



**Federal budgetary institution  
«Administration of the Volga-Baltic inland waterways basin»**

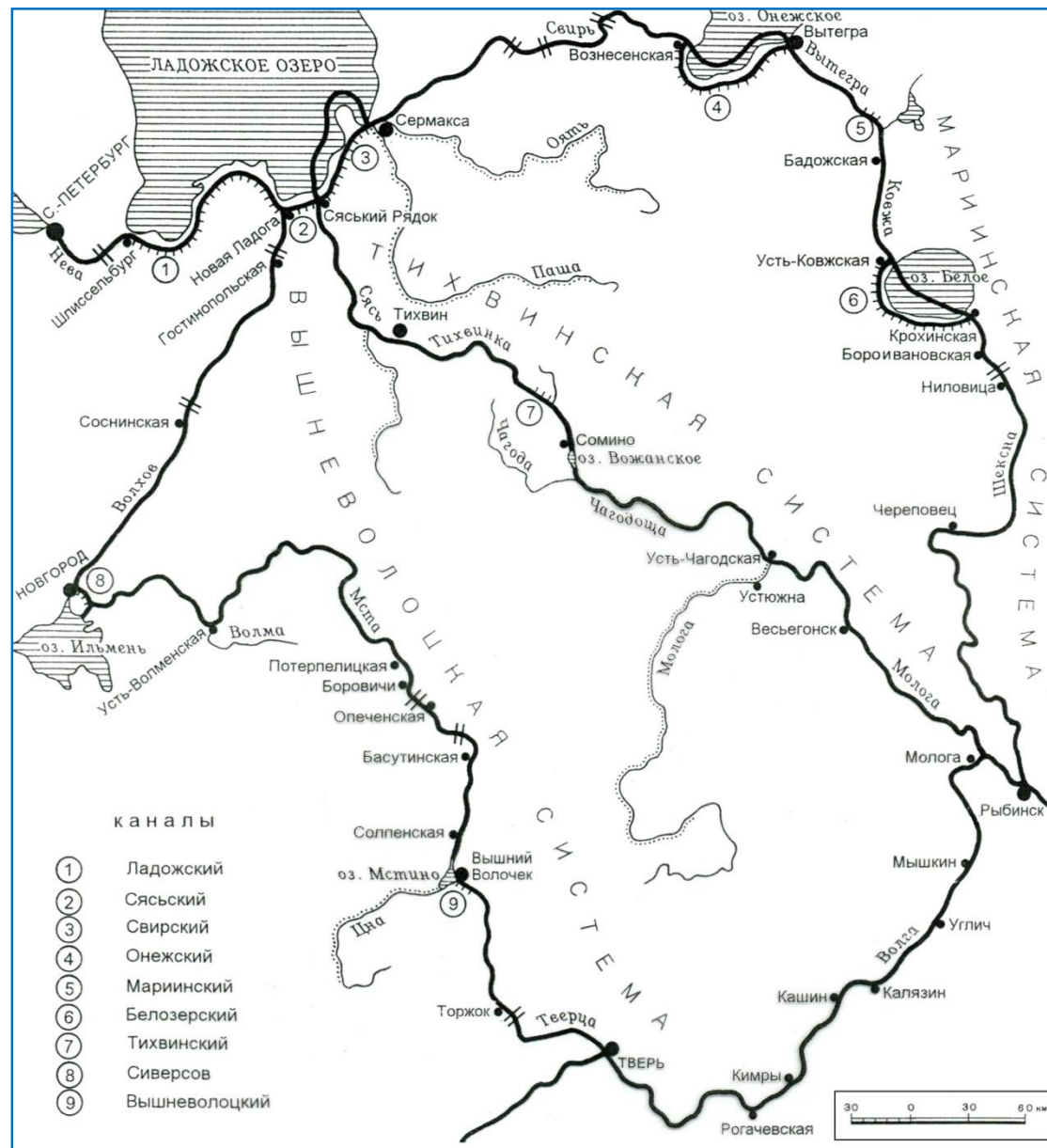
The hydraulic facilities and energetics Dept.

**Igor Cherenkov**  
Head of Department

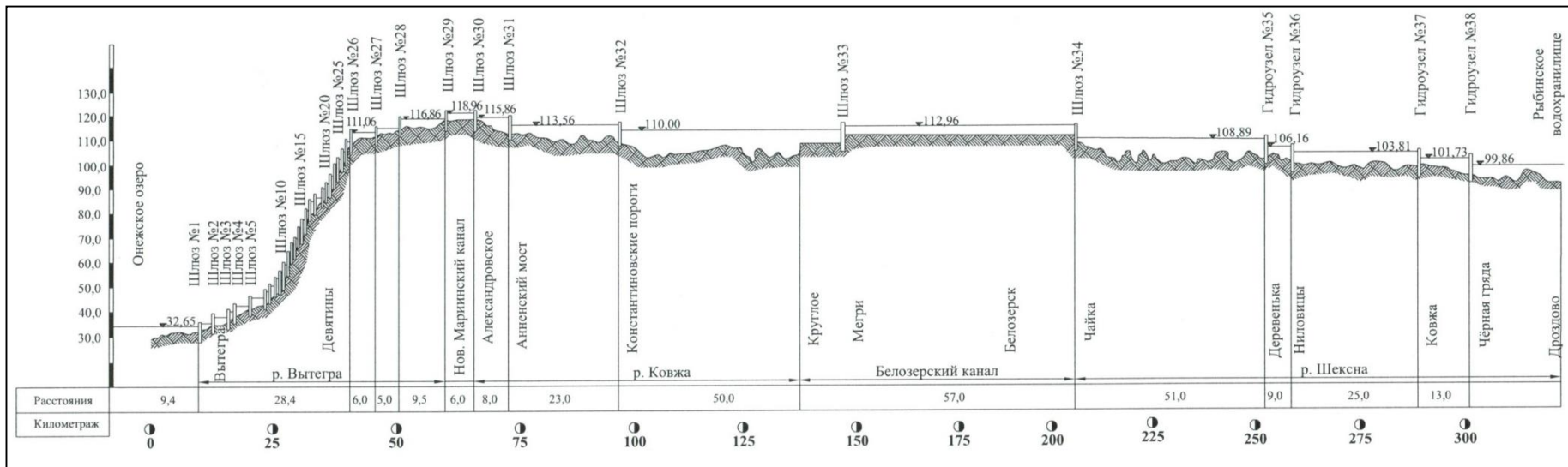
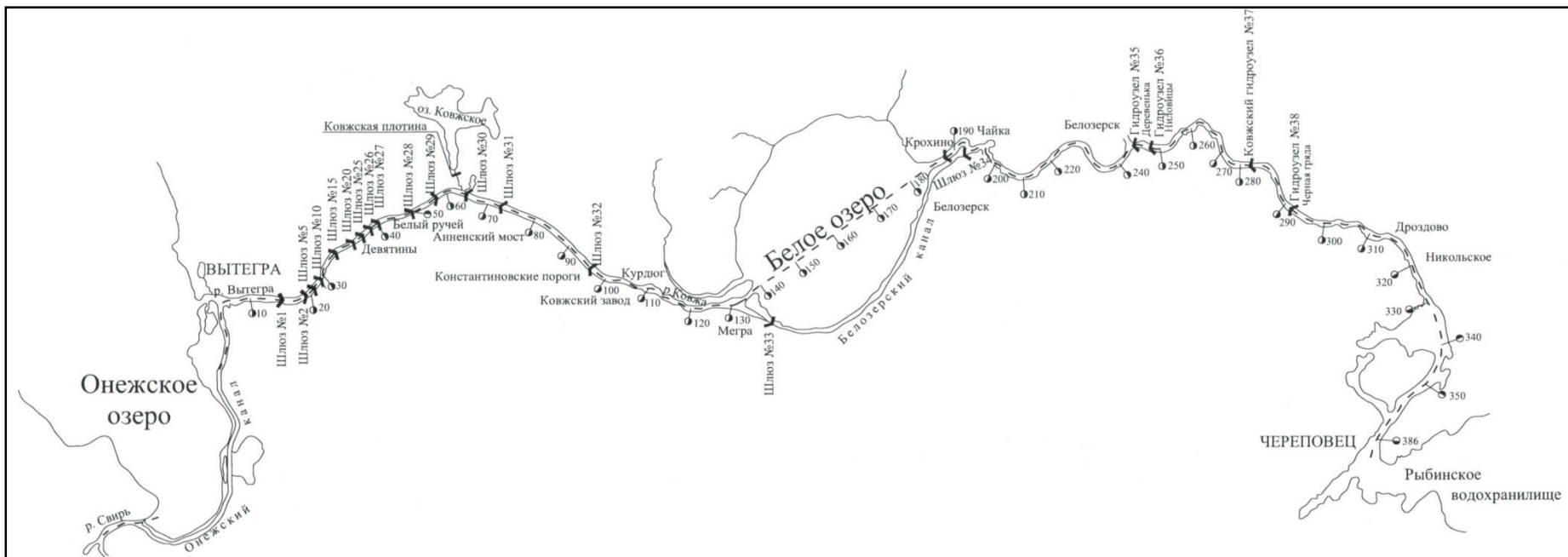
**«Reconstruction of the hydraulic facilities of the Volga-Baltic Waterway»**

**Lappeenranta, 22.01.2014**

## Ancient Russian waterways: Mariin, Tikhvin and Vyshnevolotsk



# Cross-section of the Mariin waterway from lake Onega to lake Beloye



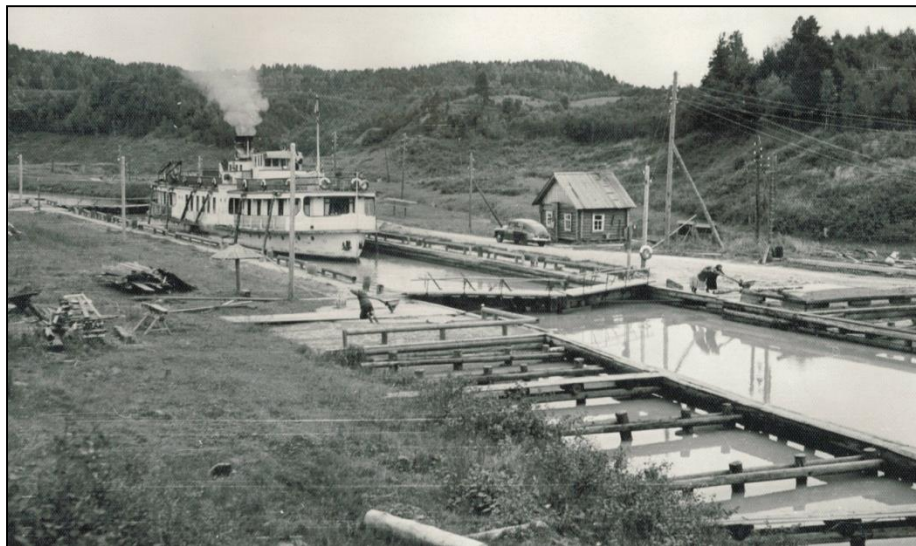


## The Mariin waterway facilities, 1960

Lock № 4



Lock № 7



Lock № 22



Lock № 25





## The Mariin waterway facilities, 1960

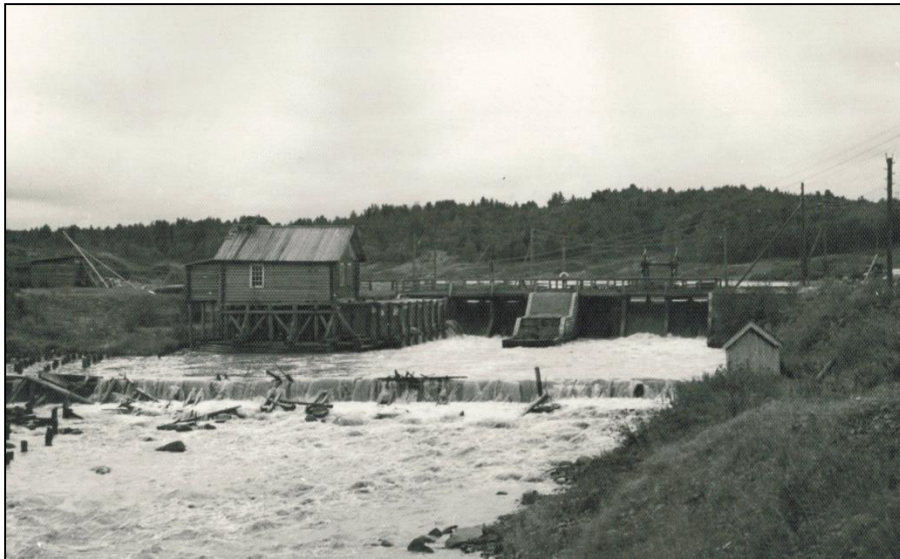
Lock № 26 and weir



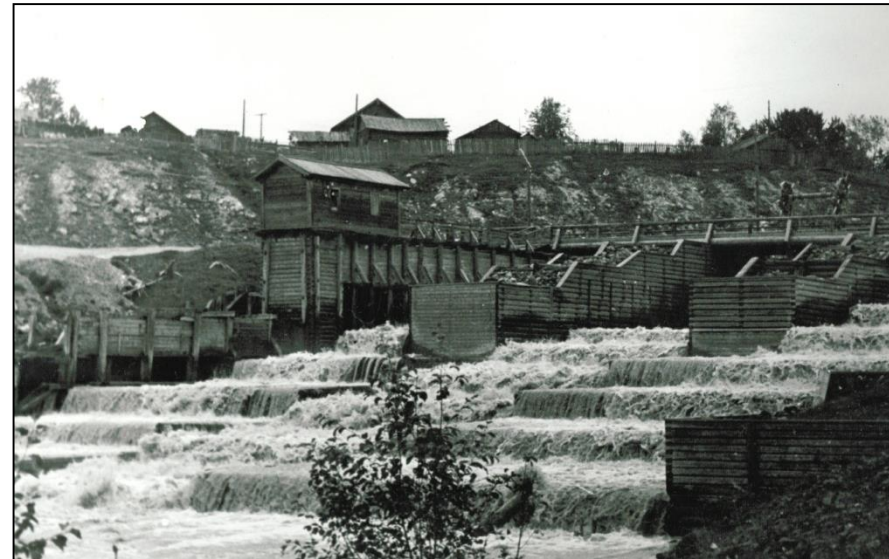
Шлюз № 37



Weir № 7 and hydropower station



Weir № 22





## The Volkhov hydrosystem is operative since 1926



Housing of the hydropower station



The lock



## The Lower Svir hydrosystem is operative since 1933





The Upper Svir hydrosystem is operative since 1952





# The Volga-Baltic locks nowadays

Lock № 1



Lock № 1



Lock № 2



Lock № 2





## The Volga-Baltic locks nowadays



Lock № 7





# The Volga-Baltic locks nowadays

Lock № 3



Lock № 4



Lock № 5



Lock № 6





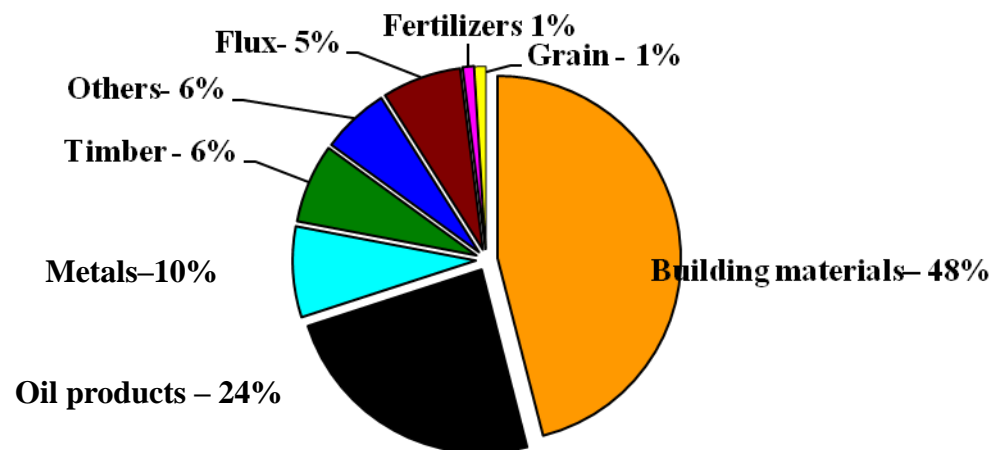
**The Lock №8 of the Sheksna hydrosystem is operative since 1990**



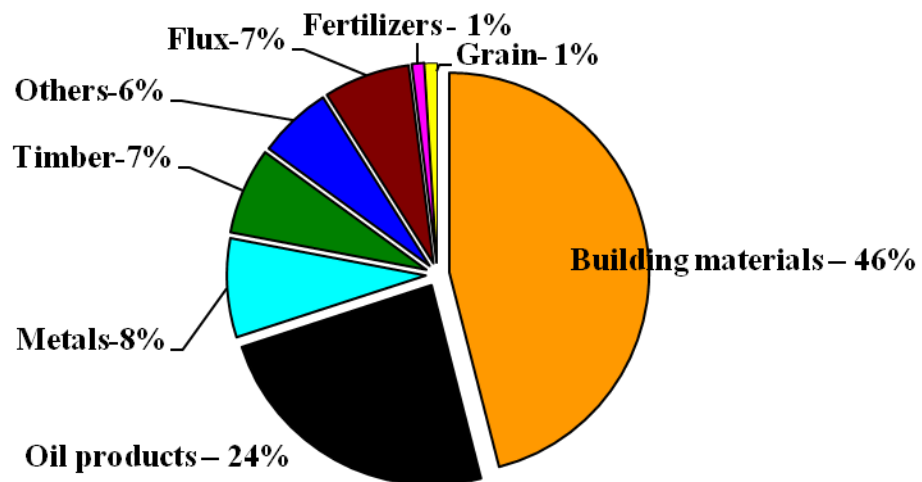


## Structure of the freight turnover on the Volga-Baltic Waterway

**2012**

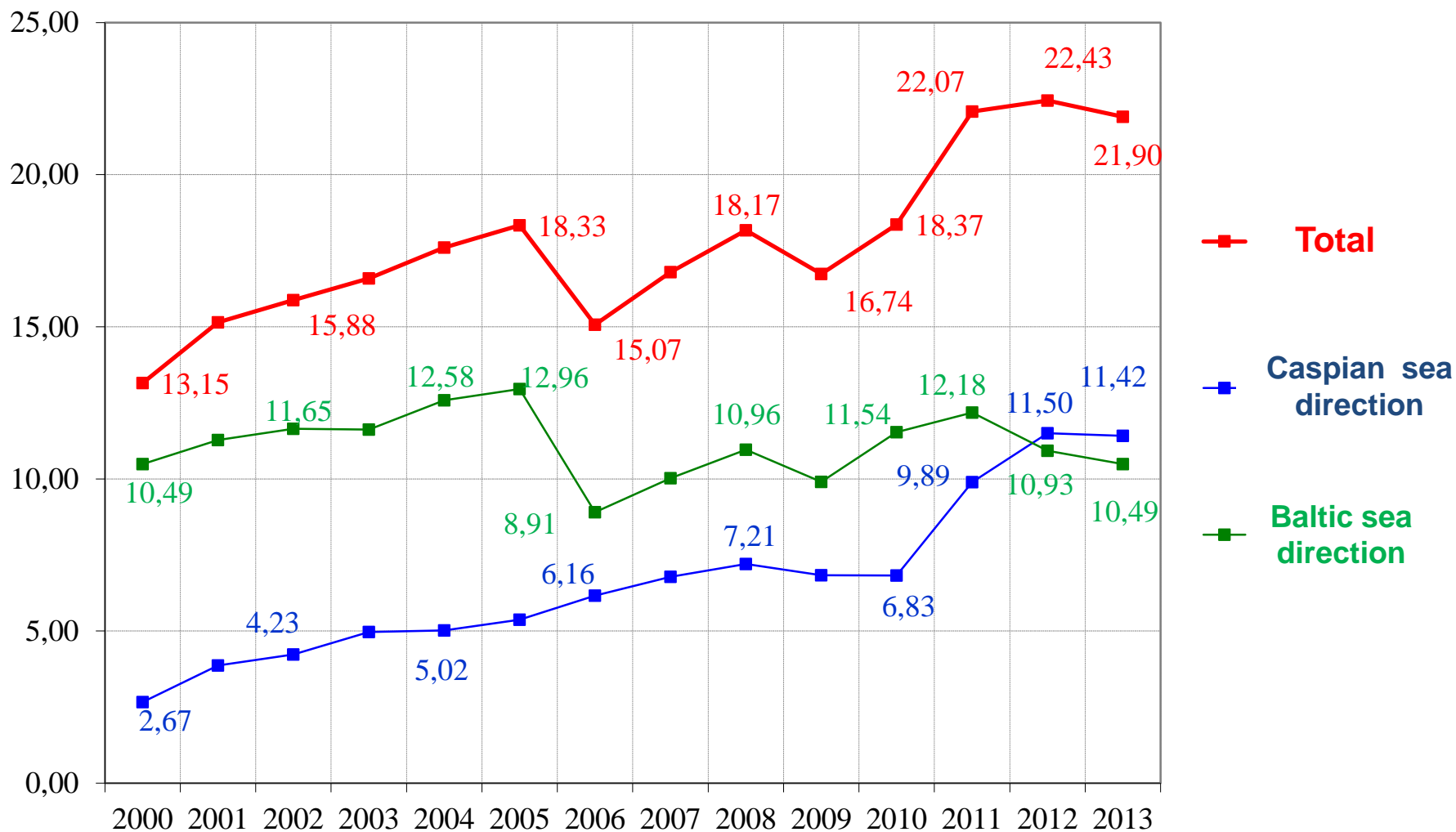


**2013**



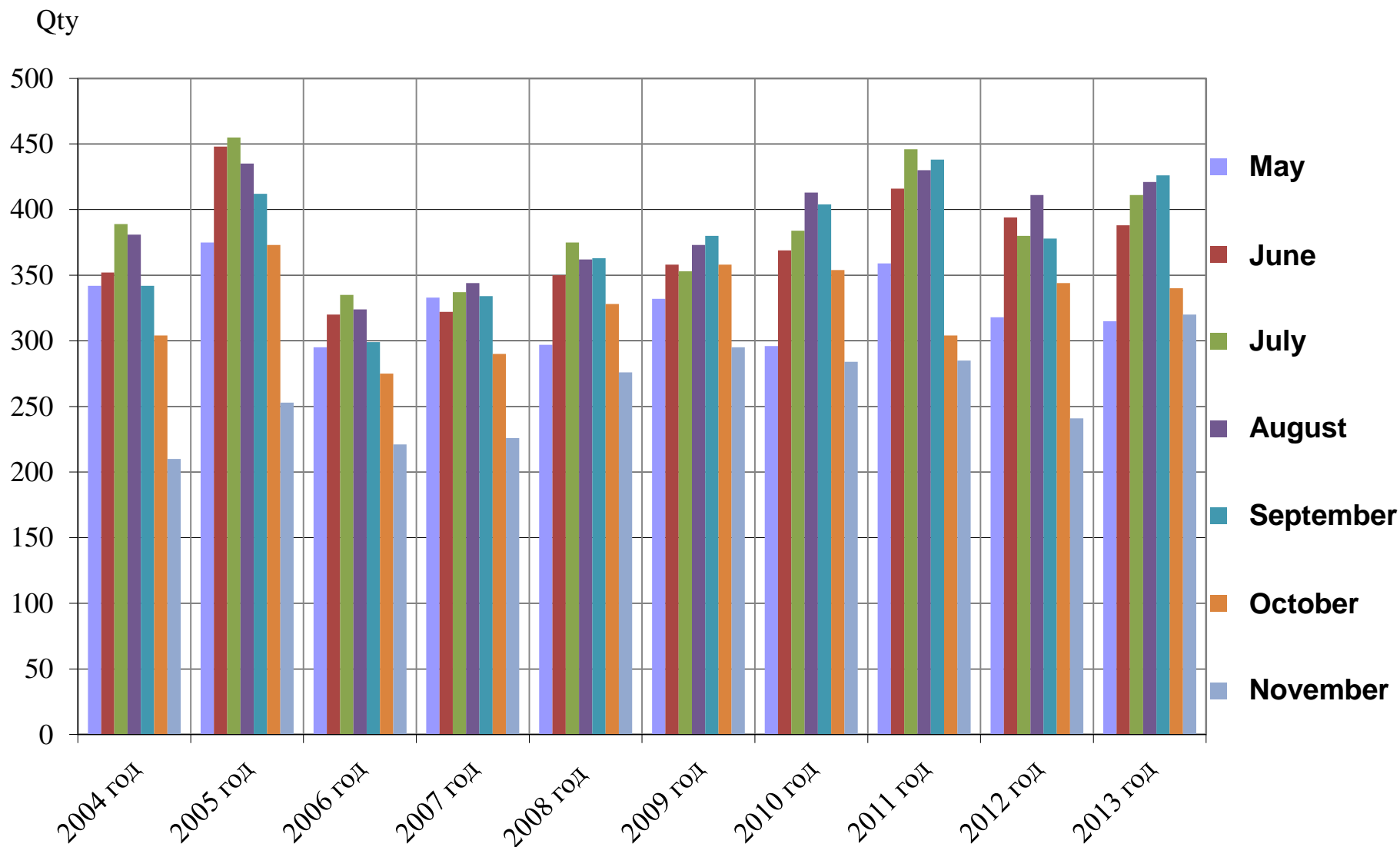
## Cargo traffic through the Volga-Baltic waterway 2000 ÷ 2013

Million tons





## Ceiling amount of vessels on the main Volga-Baltic waterway tracks



## Reconstruction of the Lower Svir lock (2006 – 2010)





**All the gate engines, paddle engines and metalware have been replaced**

**Gate engines**



**Paddle engines**



**Paddles**





## An emergency-bulkhead gate with hydroelectric drive has been mounted in 2010

**2007:** A headrace water shutoff and leakage elimination takes 250 hours



**2010:** A headrace water shutoff takes 10 minutes





## Lockage control system has been updated

Relay-contactor control system  
(electromechanical switching)



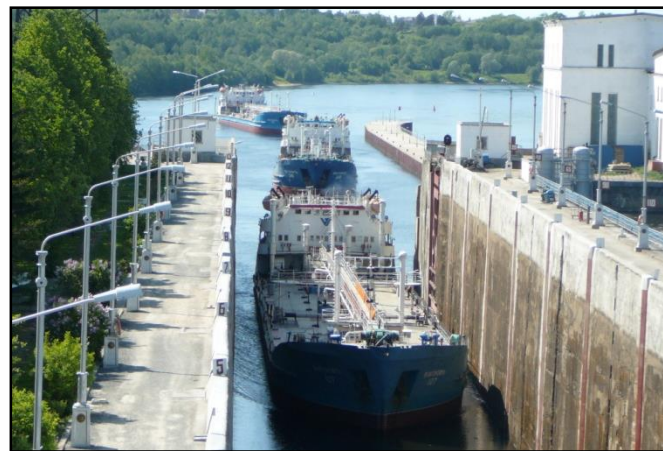
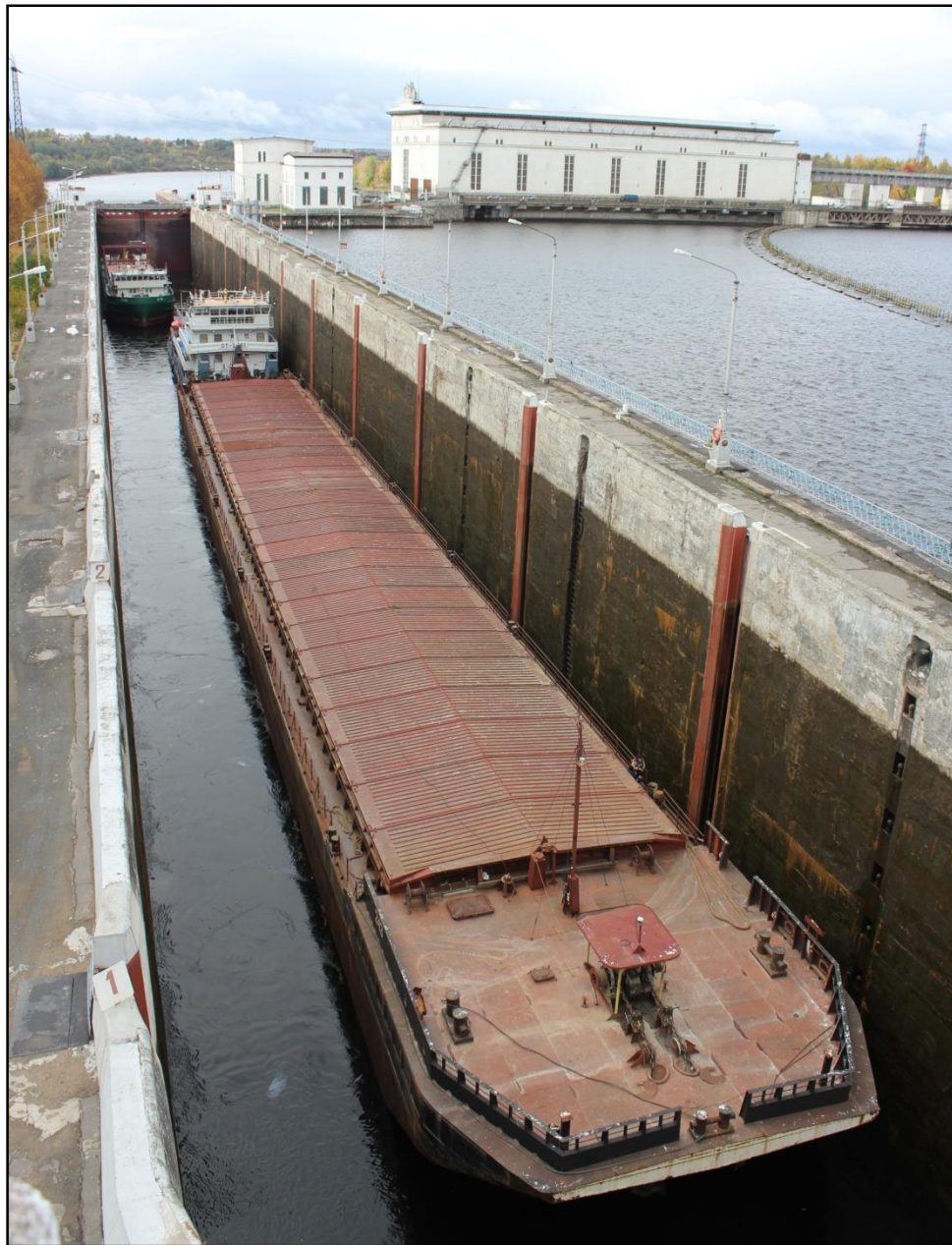
Computer-driven control system



In case of failure of computer control system an automatic fallback to the relay-contactor system occurs



## Reconstruction of the Upper Svir lock (2007 – 2012)





# A chamber bottom repairing of the Upper Svir lock has been executed

2010



2011





## An emergency-bulkhead gate has been replaced in 2007

**2006**

**Demounting of the old gate  
(53 y.o. !)**



**2007**

**The gate has been substituted**

**A water pressure protection  
is assured**



**All the engines of the gates, paddles and turning bridge have been replaced**

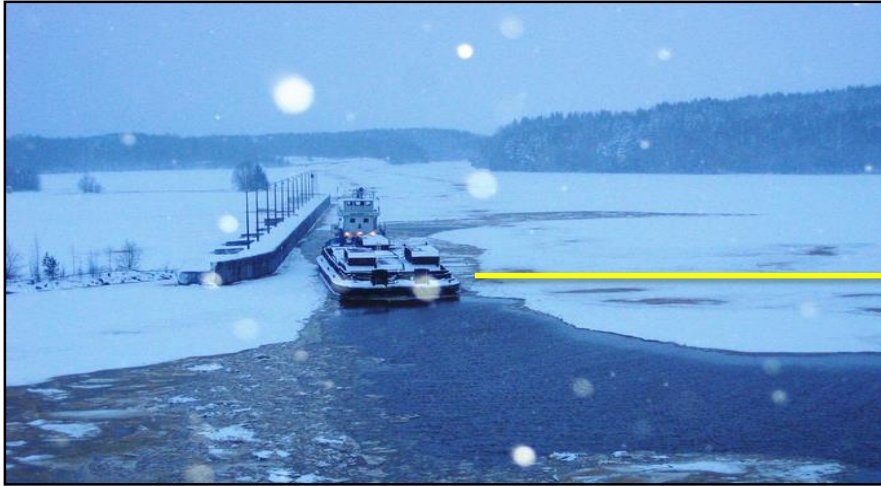
The engine of the emergency-bulkhead gate



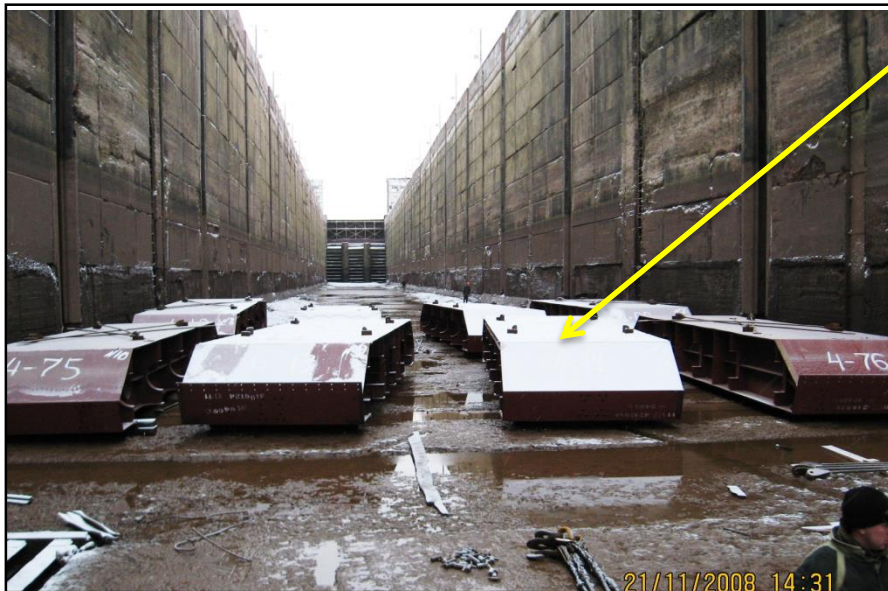


# The main downstream gates of the Locks 1÷6 have been substituted during 2007÷2010 (1)

Transportation and down movement of gate sections into the lock chamber bottom



Lock chamber after discharge



Demounting of old gates

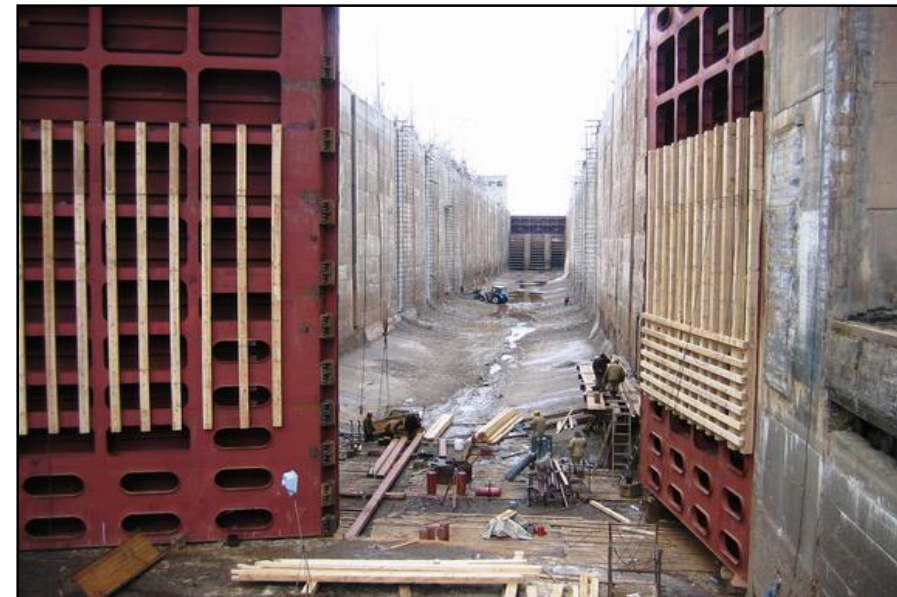




The main downstream gates of the Locks 1÷6 have been substituted during 2007÷2010 (2)



Mounting of new gates





The main downstream gates of the Locks 1÷6 have been substituted during 2007÷2010 (3)

Old gates



New gates





# All the concrete cavities for lifting ring rails have been replaced in 2006-2009 (156 pcs.)

1) Disassembling of concrete



3) Casing and concreting



2) Reinforcing of concrete



4) Action done !





## Reconstruction of the moorage wall at the Lock №1 tailrace access duct

**2008:** the fairway width is 40 m.;  
Passage of 2 vessels is prohibited !



**2010:** the fairway width is 64 m.;  
passage of 2 vessels is allowed !  
A lockage time saving is 15 minutes



## The guiding and mooring walls have been built between Lock №3 and Lock №4



**2008:** the fairway width is 46 m.;  
Passage of passenger vessel by large-  
capacity vessel or convoy is prohibited !



**2010:** the fairway width is 80 m.;  
Passage of all types of vessels is allowed !  
A traffic capacity growth is 20%



**Over the last 10 years a fairway dimensions restoration work are annually held**

More than 10 millions cbm of soil have been excavated



11 км of slurry pipelines have been mounted



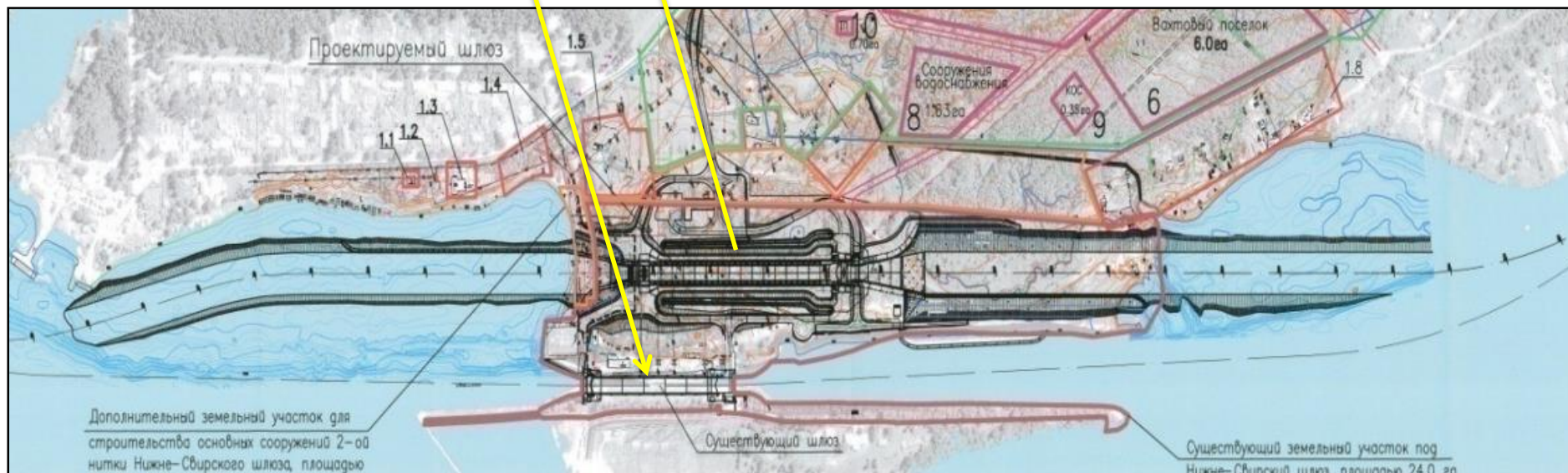


In 2013 we celebrate the 80th anniversary of the Lower Svir lock





### Layout plan of the second line of the Lower Svir lock





## Passing of the large-size ferry «Makhachkala-1» in 2005











**Thank you for your kind attention !**