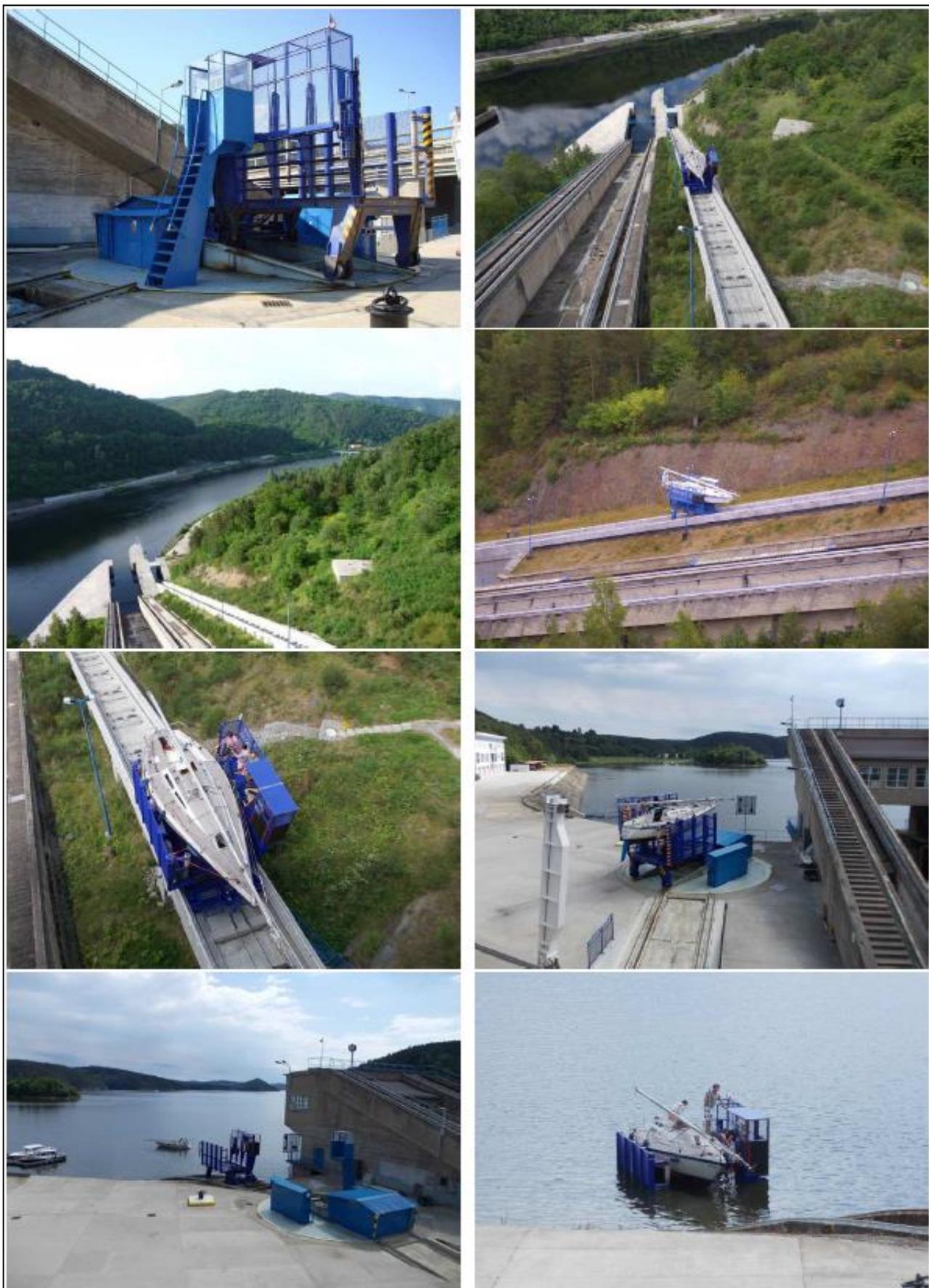


## **VD ORLIK – MODERNISATION OF THE LEISURE BOAT LIFT**

### **Background documentation for market consultation**



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## **1. INTRODUCTION**

The background documentation for market consultation has been prepared on the basis of the intention of the state company Povodí Vltavy to modernise the lift for leisure boats (LB) at Orlik Waterworks, the purpose of which is to improve the operational-utility features of the existing facility. The LB lift has been in operation since the mid-1970s and it is currently heavily burdened during the boating season. The modernisation should improve its operational reliability and safety, as well as its capacity. The expected scope of the investment is the supply of the entire project documentation, manufacturing, assembly, operational tests—including approval—and commissioning of the facility. The subject of the procurement is the full modernisation of the machinery and electrotechnical parts of the facility (lift car and machinery of the turntable) and, if an intervention on the existing structure is required, the scope shall also include the necessary construction works, including the full project documentation.

## **2. ANALYSIS OF THE CURRENTLY AVAILABLE DOCUMENTATION**

The following is the available background documentation that will be part of the forthcoming procurement documents:

- a) Technical description, instructions for operation, testing, maintenance and lubrication (ČKD Slaný – 1974)
- b) Original drawings of the car and the turntable (ČKD Slaný – 1971)
- c) Technical certificate LV3.5t
- d) Project documentation (PD) of the car repairs (PVL – 2012)
- e) PD of the modernisation of the lift drive (J-Controls – 2012)
- f) Vessel lift modernisation study (Pontex – 2014)
- g) State Navigation Administration information no. 7/2016 of 29/4/2016 related to the manipulation of boats on the leisure boat lift at the Orlik waterworks.
- h) Photo documentation

## **3. DESCRIPTION OF CURRENT CONDITION**

### **3.1. BASIC DATA OF THE LB LIFT**

The sloping track LB lift is designed to transport leisure boats and their crews over the crown of the Orlik Waterworks dam, from the lower to the upper water, and vice versa. The boats are transported on a lift car pulled by two cables on the tracks of the machine located on a turntable built on the dam's crown.

The mode of transport is as follows:

The car with the driver is partially submerged in the upper or lower water (the height of the surface varies). The boat is placed on the car and tied and settles on a horizontal platform when the car moves on the sloped tracks. Upon reaching the turntable, the car with boat and crew stops, the turntable turns 180° and the car is lowered on the opposite side of the dam, again partially submerged so that the untied boat may sail away.

The downstream side of the existing track of the lift of two slopes (8° and 22°) with R=180 transition arcs consists of two concrete bases in the shape of a channel built on both sides of the dam, to which two pairs of rails are anchored. The inner rails drive the tread and the top wheels of the car along the entire length of the track. The lower wheels of the car travel only on the 8° slope. On the transition arcs and the 22° track, the lower wheels of the car run on the outer rails and raise over the upper edge of the inner rails at the start of the transition arcs. This is necessary to keep the horizontal level of the platform on both slopes of the track. On its entire length, the track is fitted with rollers to support pulling lanes. Due to the significant damage caused by the 2002 floods, a thorough renovation of the

LB lift on the downstream face was carried out in 2004-5. The original structure of the concrete gutter was left on the upstream face.

The lift car has a platform to carry boats and the operator's cabin. The cabin is fitted with a seat and a panel with the control and signal instruments. The cabin is also fitted with safety components: speed limiter, control shaft, pressure distribution and manual drive actuating slide grippers. The outside of the structure of the platform is covered with protective mesh panels. The front part of the support structure of the platform is fitted with anchors to fasten the boats. The car is secured against unintended acceleration with a centrifugal speed limiter that activates sliding pneumatic traps. The platform is controlled with levers. The transmission of the controls is carried out by wireless signal to the main switchboard located near the turntable (Exemption granted No. 6484/ 4.77/71 from ČSN 274009 – design and construction of el. lifts). The control of the platform turn and its arrestment to the appropriate track of either the upper or lower station is button controlled from the turntable station. When the platform reaches the upper or lower station, a traffic light automatically turns on to indicate whether a boat can go on the platform. The load of the lift is monitored by a device on the cable sling rocker. The operator can control the weight of the load on a display on the control panel. An overload will activate an acoustic signal. The platform is controlled by a trained operator who is responsible for the safety during loading, monitors the weight and size of the boats and communicates with a mobile phone or the phones in each station. The operator is responsible for the maximum number of people transported, the safe transfer of crews to the place designated on the platform for the transport of persons.

#### **Basic data of the existing LB lift:**

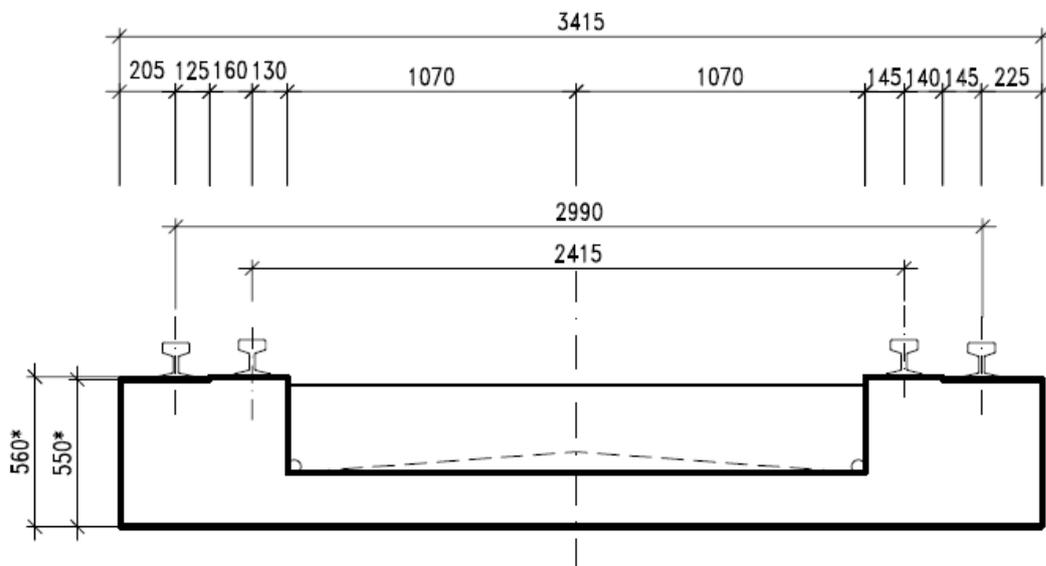
Type of facility:	sloped lift with driver to transport persons and cargo
Producer:	ČKD Praha o. p.
Serial no.:	ŠVO3500.5.05
Year of production:	1974
Operator:	Povodí Vltavy, státní podnik
Location:	Orlik Dam
Number of stations:	3 – lower water, turntable, upper water
Length of track:	approx. 211 m (downstream part) + 55 m (upstream part)
Slant of track:	8° to 22°
Track gauge:	2420 and 3120 mm
Wheelbase:	3500 mm
Max. load (boat + crew + operator):	3.5 t
Car weight (structure):	5.34 t
Max. boat length:	8.0 m
Max. boat width:	3.0 m
Rated speed:	$v_1 = 1.225$ m/s
Maximum speed on the track:	1 m/s upwards, 1.1 m/s downwards
Lift machine:	drum, two-cable with electric drive
Cable Ø 25 mm :	ČSN 024324.45.6.
Wires per cable:	222
Electrical system:	380/220 V, 50 Hz
electric engine of main drive:	T4231 E/6, Commutator, derivative feed to the rotor
power/revolutions:	70/14 kW, 1450/290 rpm
electric motor of turntable drive:	VM 10/6, 1,8 kW, 955 rpm
electric motor of turntable lock:	2AP 71-48, 250 W, 1380 rpm
rails):	125 mm high Xa

### 3.2. BASIC DATA OF THE CURRENT STRUCTURE OF THE LB LIFT

#### Upstream section:

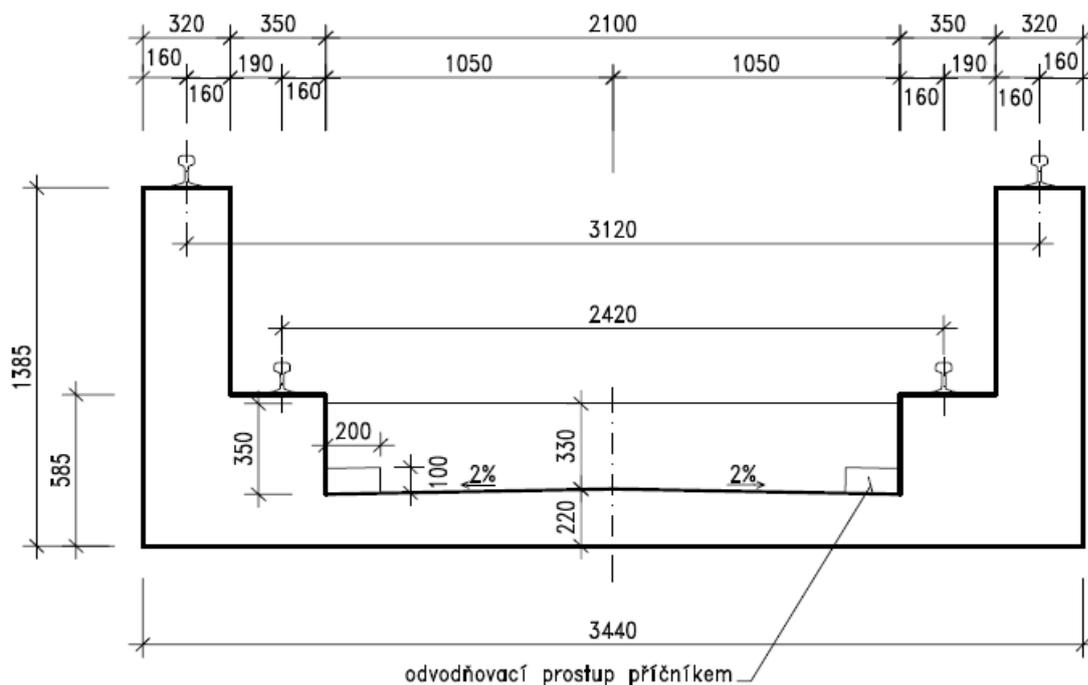
The original, upstream, part of the LB lift consists of reinforced concrete monolithic U-shaped blocks placed on a concrete foundation. The rails are anchored directly on the concrete. The modification of the concrete structure to unify the gauge with the reconstructed downstream part is yet to be carried out.

#### Sample cross-section:



#### Downstream section:

A full reconstruction of the downstream section, which had been damaged by the 2002 floods, was carried out in 2004-5. The works included repairs to the outer gauge. The chassis of the car was modified so it could run both on the reconstructed section of the air face and the upstream section, which has kept the original rail gauge. Refurbished rails are discontinuously placed on an ORTEC MX 1316 system on steel plates.



## **4. DESCRIPTION OF THE CONCEPT OF THE MODERNISED LIFT**

### **4.1. BASIC DATA OF THE MODERNISED LB LIFT**

Length of track	approx. 211 m (downstream part) + 55 m (upstream part)
Slant of track	8° to 22°
<b>Max. load (boat+crew+operator)</b>	<b>6.6 t</b> (6.0 t boat + 0.6 t crew incl. operator)
<b>Car weight (structure)</b>	<b>8.8 t</b> (8.0 t car + 0.8 t of equipment)
Max. boat length	8.0 m
Max. boat width	3.0 m
Maximum speed on the track	1 m/s upwards, 1.1 m/s downwards
Max. boat height	4.5 m
Max. boat displacement	6.0 t
Max. boat draught	1.15 m
Max. number of persons	5 (crew) + 1 (operator)

### **4.2. REQUIREMENTS FOR THE MODERNISATION OF THE FACILITY**

The following is required in addition to the requirements to increase the lift's maximum load:

- to reliably and accurately weigh the transported boats
- to prevent the negative effect of the misalignment of the boats' centre of gravity on the platform when the car is moving on the rails (a system to fasten a centre the boat to ensure a stable of its centre of gravity)
- to fit the facility with a reliable automatic braking system in case of malfunction of the pulling system
- to design the chassis and wheels to ensure smooth movement free of vibrations and the associated wear of the wheels
- to fit the car with a suitable and safe place for crews and operator

## **5. SPECIFICATION OF THE SCOPE OF THE FULL SUPPLY**

The supply shall comprise, in particular:

- full project documentation, including: building permit documentation, project implementation documentation, production and workshop documentation, documentation of the actual configuration of the structure.
- machinery and electrotechnical parts, construction works, if required, including the necessary interventions to the associated equipment at Orlik Waterworks
- quality assurance pursuant to the applicable regulations, standards, etc.
- adequate revisions
- staff training, service during the trial operation
- setting up management and maintenance plans
- warranty and post-warranty service, spare parts, etc.