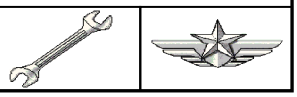
SAFETY PROMOTION NOTICE

SUBJECT: STANDARD PRACTICES

Recommendations for visual inspections - Human factor approach

For the attention of



AIRCRAFT CONCERNED	Version(s)	
	Civil	Military
EC120	B	
AS350	B, BA, BB, B1, B2, B3, D	L1
AS550		A2, C2, C3, U2
AS355	E, F, F1, F2, N, NP	
AS555		AF, AN, SN, UF, UN, AP
EC130	B4, T2	
SA365 / AS365	C1, C2, C3, N, N1, N2, N3	F, Fs, Fi, K, K2
AS565		MA, MB, SA, SB, UB, MBe
SA366		GA
EC155	B, B1	
SA330	J	Ba, L, Jm, S1, Sm
SA341	G	B, C, D, E, F, H
SA342	J	L, L1, M, M1, Ma
ALOUETTE II	313B, 3130, 318B, 318C, 3180	
ALOUETTE III	316B, 316C, 3160, 319B	
LAMA	315B	
EC225	LP	
EC725		AP
AS332	C, C1, L, L1, L2	B, B1, F1, M, M1
AS532		A2, U2, AC, AL, SC, UE, UL
EC175	B	
EC339		KUH/Surion
BO105	C (C23, CB, CB-4, CB-5), D (DB, DBS, DB-4, DBS-4, DBS-5), S (CS, CBS, CBS-4, CBS-5), LS A-3	CBS-5 KLH, E-4
MBB-BK117	A-1, A-3, A-4, B-1, B-2, C-1, C-2, C-2e, D-2, D-2m	D-2m
EC135	T1, T2, T2+, T3, P1, P2, P2+, P3, EC635 T1, EC635 T2+, EC635 T3, EC635 P2+, EC635 P3, T3H, P3H, EC635 T3H, EC635 P3H	

INTRODUCTION

The purpose of this note is to better define and outline the concept of visual inspection to harmonize and standardize the knowledge and the know-how on this very recurrent maintenance action.

WHY PERFORM A VISUAL INSPECTION?

A visual inspection is often the fastest and most economic means of effectively detecting degradations on an aircraft. However, a visual inspection is only effective when strict rules are complied with. The manufacturers and the airlines depend on regular visual inspections to maintain the airworthiness of their aircraft.

For line maintenance, the visual inspection is also the dominant work method, and represents at least 90% of the total work load.

THE DIFFERENT TYPES OF DEGRADATION

The area to be inspected must be cleaned before performing any visual inspection. A clean surface condition increases the probability of detecting a degradation.

The purpose of this section is to present the different types of degradation that are most commonly observed with Work Cards.

METALLIC

Figure 1: Brinelling

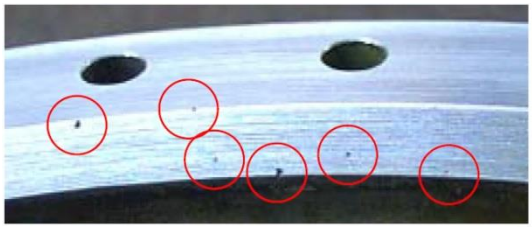


Figure 2: Pitting corrosion

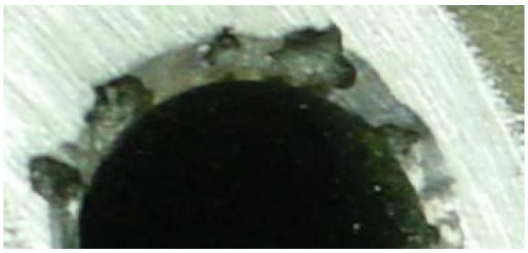


Figure 3: Cavernous corrosion

Figure 4: Galvanic corrosion

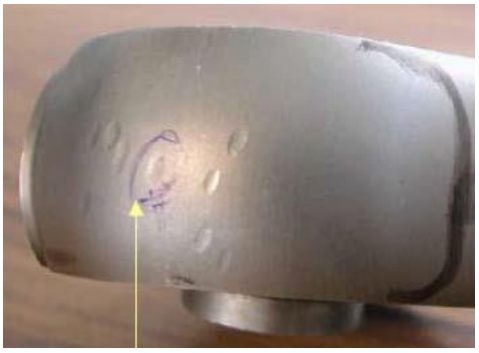


Figure 5: Dents/Impacts

Figure 6: Crack (nut retainer bush)

Figure 7: Fretting (spherical thrust bearing)

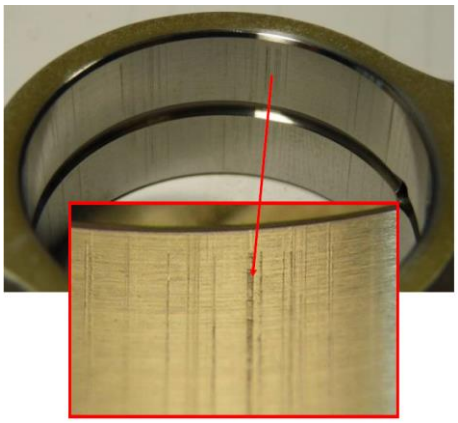
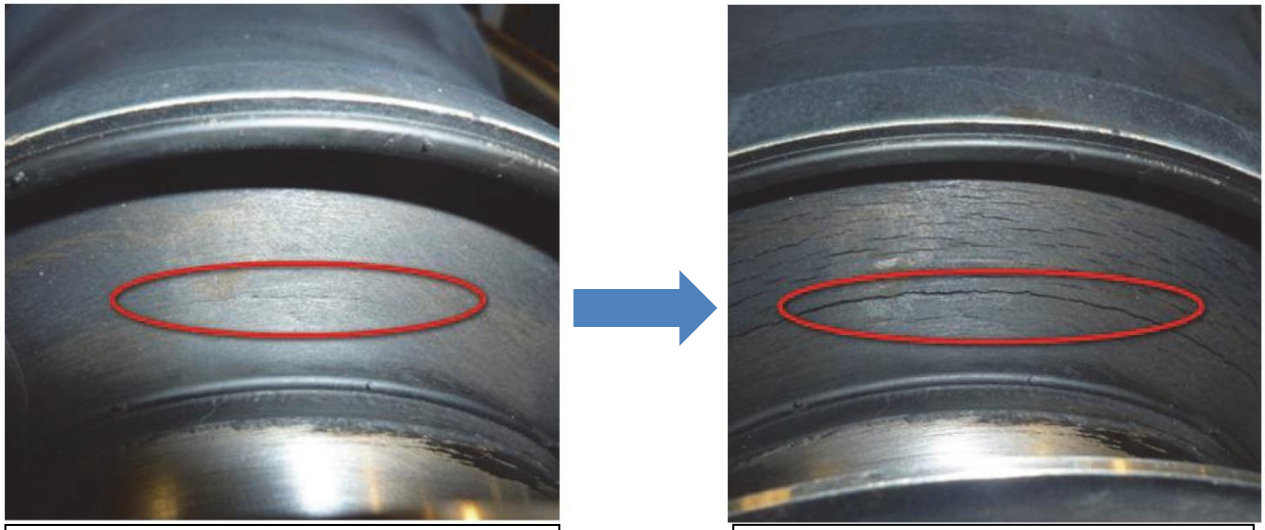


Figure 8: Scratch

ELASTOMER

Degradations on elastomer require special consideration, particularly if the degradations only appear when the elastomer is handled as shown in the following example (see IN No. 2836-I-62).



Check of the elastomer with the blade in an incorrect position:	Check of the elastomer with the blade in the correct position:
No crack found.	**A crack is found**.

Figure 9: Example of degradation on the elastomer of a damper

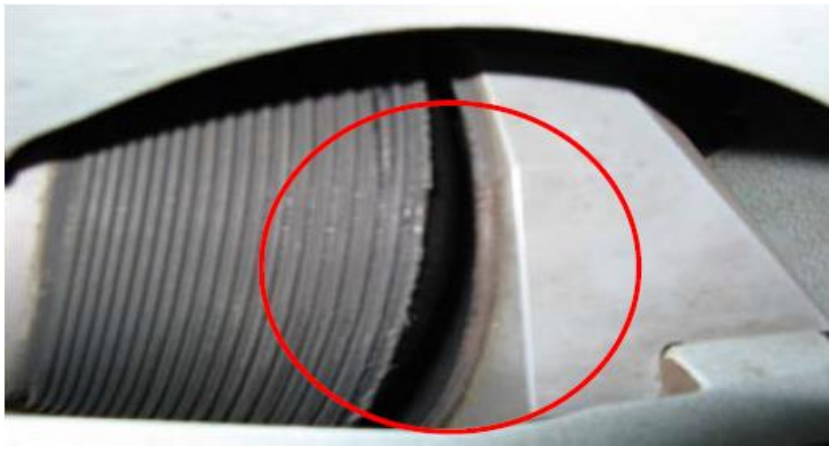


Figure 10: Partial delamination of the elastomer

LOOSE RIVET

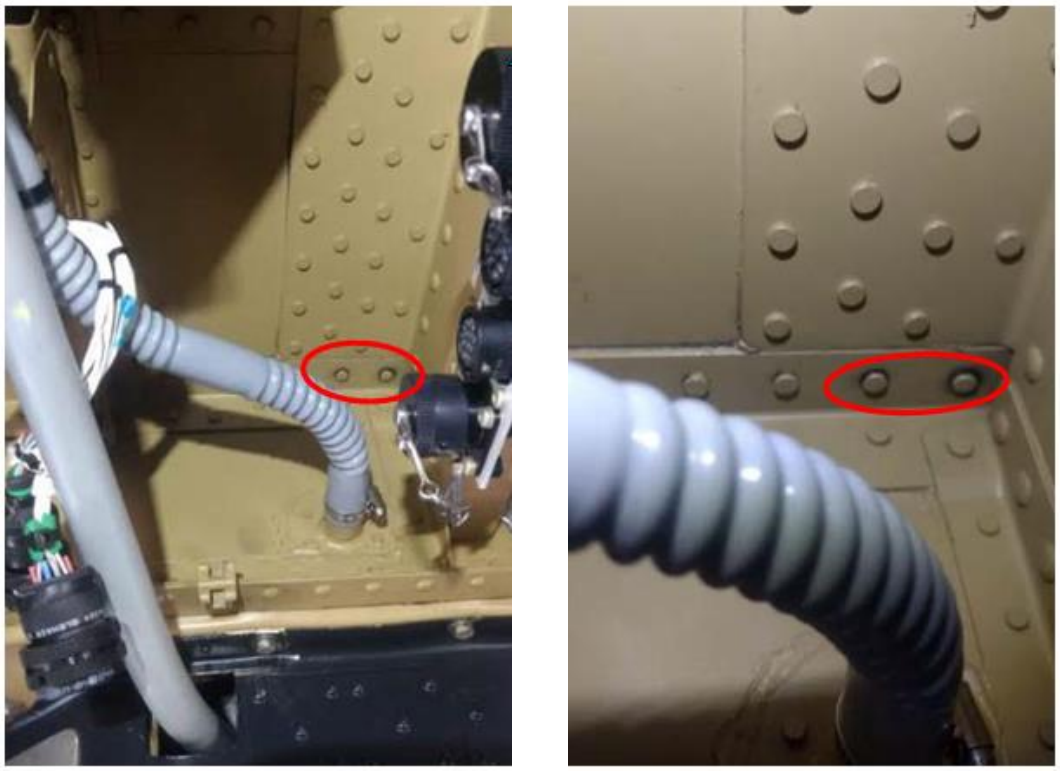


Figure 11: Degradation caused by a loose rivet

COMPOSITE

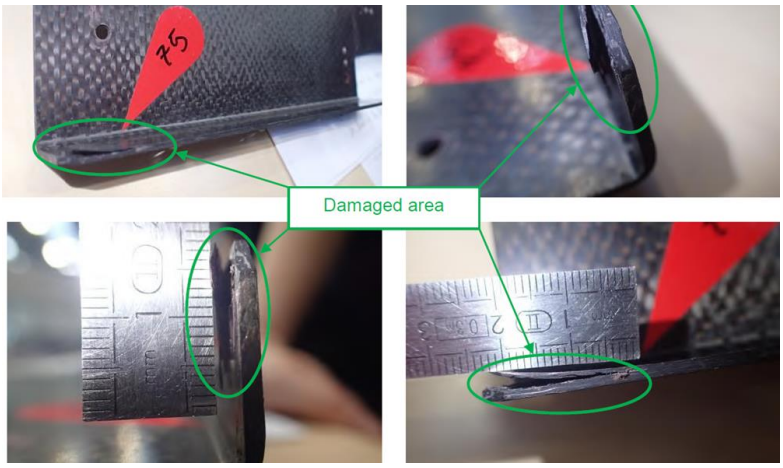


Figure 12: Delamination of the deck

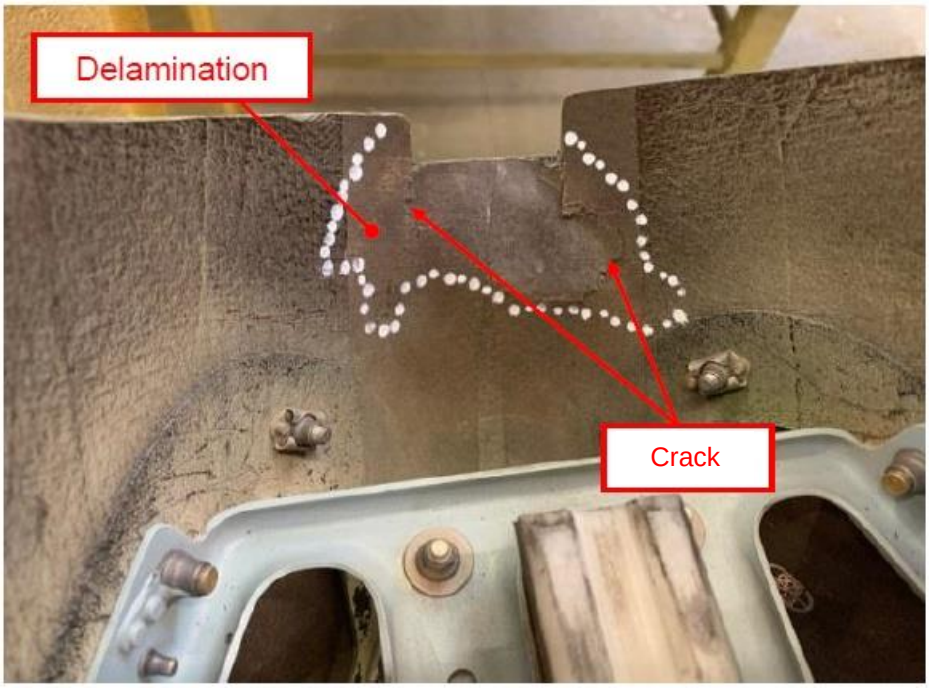


Figure 13: Delamination on cowling with crack

Figure 14: Impact on composite structure

CHAFING

Modification of dimensions with tolerances exceeded.
Wear is characterized by removal or displacement of material in a uniform manner.

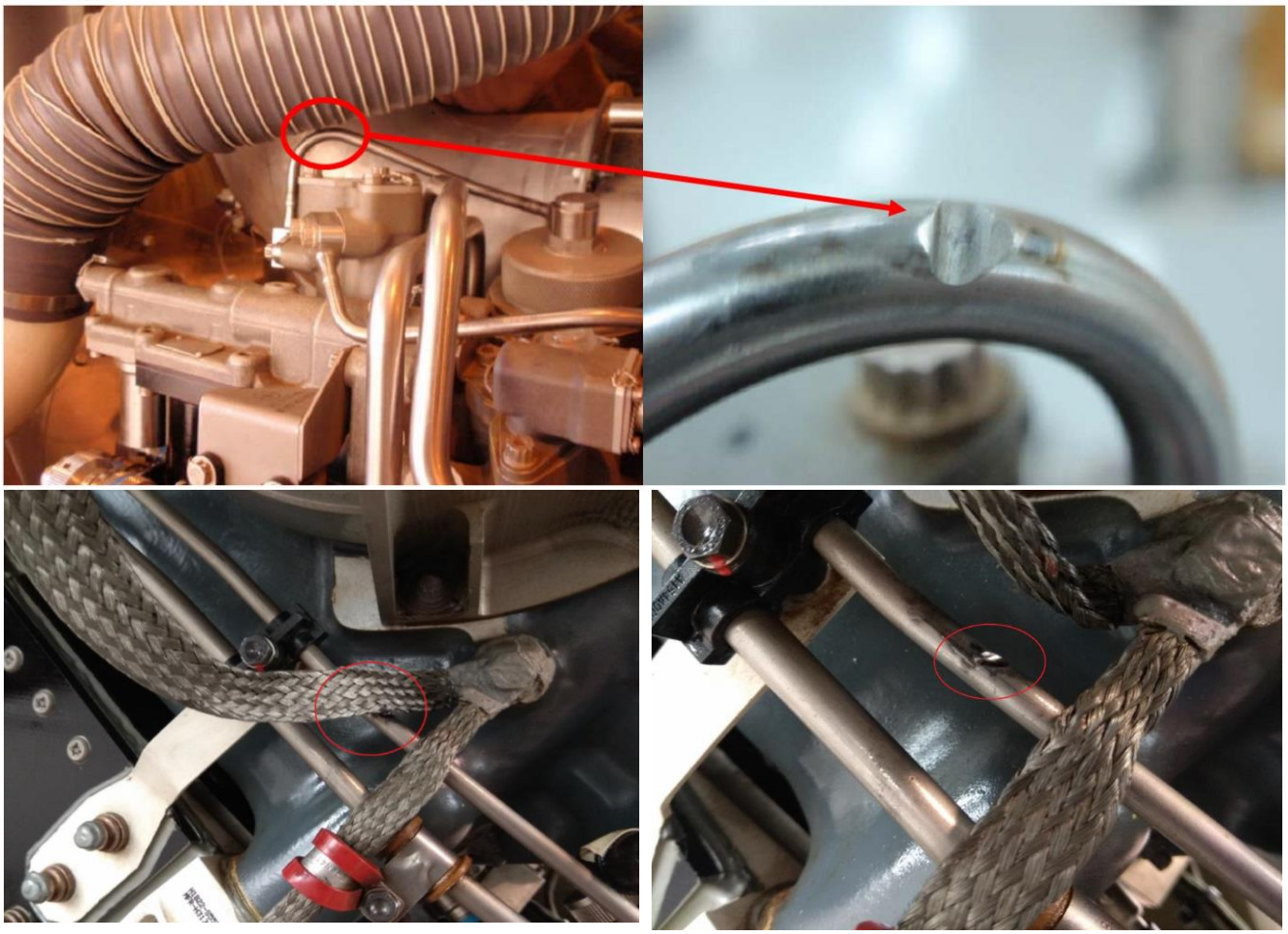


Figure 15: example of chafing

LEAK (HYDRAULIC, LANDING GEAR, ETC.)

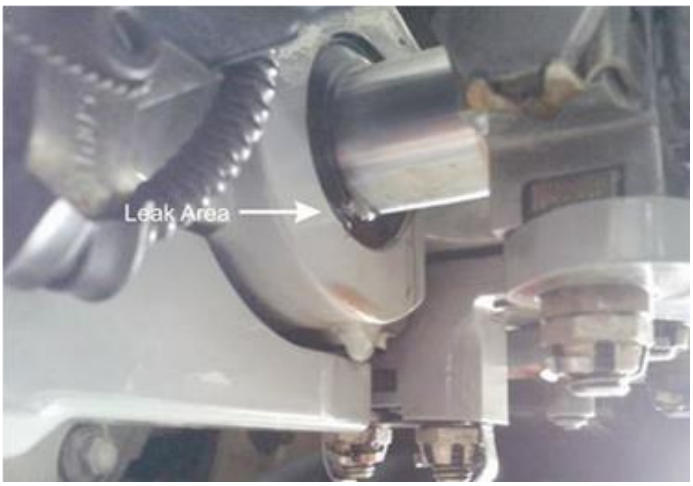
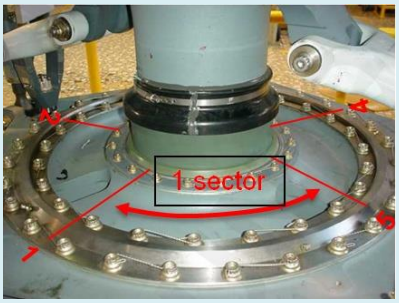
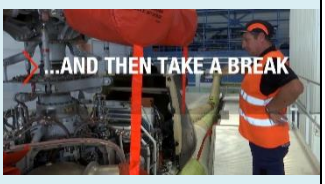


Figure 16: Example of fluid leak or seepage on the transmission deck with overflow on the fuselage.

RISKS AND STRATEGIES TO USE

RISK FACTORS FOR AN INCIDENT:	GENERAL RECOMMENDATIONS FOR INSPECTIONS
This list is intended both for mechanical technicians and for managers who play a key role in the organization of the shop work.	A video summarizes the best practices related to the risk factors given in the facing column. https://dai.ly/k4jDNBhTaE1DuYrewSD
Relating to the operator Training and/or experience with the expected types of degradations. Excessive fatigue, combined with the desire to finish quickly, working at night. Visual acuity not sufficient. (Note 1) Substances that decrease performance levels.	**Adequate training** (know what is expected and what is not expected, use the available methods (visual techniques such as Shisa Kanko, etc.)  Anticipate and establish a visual pathway on the surface to be inspected (markings) **Take a break** when necessary if tired. (Note 2)   To reduce physical strain, passive mechanical assistance may be deployed under the control of the HSE department. Perform inspections on complex tasks **at the start of the work cycle** or the start of the day.

Relating to equipment and environment Measuring equipment is unknown, inappropriate and/or not available. Master defect is not available to compare with the detected degradation. Inappropriate lighting. (Note 3) Extreme temperatures (Note 4) and/or Noise levels >80 dB. (Note 5)	 Make sure that equipment is **available** and properly **accessible**.  Provide a **well-lit environment** with bright lights, preferably inside a hangar. Provide an **appropriate environment**. If not possible, use appropriate PPE.
Relating to the organization Maintenance policy that places the emphasis on saving time and money, and not on safety, for example: • Human resources: staff shortages, short-term contracts • Work performed at fast pace with no flexibility in lead times • Production department is higher up in the hierarchy than the safety department Information is not shared in the workshop. Interruption of the visual inspection (disturbance due to work environment or colleagues). Areas that have already been inspected are opened again.	Be aware of any **contradictions** in the maintenance policy that affect decision-making on the job. **Reduce these contradictions** by giving top priority to safety.  Create spaces and time periods where information can be **exchanged** between the operators on the same team, on different teams, and with managers. Create a library of degradation types. Procedure for sharing information about observed degradations. Schedule sufficient time to fully complete the task, or include a break at a clearly identified point to stop the inspection. After each area is closed, apply adhesive tape and a tamper indicator. 

Note 1: The smallest detectable defect is 5 mm under optimum lighting and cleanliness conditions as indicated in Note 3. Aggravating factors can reduce these theoretical values, such as fatigue, wearing glasses or contact lenses, etc.

Note 2: Fatigue increases the risk of maintenance errors. It is normally caused by a lack of sleep and a disruption in the normal sleeping cycle. Fatigue can also be caused by a heavy work load, physical exhaustion, or psychological concerns. It is possible to reduce the risk of error by 30% by taking a break from work approximately every 2 and a half hours.

Note 3: For a quality control task, a brightness of 700 to 1000 lux is recommended, with sufficient contrast and no glare.

Note 4: Temperatures greater than 28°C and less than 5°C are a risk for the operator, and have an impact on his or her physical, cognitive, and physiological capabilities. It is thus essential to wear appropriate clothing to ensure, amongst other things, temperature control for the body.

Note 5: Noise makes it difficult to concentrate, affects the quality of work, and can cause accidents. There is also a risk of hearing damage when exposed to more than 80 decibels of noise over an 8-hour work shift. Exposure to noise levels greater than 130 decibels is dangerous even over a very short time period. It is thus essential to provide appropriate collective and individual protection (PPE - Personal Protective Equipment).

SPECIFIC RECOMMENDATIONS FOR THE DIFFERENT TYPES OF INSPECTION

The area to be inspected must be cleaned before performing any visual inspection.

<table>
<tr><th>GVI (General Visual Inspection)</th><th>DET (Detailed Inspection)</th><th>SDI (Special Detailed Inspection)</th></tr>
<tr><td colspan="3">Clean the surface to be inspected.</td></tr>
<tr><td colspan="3">Use a mirror and/or flashlight if necessary.</td></tr>
<tr><td colspan="3">Detect all apparent damage, malfunctions and irregularities.</td></tr>
<tr><td colspan="3">Improve access by removing or opening panels, doors and cowlings.</td></tr>
<tr><td colspan="3">Ensure the safety, stability and proximity of platforms and equipment for work at heights.</td></tr>
<tr><td rowspan="3">Inspect from an appropriate distance to see all the anomalies to be detected.</td><td>Perform an intense visual inspection of a specific area such as the system, installation or assembly.</td><td>Perform an intense visual inspection of one or more specific elements, particularly if the elements are hidden or if they are difficult to see.</td></tr>
<tr><td colspan="2">Ensure optimum visibility, with no shadows.</td></tr>
<tr><td></td><td>Use specific tools or techniques such as a borescope.</td></tr>
</table>

REFERENCES

- INRS documentation, 2019. Bruit (*Noise*).
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