ELECTRIC-HYDRAULIC DRIVES
Engineering services, Consulting, Original drive design, Factory Assembly, Testing,
Assembly at site, Commissioning,
System monitoring during guarantee period and after guarantee period expiration, Training for
operating personnel,
Engineering in reconstruction and revitalization of fluid power systems
“PPT Engineering a.d”, was founded in 1958, as an integral part of the Industry of Hydraulics and Pneumatics Prva Petoletka Trstenik. Since 2011, it is owned by the company OAO “Trestgidromontazh” from Moscow, Russian Federation.

**Application of electric-hydraulic drives with “turn-key” delivery:**

- Hydromechanical equipment – Hydroelectric power plants, dams, navigation locks
- Metallurgy - Coke manufacturing equipment
- Surface mining equipment - Lubrication systems for coal excavators
- Civil engineering - load lifting devices, pneumatic gates, doors and windows, formwork
- Other – hydraulic platform (barge), load testing equipment, oil platform equipment

**Over 2500 completed projects**
GEOGRAPHY OF OUR PROJECTS
WORK ORGANIZATION

THE DATA BASE OF TYPICAL AND SIMILAR SYSTEMS ACCORDING TO CONCEPT AND CONFIGURATION

STANDARD COMPONENTS

DESIGN
- DEFINING OF HYDRAULIC SCHEMATIC - FUNCTIONAL AND MOUNTING
- TECHNICAL DOCUMENTATION
- DRAWINGS (EQUIPMENT LAYOUT)

ORDERING AND MANUFACTURING OF SYSTEM SUBASSEMBLIES

TESTING, PARAMETER REGULATION

ASSEMBLY

TESTING

SYSTEM MONITORING AFTER THE GUARANTEE PERIOD EXPIRATION

SYSTEM MONITORING DURING THE GUARANTEE PERIOD

PERSONNEL TRAINING

COMMISSIONING

MANUAL FOR
- ASSEMBLY
- TESTING
- OPERATION
- MAINTENANCE
- TRANSPORT
- STORAGE

INTEGRATION TECHNOLOGY

- CALCULATION
- SIMULATION

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REFERENCES - HYDROMECHANICAL EQUIPMENT

**HPP “Djerdap 1”, Serbia**

**Scope of work:**
Design, manufacturing and delivery of electric-hydraulic system, assembly at site, testing and commissioning of equipment at 12 spillway radial gates and 12 gates of the intake tunnel:

- Intake gate cylinders
  Ø600 x 18000 mm....................12 pcs.
- Radial gate cylinders
  Ø 500 x 11470 mm.....................28 pcs.

**Saint Petersburg Flood Protection - Object S2, Russia**

**Scope of work:**
Design, manufacturing, delivery and commissioning of electric-hydraulic system for manipulation of a slide gate:
- Gate width 116 m,
- Gate mass 2700 t,
- Lifting and lowering stroke 11500 mm

**Saint Petersburg Flood Protection - Object S1, Russia**

**Scope of work:**
Design, manufacturing, delivery and commissioning of electric-hydraulic system for manipulation of:
- Two double-section gates
- Two slide gates

- Slide gate cylinder:
  Ø 250/125x2700 mm...2 pcs.
- Section gate cylinder
  Ø 320/140x3000 мм...........4 pcs.
REFERENCES - HYDROMECHANICAL EQUIPMENT

St. Petersburg Flood Protection - Object V1-V6, Russia

Scope of work:
Design, manufacturing, delivery and commissioning of electric-hydraulic system for manipulation of the groups of radial gates. 6 groups of radial gates V1…V6, containing 10 or 12 gates, the width of each gate being 22 m.
The hydraulic drive enables the entire group of gates to get lowered simultaneously.

HPP “Se San 3”, Vietnam

Scope of work:
Design, manufacturing, delivery and commissioning of electric-hydraulic system for manipulation of 6 radial and 2 slide gates:
Slide gate cylinder
Ø 420/160x7200 mm........2 pcs.
Radial gate cylinder
Ø 420/160x7200 mm........12 pcs.
Hydraulic drive - 5 pcs.
Electrical cubicle.................5 pcs.

HPP “Sangtuda”, Tajikistan

Scope of work:
Design, manufacturing, delivery and commissioning of electric-hydraulic system for manipulation of emergency repair gates and auxiliary spillway with radial gates.
**Scope of work:**
Design, manufacturing, delivery and commissioning of electric-hydraulic system for manipulation of emergency-repair gates:

Cylinder Ø 500/200x8300 mm..... 4 pcs.

**HPP „ZARAMAGSKAYA“, Russia**

**Scope of work:**
Design, manufacturing, delivery and commissioning of electric-hydraulic system for manipulation of an emergency-repair slide gate and a working radial gate of the outlet tunnel:
Cylinder 630/280 x6900 mm.......1 pc.
Cylinder 500/250 x7100 mm.......1 pc.

**HPP „ROGUN“, Tajikistan**

**Scope of work:**
Design, manufacturing, delivery and commissioning of electric-hydraulic system for manipulation of 6 repair slide gates of the 1st and 2nd gallery tunnels:
Cylinder 1000/710 x770 mm........3 pcs.
REFERENCES - HYDROMECHANICAL EQUIPMENT

HPP „ROGUN“, Tajikistan

Scope of work:
Design, manufacturing, delivery and commissioning of electric-hydraulic system for manipulation of emergency-repair gates of the 1st and 2nd gallery tunnels:

Cylinder Ø800/Ø400x7640 mm…..6 pcs.

Scope of work:
Design, manufacturing, delivery and commissioning of electric-hydraulic system for manipulation of working radial gates of the 1st and 2nd gallery tunnels:

Cylinder Ø560/Ø250x6730 mm………6 pcs.

Scope of work:
Design, manufacturing and delivery of electric-hydraulic system for manipulation of incident-repair gates of the temporary intake penstock:

Cylinder Ø1060/Ø450x7600 mm….2 pcs.
**Navigation lock “Gorodets”, the Volga, Russia (2012)**

**Scope of work:**
Design, manufacturing, delivery and commissioning of 8 electric-hydraulic systems for manipulation of gallery slide gates for emptying of the lock chambers:

- Cylinder Ø350/Ø160x5000 mm….8 pcs.

**Navigation lock “Krasnogorsk”, the Irtish, Russia (2013)**

**Scope of work:**
Design, manufacturing, delivery of:
- electric-hydraulic systems for manipulation of 2 double-section gates – at the upper and at the lower head of the lock,
- electric-hydraulic systems for manipulation of 2 lower head slide gates for emptying of the lock chamber.

**Water accumulation “Krasnodar”, Russia (2013)**

**Scope of work:**
Design, manufacturing, delivery and commissioning of:
- electric-hydraulic systems for manipulation of 5 double-section slide gates for water level regulation,
- electric-hydraulic systems for manipulation of 2 ecological lattices for helping fish move upstream to the lake.

Hydraulic cylinders were not included in the scope of delivery.
REFERENCES - HYDROMECHANICAL EQUIPMENT

HPP “Polotskaya”, Belarus (2014)

Scope of work:
Design, manufacturing, delivery and commissioning of electric-hydraulic systems for manipulation of 6 spillway radial gates and 2 flap gates:

Cylinder Ø320/Ø160x6200 mm.....12 pcs. Cylinder Ø200/Ø110x1800 mm.......4 pcs

HPP “Zelenchukskaya”, Russia (2014)

Scope of work:
Design, manufacturing, delivery and commissioning of 2 electric-hydraulic systems for manipulation of emergency slide gates at the lower basin:

Cylinder Ø250/Ø110x5500 mm.....2 pcs.

HPP “Nizhne Bureyskaya”, Russia (2014)

Scope of work:
Design, manufacturing, delivery and commissioning of 2 electric-hydraulic systems for manipulation of 5 radial spillway gates and 4 emergency-slide gates.
Scope of work:
Design, manufacturing, delivery and commissioning of 2 electric-hydraulic systems for manipulation of the upper head slide gate. Synchronization of cylinder motion is obtained by frequency regulation of the electric motor driving the pump unit.

Cylinder Ø360/Ø200x8540 mm…..3 pcs
(with two flexible micro-pulse linear position transducers built in each cylinder)

Scope of work:
Design, manufacturing, delivery and commissioning of 2 electric-hydraulic systems for manipulation of 2 emergency slide gates. A new hydraulic cylinder was delivered for one gate only.

Cylinder Ø500/180x6050…………1 pcs.

Navigation lock “№7”, Volgo-Don Canal, Russia (2015)

HPP “Jablanica”, Bosnia and Herzegovina (2015)

HPP “Sayano-Shushenskaya”, Russia (2015)
REFERENCES - HYDROMECHANICAL EQUIPMENT

HPP “Sayano-Shushenskaya”, Russia (2015)

Scope of work:
Design, manufacturing, delivery and commissioning of additional electric-hydraulic drive for manipulation of the dam spillway.

HPP „ROGUN“, Tajikistan (2016)

Scope of work:
Design, manufacturing, delivery and commissioning of electric-hydraulic system for manipulation of 2 emergency-repair slide gates of 3rd tunnel.
We can name a few among various metallurgy plants with which our company has successfully cooperated in many projects — “Severstal” (Cherepovets), “ZAPSIB” (Novokuznetsk), NLMK (Lipetsk), Industrial-Metallurgy Company (formerly known as “KOKS”, Kemerovo), “Arselor Mittal Krivoy Rog” (Ukraine) and “Izdemir” (Turkey).
Transport of red hot coke – locomotive with hydrostatic drive, Russia (2005)

Coke discharge equipment, Russia (2005)

Scope of work:
Design, manufacturing, delivery and commissioning of electric-hydraulic system.
ELECTRIC-HYDRAULIC SYSTEM FOR BLAST FURNACE IN THE METALLURGY PLANT “ILVA”, ITALY (2015)

Scope of work:
Design, manufacturing and delivery of electric-hydraulic system.
Scope of work:
Design, manufacturing and delivery of electric-hydraulic equipment for the lifting of the dome of the Saint Sava Church in Belgrade, Serbia in 1989.

Control system of a slide gate:
- The weight of the dome is 4000 t, its height 27 m and it was lifted to the height of 43 m.

Scope of work:
Design, manufacturing, delivery and commissioning of electric-hydraulic systems for tunnel lining (like the one presented in the photo above in Shargan, Serbia) as well as telescopic platforms and unloading platforms in silos.
Scope of work:
Design, manufacturing, delivery and commissioning of hydraulic and pneumatic control and power transmission systems.

Lignite excavator, Serbia
Lignite excavator, Serbia

Scope of work:
Design, manufacturing, delivery and commissioning of systems for central lubrication.
REFERENCES – MISCELLANEOUS

Device for static and dynamic testing of crane load lifting mechanism up to 525 t, Russia

Hydraulic grab for litter removal, HPP “Djerdap 2”, Serbia

Hydraulic equipment for oil drilling, Turkmenistan

Scope of work:
Design, manufacturing, delivery and commissioning of electric-hydraulic equipment.
REFERENCES – MISCELLANEOUS

Scope of work:
Design, manufacturing, delivery and commissioning of electric-hydraulic equipment.

Hydraulic barge – oil rig, Malta

Material handling and structure testing, Serbia
Electric-hydraulic drives for hydro-mechanical equipment belong to the systems with standard solutions regarding their concept and configuration. The application of such drives demands that they are compact and verified theoretically and in practice.

Innovations in this field of application may not be visible at first glance, but they are always there, especially in details which have a significant impact on the quality, reliability and life span of the drive. An important demand that these drives must satisfy concerns the life span of the equipment - around 50 years if specific working conditions are met, namely low working frequency.

Design technology of electric-hydraulic drives for hydro-mechanical equipment comprises of several phases providing the required quality of system performance.
The hydraulic cylinder is an executive organ of the hydraulic drive. It conveys the hydraulic power of the hydraulic liquid under pressure converted into the linear motion to the mechanism of the gate. At the same time, it is subjected to the external load (weight) of the gate, the friction of the sealings and reactive force of the roll-gate wheels. From the kinematic point of view, a lot of solutions demand synchronous motion of two hydraulic cylinders to drive the gate which makes the selection of the optimal solution a compromise between the demands on quality of the minimum stable velocity of the cylinder motion, sealing friction, quality of the roll-gate wheels function and sealing reliability.
Hydraulic unit comprises of pump units with hydraulic tank and with necessary accessories. The hydraulic components are usually integrated in hydraulic manifolds. Valves include pressure relief valves, throttle valves for flow regulation and distributor valves depending on the drive configuration.

Hydraulic unit for manipulation of the gates of the temporary water tunnel of the first two turbine units at HPP “Rogun”, Tajikistan

Hydraulic unit and cylinders for the manipulation of working and service two-winged gates and gallery gates of the Krasnogorsk navigation lock
Gate position measuring system is of essential importance for the quality of performance of gate motion where active synchronization of two hydraulic cylinders’ motion is involved and the gate position information is needed. Today, there are plenty of traditional and modern system solutions.

PPT Engineering uses the following measuring systems:

Original system solution for measuring of cylinder stroke (control column, mechanical transmission, eccentric sheave, limit switches and potentiometer)

Measuring system comprising of rotating potentiometer, inductive switches, drum and sheave
Magnetostrictive sensor—external mounting - **HPP Shikapa, Angola**

Magnetostrictive sensor—internal mounting

Internal mounting of two magnetostrictive sensors – **Navigation lock №7, Canal Volga-Don**
Thank you for your attention!