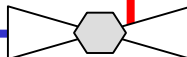# Non-Compliance with Maintenance Procedures

An EMSG Committee Paper
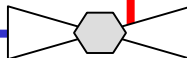
Cliff Edwards
Chairman EMSG

Aviation Hazard Management Ltd
Bentley Priory October 2005

# Non Compliance in Aircraft Maintenance

Background

EMSG Committee Activity

The Engineering & Maintenance Standing Group (EMSG), are a sub-committee of the Royal Aeronautical Society's (RAeS), Human Factors Group (HFG).

We are established to enhance understanding and the communication of human factor related issues in the aircraft engineering and maintenance environment.

As a committee, we believed that one area needing enhancement is the understanding of the level of compliance in the maintenance workplace.
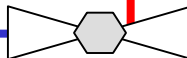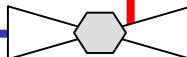
Non-Compliance

The questions we wanted to consider:

- **Is Non-compliance with procedures an issue?**

- **Are we satisfied with the current situation?**

- **What are the reasons for non compliance?**

- **Do we really need high levels of compliance?**

- **Is this deliberate violation?**

- **Or is it an optimising violation?**

- **And is it a norm in the organisation?**

- **Or even a norm in the Industry?**
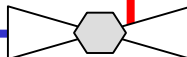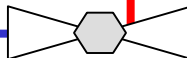
Non-Compliance

- **If we wanted answers to they questions, we needed to look at working practices.**

- **We chose to do the assessment by looking at the "Daily" Inspection.   This because we were not aware that any occurrence had been reported against this activity and therefore the engineers might be more open about the compliance and decision making process used by maintenance personnel.**

- **We utilised simple observation and discussion techniques with 5 carriers, and gained insights from most of these.**

- **We pooled the data to de-identify its source.**

Aims

We had three aims for this study:

- To determine the nature and extent of compliance with procedures within Daily inspections.

- To understand the maintenance engineer decision-making process where compliance, or non-compliance was achieved and to know if this was random, or systematic within shifts, the Company or more widely in the aviation industry.

- To improve the management of compliant practice in aviation maintenance organisations.

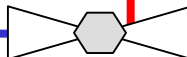# Non Compliance in Aircraft Maintenance
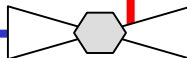
General and Indicative Findings
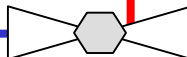
General Findings

- **All the companies contributing to this study had documented checklists for the "Daily" based on the manufacturers maintenance recommendations and each had over a period of time enhanced these checklists.**

- **Although available there was virtually no take-up of use of the checklists to do the Daily by engineers.**

- **The engineers assessed where all: average, well meaning, reliable, well trained and importantly committed to getting the task done safely.**

- **None of the observed actions led to negative outcomes.**

Indicative Findings

- **Generally experienced engineers did not believe they need to use the "Daily" checklist.**

- **There is virtually no systematic QA assessment or QC supervision of the Daily in progress.**

- **Compliance auditing/monitoring is largely ineffective at finding non-compliant practice.**

- **The engineers made judgements on what to do, or not based on their experiences.**

- **Other work and manning levels, on the day, dictated how much of the daily was done.**

- **Best intentions were always the motive for non-compliance.**

Non Compliance in Aircraft Maintenance

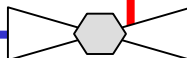## Specific Analysed Elements of the Daily Inspection
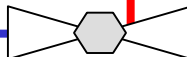
Specific Analysed Elements

I will not comment on what was done well, or is achieved systematically.

However, those elements of the Daily that were performed poorly, or to highly variable standards I will briefly address:

- **Flight-deck Checks** – the observed standards varied from very thorough to hardly done at all, especially if access to the cockpit was limited on the day.

- **External Checks** – structure, cowlings etc. lacked clear focus and were inconsistent in their application.

- **Cargo Holds** – similar to the external checks, often lacking in understanding of why it was to be done.
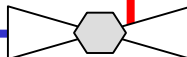
Specific Analysed Elements

- **Fuel and water drain checks** – the application of these checks was almost always poor, many saying that the it was pointless as nothing is ever found worthy of note.

- **Cabin Check** – similarly these were not considered essential and in general are not viable (e.g. to check the life jackets, or seat services in every seat would take to much resource). The cabin staff, or cabin log were the indicators they rely on.

- **Specific system checks** – varied by the aircraft type, but in some cases can't practically be achieved, or induced system shutdowns, that led to omissions in their application.
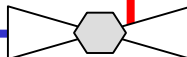
Specific Analysed Elements

- **Checklist Usability** – this was seen to induce non-compliance as in the main it does not follow a coherent work-flow, and may mean several circuits of the aircraft if followed.

- **Management Control and Supervision** – there seemed to be little in place to promote compliant practice. In fact generally it was the converse as "getting the job done" was the primary driver.

- **Corporate Culture** – the organisation should be using their safety culture to achieve full compliance, but in some cases, can-do-ism and shortcutting were encouraged.

Specific Analysed Elements

- **Regulations – In general these do not help, the encourage repetition of the dogma, "all work must be done in accordance with procedures" whilst the evidence is there that this is not the case.**

However, on the positive side - in general the individual safety awareness of the individual engineer, their professionalism, as a norm, results in an overall safe and largely acceptable standard being achieved.

But this use of individual standards is non-systematic and should not be relied upon by their companies, or the maintenance organisations.
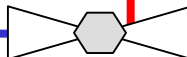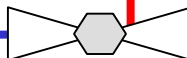
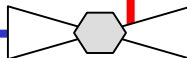# Non Compliance in Aircraft Maintenance

Summary
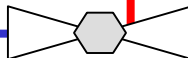
Summary

- **We did not try to calculate the percentage of non-compliance, but its clear that although better than 50% of the checklist is done, it is way short of the 100% we imagine is happening, and rely upon.**

- **The parts of the daily that are done, are not in itself systematically applied, albeit the key issues that we would all consider primary airworthiness issues seemed to be done.**

- **We have not yet decided where to take this next but we are agreed that it is important to continue to raise the profile of non-compliance with procedures as this features routinely in accident and incident reports.**
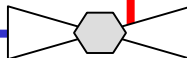
Summary

- **Little is being done to reduce the levels of non-compliance and yet non-compliance if repeatedly condoned soon becomes a norm and the accepted practice.**

- **We will not solve the problem by repeating, or trying to enforce the dogma "all work is done to procedures"**

- **We need intelligent solutions, that are both practical in the workplace and yet provide the required levels of safety.**

- **What do we think could be done, we don't have the answers, but we believe that as an industry we must work together to start addressing our problems.**

Questions of Non-Compliance

- **Is Non-compliance with procedures an issue? Yes!**

- **Are we satisfied with the current situation? No!**

- **What are the reasons for non compliance? Expectations, Norms and Pressure of Work!**

- **Do we really need high levels of compliance? Yes!!**

- **Is this deliberate violation? Not in the true sense its condoned, an optimising violation & therefore a Norm!**

- **Or is it an optimising violation? As Above.**

- **And is it a norm in the organisation? As Above.**

- **Or even a norm in the Industry? Yes but not well understood in many of our companies!**

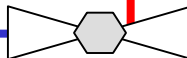# Non Compliance in Aircraft Maintenance

Conclusions
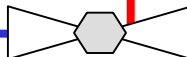
Conclusions

- **Reduce the number of items in the daily to those that are essential and each must be readily achievable.**

- **Improve the workflow of the checklist, as is already done in some companies.**

- **Accept that some tasks could be "memory item" tasks, and in doing so introduce training to set the standard, and routine testing to confirm it.**

- **Reallocate tasks to other inspections or other people.**

- **Question if the quality control provided by line management and supervision is adequate.**
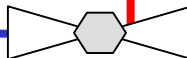
Conclusions

- **Make the checklists operationally useable, e,g, clear, concise & plasticised to enable use in all conditions.**

- **Consider pocket size aide memoir checklists**

- **Enhance quality assurance audits and assessments to highlight non-compliant practice, shortfalls in competence and training and poor work instructions.**

- **Assess through audit (regulatory and QA) the resourcing levels (people, time equipment) available.**

- **Recognise that reading and doing are not natural partners and that we need to do some supervising and raising awareness.**

Conclusions

My Personal Views:

- **What is not measured can not be managed, is a fact. How can we fix our problems unless we know what they are. We need effective "means & measurements" in the workplace.**

- **We need a culture of reporting and a system like MEMS to analyse and manage the information and an organisation that supports staff reporting.**

- **We also need effective peer led "Process & Practice" monitoring to assess and report the viability of the task and what is actually occurring in the workplace**