Federal Environmental, Industrial and Nuclear Supervision Service of Russia

«State Supervision Over Safety Of Hydraulic Structures»

April 2015

State supervision over hydraulic structures (HS)

Federal Environmental, Industrial and Nuclear Supervision Service of Russia (Rostechnadzor) exercises state supervision over compliance of owners and operational organizations of HSs with the mandatory requirements in regard of safety ensuring of HSs (except for navigation and port HSs)

State supervision and control over navigation and port HSs are exercised by Ministry of Transportation of Russia (Rostransnadzor).

Overall amount of HS facilities supervised by Rostechnadzor is 29,964, of which:

568 HS facilities of fuel and energy complex, of which:

- **218 HS facilities** - HPP
- **337 HS facilities** – GRES and CHPP
- **3 HS facilities** - PSP
- **10 HS facilities** - NPP

844 HS facilities of liquid waste management, of which:

- **365 HS facilities** in mining industry
- **377 HS facilities** in chemical industry
- **102 HS facilities** in metallurgy industry
- **40 HS facilities** of other industrial enterprises

28,552 HS facilities of water sources utilization system.

The Largest Hydropower Plants of Russia

Largest HPPs of Russia

Sayano–Shushenskaya HPP on the Yenisei River

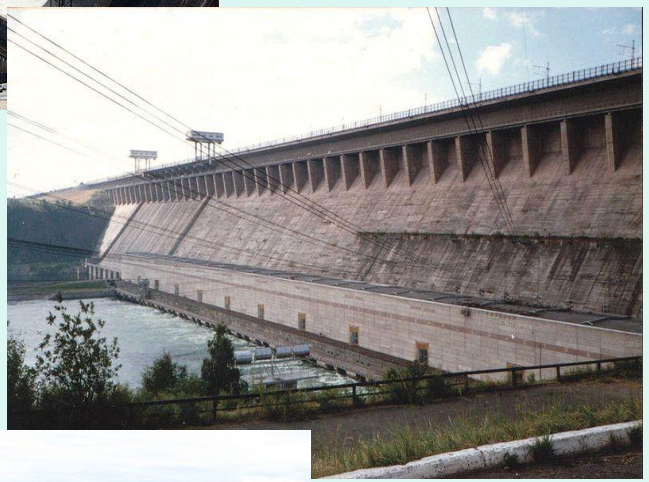
Krasnoyarsk Krai

- Installed capacity 6,400 MW.
- Construction started – 1968
- Completed – 1988
- Dam height – 245 m
- Dam length – 1,066 m
- Annual generation (avg) – 21 TWh

Largest HPPs of Russia

Krasnoyarsk HPP on Yenisei River

- Installed capacity – 6,000 MW
- Dam height – 124 m
- Discharge capacity – 12,100 m^3/s



Bratsk HPP on Angara River

- Installed capacity – 4,500 MW
- Dam height – 125 m
- Discharge capacity – 11,930 m^3/s

Ust-Ilimsk HPP on Angara River

- Installed capacity – 3,840 MW
- Dam height – 105 m
- Discharge capacity – 15,270 m^3/s

Zagorsk PSP

Moscow Region

Installed capacity – 1,200 MW
Rated head – 114.5 m
Full storage capacity – 0.03 km^3

Largest HPPs of Russia

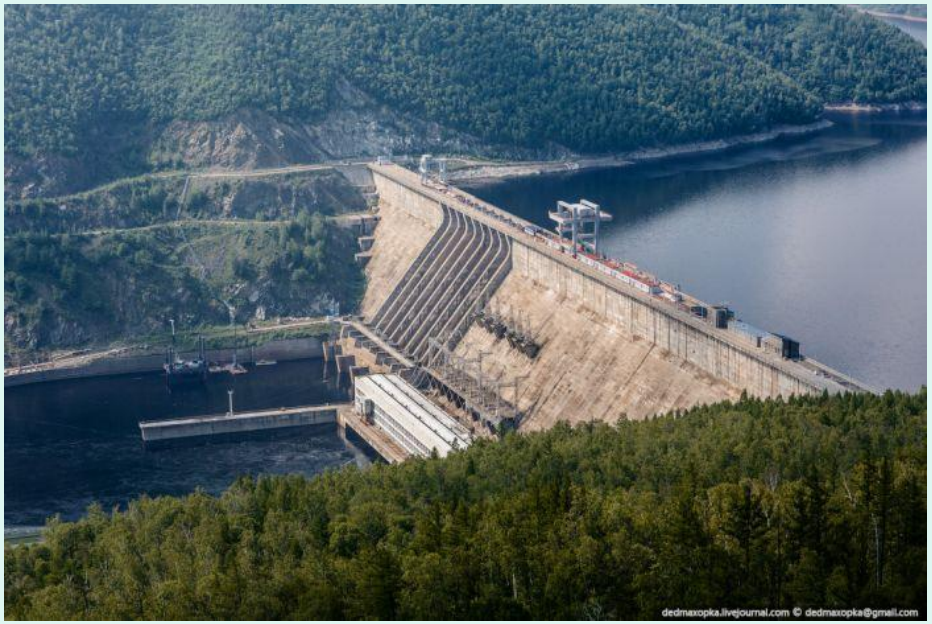
Amur region

Bureya HPP

Installed capacity – 2,000 MW
Dam height – 140 m
Discharge capacity – 13,100 m^3/s

Zeysk HPP

Installed capacity – 1,290 MW
Dam height – 115.3 m
Discharge capacity – 10,800 m^3/s



HPPs of Russia under Construction

Boguchany HPP on Angara River

Installed capacity – 3,000 MW
Dam Height – 77 m
Discharge capacity – 13 930 m^3/s
6 Units in operation
Completion expected – 2015

Ust-Srednekask HPP on Kolyma River

Installed capacity – 570 MW
Dam Height – 66 m
Discharge capacity – 18,100 m^3/s
2 Units in operation
Completion expected – 2016

HPP Construction on Far East of Russia

A program of construction of HPP on Far East of Russia for power supply and flood control has been developed

Nizhne-Bureya HPP
Construction started – 2010
Units commissioning in 2015-2016
Installed capacity – 320 MW
Dam height – 47 м

Key Normative Legal Acts Applicable to HS Safety Include:

1. Federal law No 117-FZ of July 21,1997 “On Safety of Hydraulic Structures”

2. Decree of the Government of the Russian Federation No 1108 of October 27, 2012 “On Federal State Supervision in the Area of Hydraulic Structures Safety”

3. Decree of the Government of the Russian Federation No 986 of November 2, 2013 “On Classification of Hydraulic Structures”

4. Decree of the Government of the Russian Federation No 455 of May 5, 2012 “On Continuous State Supervision Regime of Dangerous Facilities and Hydraulic Structures”

5. Decree of the Government of the Russian Federation No 458 of May 5, 2012 “On Approval of the Regulations of Safety Ensuring and Anti-Terrorism Security of Fuel and Energy Complex Facilities”

Hydraulic Structures Register of Russia

- Rostechnadzor, in course of its work, employs informational data from HS Register of Russia
- The Register is an integrated system of governmental accounting, registration, storage, and providing of information concerning to HSs of Russia.
- Keeping record of the Register is exercised by Federal Agency of Water Resources (Rosvodresursy); Rostechnadzor and Rostransnadzor provide Rosvodresursy with information on supervised facilities.
- Owner (proprietor) or operating organization of HS shall provide state supervision bodies with informational data of HSs subject to safety declaration

HS Classification

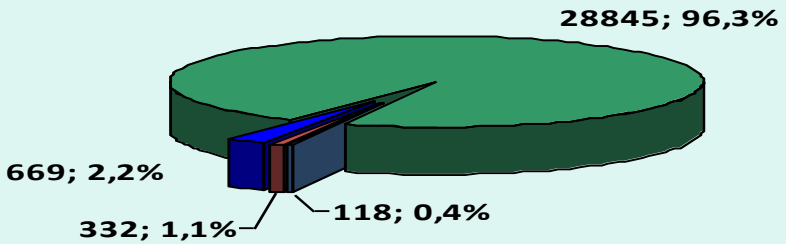
Hs classes are defined at the design stage in accordance with SNiP 33-01-2003 in in dependence of:

⇨ **Dam height**
(*depending of the foundation type: rock, sandstone, clay*)

⇨ **Dam material**
(*concrete, enforced concrete, earth*)

⇨ **Social and economical importance**
(electric power stations depending on the installed capacity; all nuclear power plants; storing facilities depending on the class of hazard of waste being stored)

⇨ **Consequences of possible accidents at HSs**
(depending of how much people may be injured as a result of an accident at HS)



I class - 118	0,4 %
II class - 332	1,1 %
III class - 669	2,2 %
IV class - 28845	96,3 %

HS Class depending on its height and foundation type

Structures	Foundation type	Structures' height, m, under respective classes			
		I	II	III	IV
Earthfilled dams	A	More than 80	50 - 80	20 - 50	Less than 20
	B	More than 65	35 - 65	15 - 35	Less than 15
	C	More than 50	25 - 50	15 - 25	Less than 15
Concrete dams	A	More than 100	60 - 100	25 - 60	Less than 25
	B	More than 50	25 - 50	10 - 25	Less than 10
	C	More than 25	20 - 25	10 - 20	Less than 10

Foundations: A — rocky
B — sandy, macrofragmental and clayey
C — aqueous and clayey

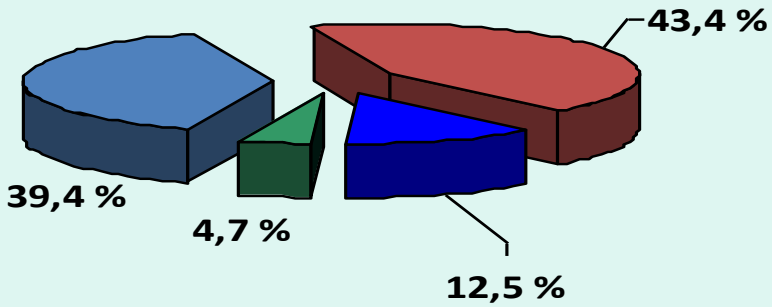
HS Class depending on its social and economical importance

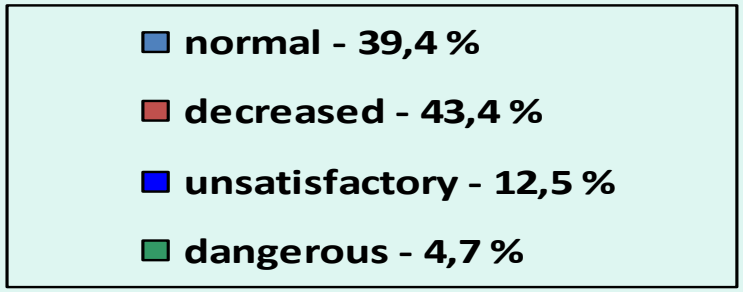
Facilities	HS Class
1. Hydropower projects with total water storage, million m^3:	
More than 1000	I
200 - 1000	II
50 - 200	III
50 and less	IV
2. HSs of electric power stations with installed capacity, MW:	
More than 1000	I
300 - 1000	II
10 - 300	III
10 and less	IV
3. HSs of NPPs regardless their capacity	I

HS Class depending on accident consequences

HS class	Amount of people who may suffer from accidents at HS, persons	Amount of people, whose conditions of vital activity may be misbalanced due to accidents at HS, persons	Extent of possible financial and physical damage, million minimum wages	The characteristic of area of spreading of an emergency as a result of accidents at HS
I	More than 3000	More than 20 000	More than 50	Within two or more subjects of the Russian federation
II	500 - 3000	2000 - 20 000	10 - 50	Within one subject of the Russian federation
III	Up to 500	Up to 2000	1 - 10	Within one municipal formation
IV	—	—	Less than 1	

Level of safety of HS





Normal level of safety:
HS complies with design safety and valid codes and regulations; values of safety criteria do not exceed admissible limits; operation goes on without violations; orders of supervision bodies are fulfilled

Decreased level of safety:
Non-conducting of high priority activities or orders of supervision bodies are not completely fulfilled; other violations are in place

Unsatisfactory level of safety :
A decrease in mechanical or seepage strength; admissible limits of safety criteria are partially exceeded; other design deviations are in place

Dangerous level of safety :
Decrease in strength and robustness of HS and its foundation keeps on developing; admissible limits of safety criteria are exceeded; other design deviations, which may lead to an emergency, are in place

Compulsory Third Party Liability Insurance of HS

- According to the Federal Law No 225-FZ of July 27, 2010, the HSs registered in the HS Register are subject to compulsory third party liability insurance
- The amount of insurance sum depends on possible inflicted damage and injured toll resulted from an accident at HS.

  Minimal insurance sum – 10 million rubles ($192,000)

  Maximal insurance sum – 6,5 billion rubles ($125,000,000)
- Penalty amount for absence of insurance contract :

  for natural entities – 15-20 thousand rubles ($288-$384)

  for legal entities – 300-500 thousand rubles ($5,700-$9,615)

Functions of Supervision Body

- organization of scheduled and off-scheduled inspections of HS
- issuance of orders on safety ensuring of HS as well as orders on discontinuation or halt of construction, reconstruction, recovery, preservation or disposition of HS;
- establishment of a list of expert centers, which are entitled to conduct expert examinations of declarations of safety of HS;
- determination of qualification requirements to specialists and working procedures for expert committees; organization of training for experts and ensuring their experience exchange;
- development of a list of facilities subject to declaration and a schedule for submitting such declarations;
- review and approval of declarations of safety of HS and conclusions of expert committees;
- issuance of operational permits;
- providing information to the Register of HSs;
- involvement in the process of drafting normative and legal acts applicable to safety of HS;
- other functions envisaged by legislation relevant to safety of HS;

HS Inspections Intervals

Scheduled inspections shall be carried out exactly as it is stated in the annual inspection schedule approved by the prosecutor’s bodies.

Scheduled inspections intervals are defined with respect to class of hazard of facilities:

I class – HSs of extreme hazard – a continuous state supervision regime;
II class - HSs of high hazard – not more than 1 time per year;
III class - HSs of moderate hazard – not more than 1 time per 3 years;
IV class - HSs of low hazard – scheduled inspections not carried out.

Grounds for off-schedule inspections are:

- order of the President of Russia or the Government of Russia;
- prosecutor's demand;
- expiry of compliance timeframes for previously issued instructions;
- representations and applications of citizens and/or legal entities about facts of accident and emergency occurrences.

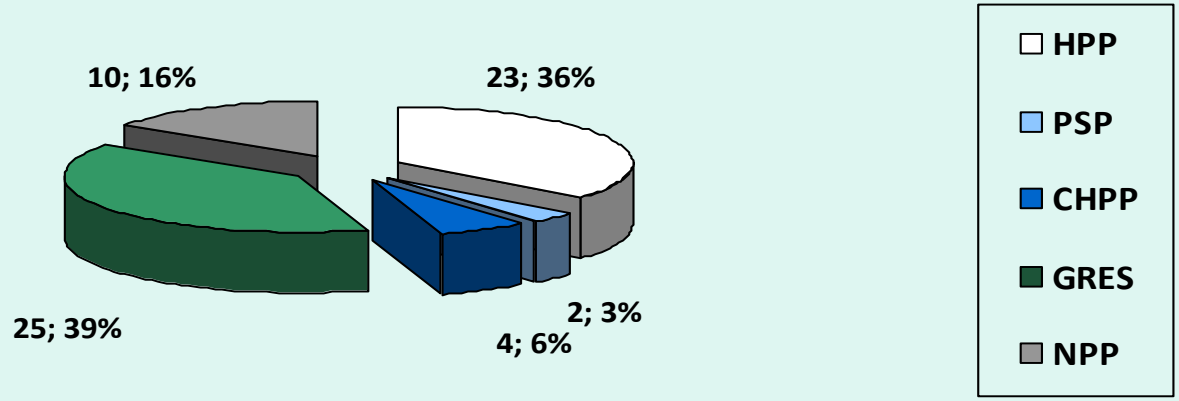
A Continuous State Supervision Regime

In accordance with the Decree of the Government of the Russian Federation No 455 May 5, 2012 “On Continuous State Supervision Regime of Dangerous Facilities and Hydraulic Structures”, the most critical HSs class I are subject to the continuous sate supervision regime

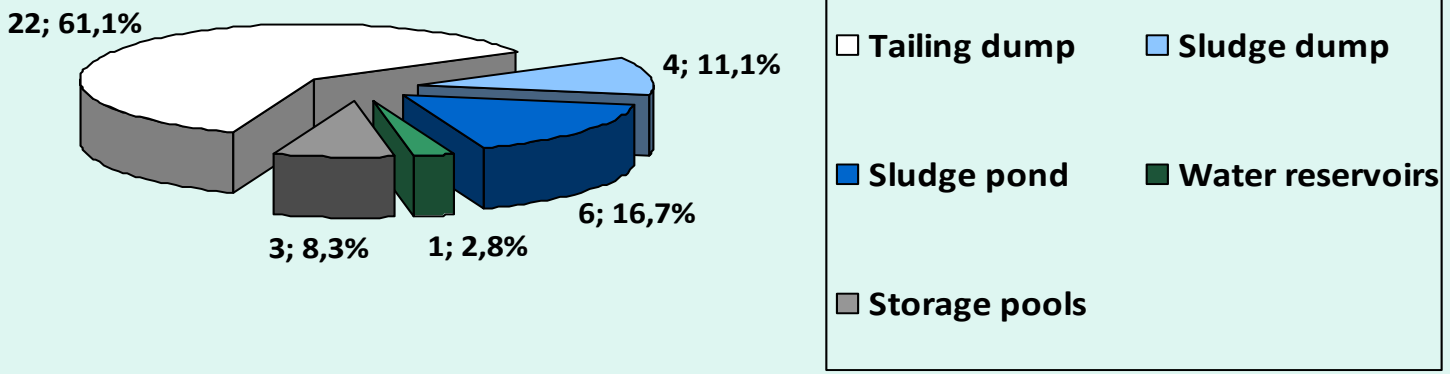
HSs under Continuous State Supervision Regime

The list of HSs under continuous state supervision regime comprise **118 hydraulic structure complexes**, of which 18 ones are water resource utilization systems

64 hydraulic structure complexes are **power engineering facilities**



36 hydraulic structure complexes are **industrial facilities**



Thank you for your attention!