Improvement of service life of turbine blade in wet region

REASON FOR SUGGESTION:
A condensing turbine being operated in a wet steam region may have its blade surface erosion due to drain produced during long-term operation, leading to an accident of broken blade(s) in a worst case as well as reduction in efficiency.

DETAILS OF SUGGESTION:
Replace the blades (application limit of blade height : 200 mm) in a relatively high wet (< 10%) stage with those so-called ceramic-ion plated which are Nitrided titanium (TiN)-top coat and chrome (Cr)-under coat. Thereby, higher erosion resistance and longer service life will be obtained.

---

**Fig. 1 Cavitation Erosion Curves**
- Cr-TiN IP
- Stellite (Soldering)

**Fig. 2 S-N Curves**
- Rotating
- Bending

**Table:**

<table>
<thead>
<tr>
<th>Material</th>
<th>Environment (Room temp.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Metal</td>
<td>Air</td>
</tr>
<tr>
<td>TiN Coating</td>
<td>3% NaCl</td>
</tr>
</tbody>
</table>

---

Mar. 12, 2012
T-S-002 / 766-90172
**BASE MATERIAL**

- **TiN**
- **Cr**

**Base material**: about Hv 200

**Ion plating**: about Hv 1500