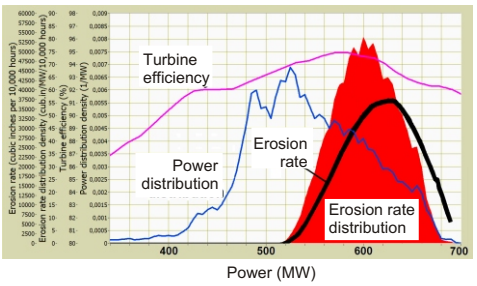
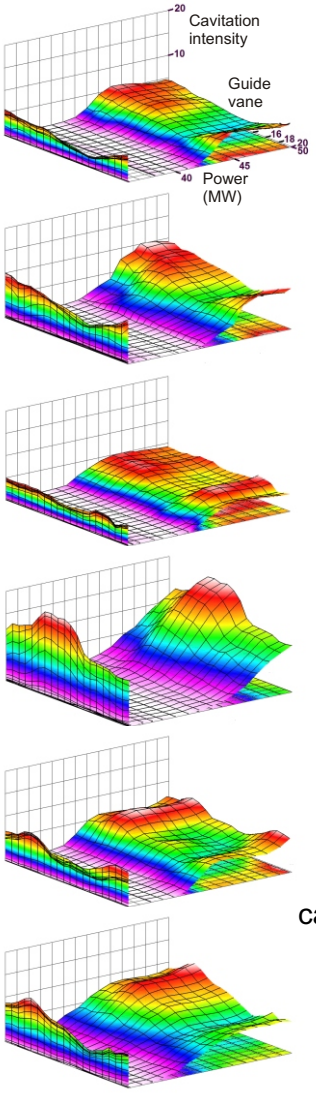
Turbine Cavitation Diagnostics and Monitoring
Based on the Korto Multidimensional Technique

If you have trouble with cavitation in your turbines, you might be interested in the following cases.
If you recognize any of the situations as yours, we would like to hear from you.

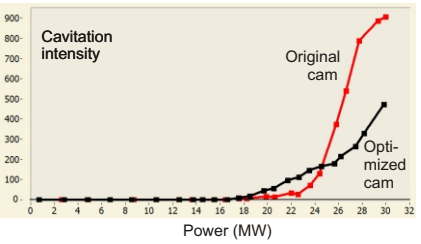
You want to optimize the operation of your turbine. You know its efficiency characteristics pretty well, but you also wish to keep cavitation under control. We can supply you with reliable cavitation data such as shown on the right from the big Francis unit at **Grand Coulee HPP in the USA**. To do this, we make a test as described on the opposite side of this leaflet. In addition to global cavitation characteristics such as these, we deliver diagnostic details on cavitation. These indicate what should be changed in a turbine in order to improve its cavitation performance.

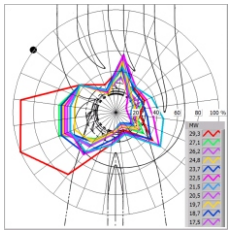




You have more units in your plant. You know that, even if they are identical, the turbines might differ in cavitation performance. You wish to quantify this in order to optimize the load distribution and reduce total cavitation erosion to the minimum. The example shown on the left of the six Francis turbines at **Burfell HPP in Iceland** illustrates these differences. For each of the units, cavitation intensity is shown above the turbine power and guide-vane number, which reveals the influence of the position within the spiral casing. On different turbines, the cavitation-threshold power values differ by up to 10%, and the total cavitation intensity by 3:1.

You plan to adjust or re-adjust the cam in your Kaplan turbine, and you want to know how the changes in the cam affect cavitation. Here is an example from **Kembs HPP in France**.

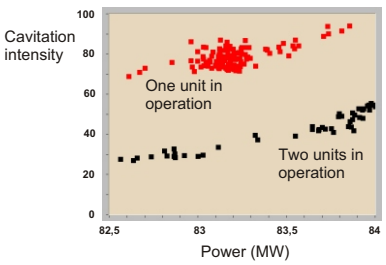




You wish to check the quality of the internal geometry of your turbine with respect to cavitation. Is the shape of its flow-directing parts good enough? This test result on the **Kembs** turbine indicates more pronounced cavitation behind some parts of the spiral casing, and reveals, in these positions, anomalous cavitation on the highest power values.

The operating conditions of your turbine are quite variable. Making tests in all of them would be time consuming. You wish to have your own tool for on-line cavitation assessment. For this purpose, we deliver **Cavitation Monitoring Systems**.

They typically consist of 6 cavitation sensors **S** and one cavitation processor **P** per unit. Here, the Korto multidimensional cavitation monitoring algorithm is implemented using FPGA/RT technology. Such systems can be employed as cavitation channels of a general plant monitoring system or, with the addition of one PC per plant, independently.



You have a cavitation monitor and want to quantify the effect of other units on the cavitation in the monitored turbine. Here you can see the result for the Francis units at **Belesar HPP in Spain**.

The cavitation monitors also yield **Accumulated Cavitation Intensity** which estimates accumulated cavitation erosion. This enables predictive maintenance to be carried out for cavitation.

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