

View from a Technical Expert

Brilliance is not required to be a turbine generator expert...You just need to see hundreds of failures.

Overview – 1972 through 2015

In 43 years many issues remain, some with new and more difficult challenges than before

- An Experience Gap has returned
- Difficulty of reviewing and adjusting a failure has increased
- The equipment is less tolerant of variations in operating parameters
- More complicated plants with fewer, less experienced personnel and lower maintenance spending overall
- Contract issues today create significant barriers to a smooth adjustment
- OEM contracts which look great on the outside are not what they seem

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But... the equipment still breaks as always

The Gap – Not the London Tube

Today there is an experience gap in many industries and vocations

- In 1972 there were 20's and 40's
- Today there are groups of 20/30's and 50/60's – Thus the Gap
- Training by all industries has been lax or nonexistent, little movement upward and the "young" personnel in many plants are in their 50's
- Today training is ramping up and your experts are being used in the process
 - Site visits
 - Meeting presentations
 - Sharing training materials
- This situation has created opportunity for many young people considered to be "Hi-Pots"

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This failure is the result of inadequate training

Difficulty in Claims Today

Today's Adjustments Seem to be More Difficult than in the Past

- 25 years ago a technical expert could say what happened – Adjuster apply policy – Come to an agreement
- Around 2000, T&C changes resulted in less OEM responsibility – Consequential was redefined
- Business profits dropped
- Owners argue more to keep costs in claim or even establish a claim exists
- Litigation or threat of lawsuits seem to have increased significantly
- This is requiring more expert involvement in not only technical, but litigation support very soon after the loss has occurred

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However,



Some are easy to agree there is a claim

Less Tolerant Equipment

Today's Turbine Generator Equipment is Less Tolerant of Variations in Operating Parameters than in the Past

- Much tighter design using computers
 - Calculations
 - Modeling
 - Generating drawings and digital machining
- With more accuracy comes less margin added as in the past
- Output and Efficiency improving significantly – More on the “edge”
 - Temperatures – Material Concerns
 - Mass flow – Compressor Concerns
 - Emissions – Dynamics Issues
 - Size – Stress Issues
- Materials making repairs more difficult
- Parameters include Fuel, Steam Purity, Air Flow, Tight Clearances, Cycling Operation, Less Maintenance, Starting/Loading Rates, Etc.

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Dynamics and failure happens in a “Flash”

More Complicated Plants with Less

As the Power Industry expands, there are more complicated plants with fewer, less experienced Operators and less Maintenance

- Computer controls have evolved to very reliable level, can control, monitor and archive – Thousands of points can be monitored
- Many plants heavily depend on computer programs in lieu of significant training
- In a control room, screens are limited and others in the stack are noted only if alarmed
- Problem is trend on a back screen – May indicate major issue occurring, but not aware until alarms and perhaps too late
- Also some alarms and trips will not arm until certain speeds, temperatures, etc.
- Failure can be a result

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As the Power Industry expands, there are more complicated plants with fewer, less experienced Operators and less Maintenance

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- In a control room, screens are limited and others in the stack are brought up only if alarmed – Thousands of points can be monitored
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Vibration Alarm Not Armed – Rub Not Detected - Resulted in Bowed Rotor

Contract Barriers to Adjustment

Contract language creates major issues in the technical review

- Consequential damage in the 90's and prior was anything outside the unit – Warranty covered the PD repair costs
- In the late 90's demand for equipment was high and OEM's redefined the term "Consequential"
 - Advantage to OEM due to demand
 - Largest major manufacturers began the trend
 - Not all made the changes till later
- The new definition limited the OEM to the part that failed and nothing else – Mirrored Insurance Provider
- This increased costs significantly for Insurers by eliminating OEM PD responsibilities – Even if it is under Warranty
 - Open and Close the Unit
 - Major parts that were damaged downstream
 - Large GT range is \$9 million to \$25 million
- Owners complained and the OEM's responded ... eventually
 - Many now offer to cover all Warranty costs
 - LOL is \$1 million to \$1.5 million
 - Insurers pay the rest

OEM Contracts – The Answer?

OEM contracts have responded to problems with Warranty and Subrogation

- The LTSA and LTP became the answer to Owners and Insurers – At least that was the idea
- Service Agreements were the answer to the OEM as well
 - Regular monthly payments for a known period on the Gas Turbine
 - Owner bound to use only the OEM
 - Unplanned Maintenance (Insurance Loss) was not discounted
 - OEM Responsible for maintaining HGP components
 - OEM can use either new or refurbished parts
 - Warranty limits priced into the contract (Usually Value of Deductible)
 - No Underwriters were allowed to review – Confidential
- Consider who wins and loses in an LTSA or LTP
 - Owner has agreement from OEM to maintain parts
 - Owner knows their financial obligations and can plan
 - Owner plans for time off line
 - Insurers cover without knowing terms in some cases
 - Insurers do not benefit from the discounts – Typically Market Price
 - Insurer typically do not benefit from value already paid
 - Parts removed belong to OEM – Title passes and must ask to inspect
 - Parts removed have zero salvage value
- Score – OEM 1 Insurers 0

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- If borescope inspected and thought to “make to the next outage” but fails – Insurers pay – OEM does the repair at Market Value
- The LTSA and LPT contain waivers of Subrogation – Insurers recover only on Gross Negligence
- When the parts have transferred title, Insurers lose their ability to inspect the components – Owners (Insurers) can thereby lose their right to even declare a Warranty
- When the parts are repairable, but have no salvage value, the Insurers lose the remaining value – No credit to the claim
- What about the outage the OEM no longer has to complete although already being paid monthly?
- Score OEM 2 – Insurers 0

All That Said – Why do you even Need an Expert?

They are expensive

They are sometimes moody

They usually provide a poorly written report or one that is long and filled with minutia

Some are busy and hard to reach

Most are old – The Gap

However - Your expert can provide the needed information to adjust the loss, whatever the circumstances

Be sure you both understand the Expert's role

Your Expert's Role in the Failure

There are important issues to resolve immediately.

Plant must understand...

- Your expert does not see the policy or any of its terms.
- Your expert is there to provide the answer only, so the Adjuster and Insurers can make policy decisions.
- Your expert is concentrating on very specific aspects of the loss.
 - Define an Event
 - Determine Event Related Damage
 - Determine Event Related Scope
 - Establish Event Related Costs and Time
- Your expert is there to support their efforts as well.

This particularly true with Plant Engineering personnel

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One Problem Area for Failures

What happens if the failed equipment is deemed abandoned and not replaced?

Simple ... Just calculate an ACV.

- How is it calculated? Many times it is not defined in the policy.
- Do we use today's new price for the base calculation?
- Do we include material only or material plus installed cost?
- Is there a floor value or is it depreciated fully over its life?
- How is the expected life defined?

These questions could be agreed in a policy to save grief later.

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This failure resulted in litigation partially because the ACV was not defined



The First Visit After a Failure

The first visit is important to gathering the most critical information and it is important that a relationship be established

- The Owner must believe your expert is there to be objective – Not to “cut costs”
- The expert must be there to provide the “answer only” then the Adjuster and Insurers can make a decision
- The first visit is critical and having an attorney along the first time can result in the inability to gather information informally
- The ability of your expert to relate to non-management (operators, maintenance personnel, engineering) is critical

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Plant operator description solved the cause



Key Thoughts

Accidents will happen.

There are many good experts available to support your needs.

- Be sure instructions are provided regarding what words can and cannot be used verbally or in reports.
- Be sure the Owner understands the expert's role and tunnel vision scope.
- The first visit is the most critical of all to gather information on what was seen, smelled, heard, etc.
- Once the Owner is comfortable, then ask for more sensitive information and to meet with specific personnel.

Keep the Owner and Risk Manager at ease by being less intrusive at first.

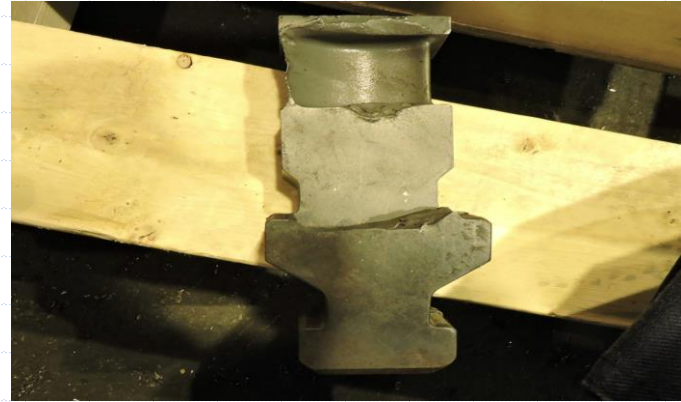
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Information on prior repair received



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Thanks and Questions

