

**MAHIPAR UNIT 3**

Commissioning Report- Breaking system

Page 1 of 6

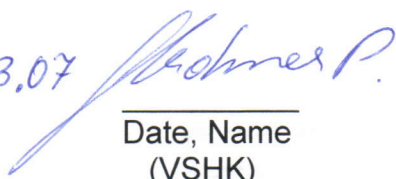
**REHABILITATION OF MAHIPAR & SAROBI HPPs,  
AFGHANISTAN**

**MAHIPAR POWER PLANT - Unit 3**

**Commissioning Report**

**Breaking system**

Customer:	Ministry of Water and Power Kabul, Afghanistan
Consultant:	Lahmeyer International
Contractor:	Voith Siemens Hydro Kraftwerkstechnik
Participants:	- Mr. P.Kolbe (Voith Siemens Hydro Kraftwerkstechnik) - Mr. P. Strohmer (Voith Siemens Hydro Kraftwerkstechnik)
Autor:	- Mr. P. Strohmer (Voith Siemens Hydro Kraftwerkstechnik)

17.3.07 

Date, Name  
(VSHK)

Date, Name  
(Client)

Date, Name  
(Consultant)

VSHK P. Strohmer. 170307

## **MAHIPAR UNIT 3**

### **Commissioning Report- Breaking system**

Page 2 of 6

#### **Contents**

<b>1. Breaking system</b>	<b>3</b>
<b>1.1 Overview of the breaking system</b>	<b>3</b>
1.1.1 Normal Stopping	3
1.1.2 Emergency Stop (Notfallauslösung)	3
1.1.3 Compressed air supply	4
<b>1.2 Commissioning of the breaking system</b>	<b>4</b>
1.2.1 Air supply	4
1.2.2 Function check during standstill	5
1.2.3 Function check during operation at no load	5

## **MAHIPAR UNIT 3**

### **Commissioning Report- Breaking system**

Page 3 of 6

## **1. Breaking system**

### **1.1 Overview of the breaking system**

Compressed air is used to activate four break shoes. They are moved back by springs. At every break shoe, 1 limit switch is mounted to indicate the break shoe position at the machine control board (0V= breaks down)

If the command breaks ON existing, a solenoid valve is switched and the break shoes are pushed up. The valve is always active for about 5,5 minutes, realised by a time relays. For whatever, the breaks can be switched ON and OFF during every condition by a manual switch located at the machine control board.

#### **1.1.1 Normal Stopping**

- $n < 30\%$  (225rpm) of nominal speed (750rpm)
- time 2 to 3min to standstill (breaks can be reactivated by the manual switch)

#### **1.1.2 Emergency Stop (Notfallauslösung)**

- $n=100\%$  breaks automatic activated
- time 5 to 6 min to standstill (breaks can be reactivated by the manual switch)

#### **Activated due to:**

“Gefahrentaste” (without delay)

Bearing temperature too high (delay of way)

No oil flow of UGB and TB (delay of way)

#### **Interlocking due to:**

Spherical Valve is not closed

or wicket gate is opened

110 kV CB is closed

10 kV CB is closed

## **MAHIPAR UNIT 3**

### **Commissioning Report- Breaking system**

Page 4 of 6

#### **1.1.3 Compressed air supply**

The same compressor as for the air replenishment of the pressure tank is used (new system for the pressure supply of the spherical valve air replenishment). The compressed air for all units is collected in one pressure tank located at unit 1. The pressure for operating should be in the range from **5,5- 7 bar**. Before the solenoid breaking valve, a manometer with one limit contact is mounted. If the pressure gets below **3 bar**, the contact is closed and a failure message occurs.

#### **1.2 Commissioning of the breaking system**

##### **1.2.1 Air supply**

The compressor is not automatic switched on and off by the pressure switches of the distribution tank. At the moment the pressure is held between the limits (5,5 - 7 bar) manually. The local operators normally closing the valve before the pressure pipes are split to each unit. So for activating the breaks, that valve has to be opened by hand.

##### *Low pressure warning*

Final adjusted to **3,5 bar**.

For further information, see Message Matrix Mahipar unit 3.

## **MAHIPAR UNIT 3**

### **Commissioning Report- Breaking system**

Page 5 of 6

#### **1.2.2 Function check during standstill**

##### Manuel Control

The manuel switch (b776) at the machine control board was switched to breaks ON and OFF position during following conditions.

1. Simulation of standstill
2. Simulation of automatic activated breaks due to relays *d4*

The breaking valve switched and the breaks moved according to the specification.

The visual indications (Signal lamps) are proper working.

##### Manuel pump

The manual pump for pushing the breaks was tested and is proper working.

#### **1.2.3 Function check during operation at no load**

##### **1. Function check during normal stopping**

The breaks have been automatic activated at 30% speed (see diagram 1)

##### **2. Function check during simulation of Trip**

*Simulated trip: "Turbine bearing temperature too high"*

According to the message matrix the breaks are activated at 100% speed if the spherical valve or the wicket gate is closed. For safety reasons, the pressure of the breaks was released at 50% speed. The breaks have been immediately automatic activated.

## MAHIPAR UNIT 3

### Commissioning Report- Breaking system

Page 6 of 6

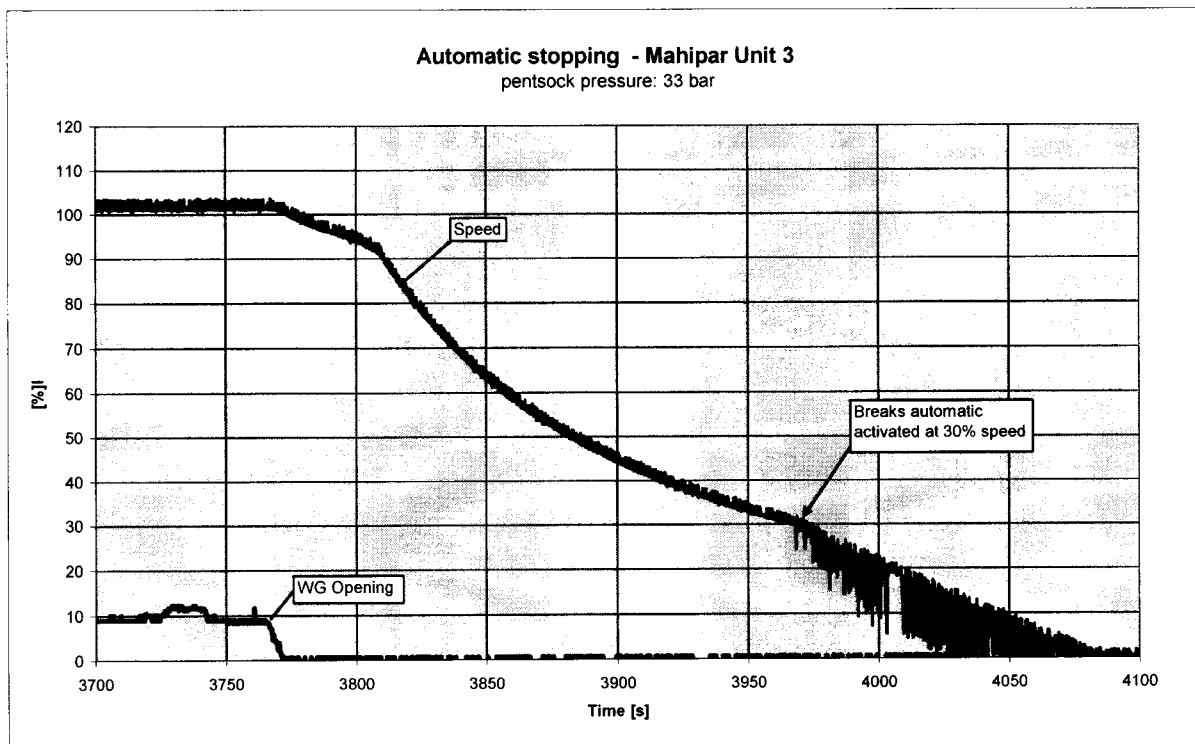


Diagram 1: Normal stopping of unit 3, Mahipar

VSHK P. Strohmer. 170307

Vertraulich, alle Rechte vorbehalten DIN 34  
Confidential, all rights reserved DIN 34  
Confidencial, reservados todos os direitos DIN 34

A company of the joint venture

**Voith Siemens**  
Hydro Power Generation