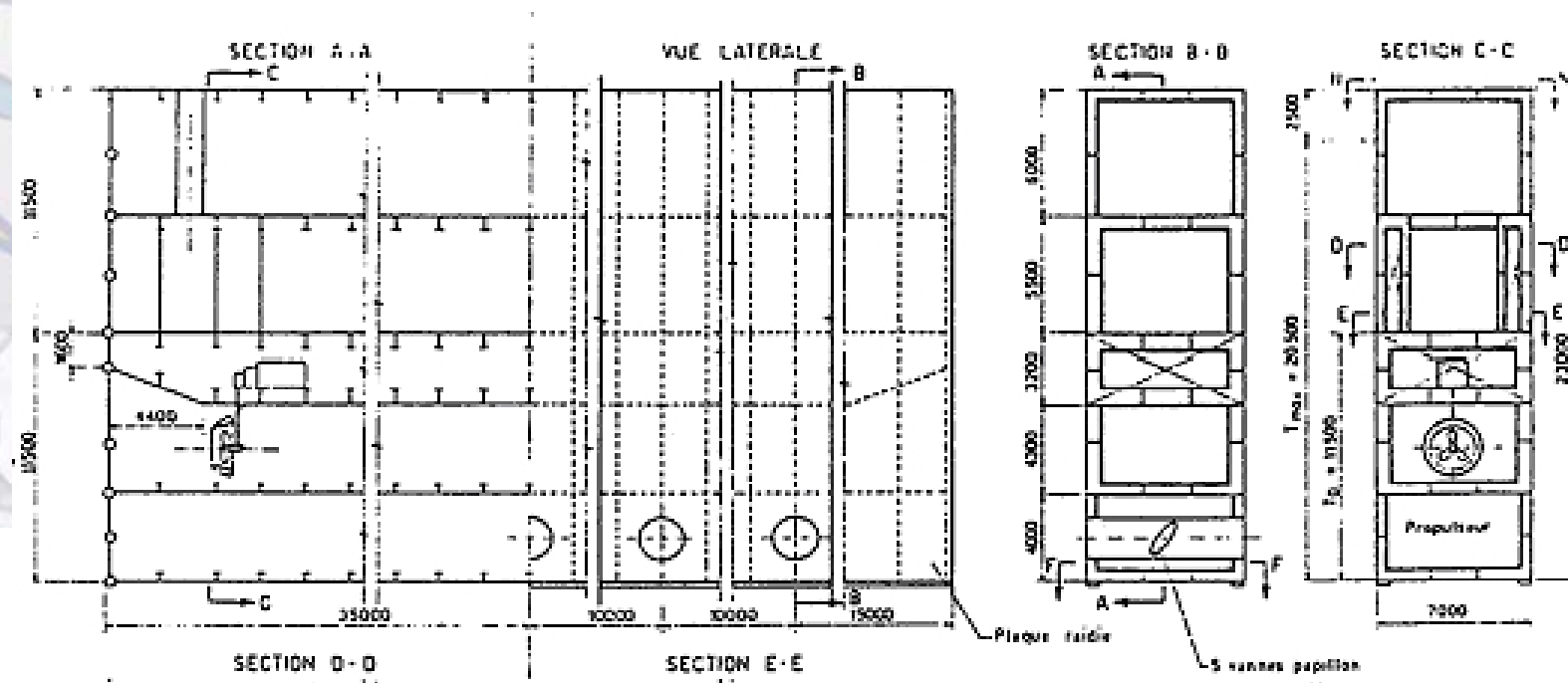
Advanced Concept

An example of an Advanced Concept is the floating gate which is self propelled and thus actually a ship.

Hydraulic	O & M	Environ	Design/ Construct	Misc
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Lock Dimensions

Length:	NA	Lift:	2-10 m
Width:	20 to 100 m	Depth:	10-20 m





Germany

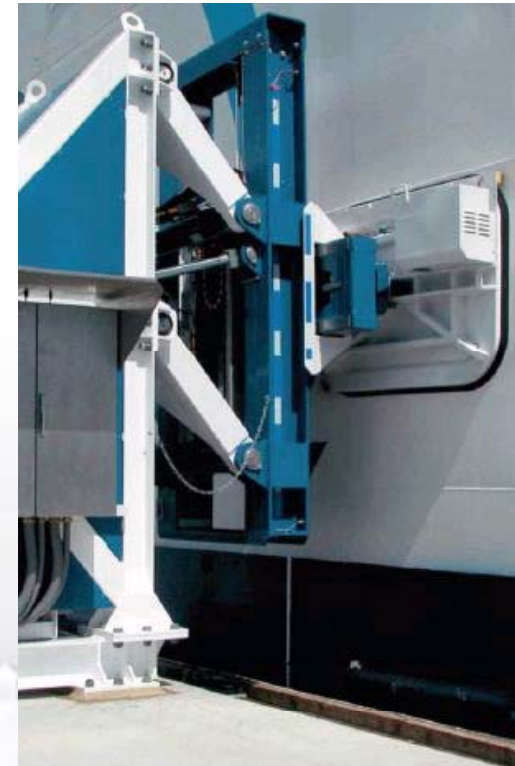


Hohenwarthe

An important example of structural innovations is the development of monolithic locks.

At the Hohenwarthe lock this solution is used for the 250 m long bottom plate.

Kaiserlock



Concept of magnetic mooring system

(also in use in N-Zealand)



Netherlands - Naviduct



Areas of Innovation

Hydraulic	O & M	Environ	Design / Construct	Misc
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Lock Dimensions

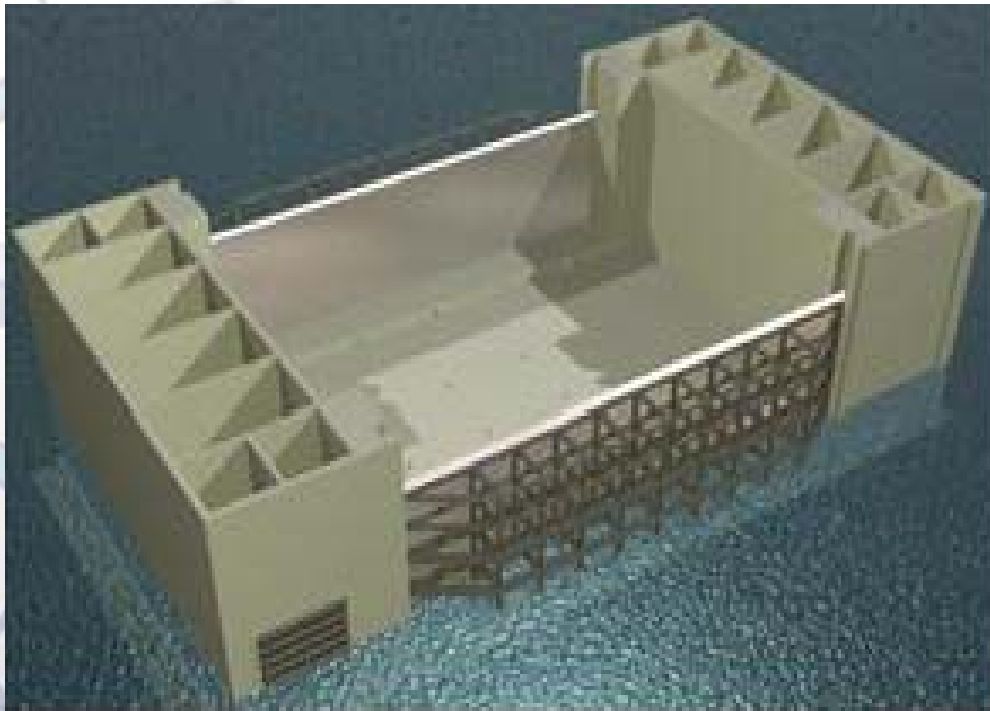
Length	160 m	Lift:	
Width:	42 m	Depth	

Enkhuizen, the Netherlands.

A unique combination of a double navigation lock and an underpass for road traffic.



USA – Greenup Lock



Areas of Innovation

Hydraulic	O & M	Environ	Design / Construct	Misc
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Lock Dimensions

Length	366 m	Lift:	
Width:	33.5 m	Depth	

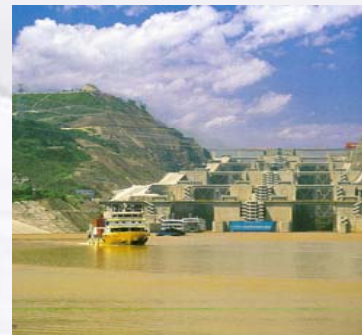
Construction Methods in the wet

In the USA many different In the Wet construction methods are in use. Among these are the Float-In and Lift-in techniques of precast elements.



Conclusion

- With Report 106 and its DVD a complete digital library on lock projects is available!
- A large diversity of innovative aspects is considered in the report.
- Why not a permanent and online PIANC database (Wikipedia like) ?



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