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5.2 VISUAL INSPECTION

5.2.1 Introduction

Visual Examination is the most basic of nondestructive inspection techniques, and utilizes the human eye. It allows for detecting and inspecting a wide variety of surface flaws such as cracks, discontinuities, corrosion, and contamination. Detection of surface cracks is particularly important due to their relationship to structural failure mechanisms. Even when other nondestructive evaluation (NDE) techniques are employed, visual examination is a needed supplement, such as in Liquid Penetrant Testing. When conducted under proper conditions, liquid penetrant testing is capable of highlighting minor surface flaws and provides a basis for detailed visual examination. Close visual examination requires proper access to the element being inspected and appropriate tools. Refer to Figure 5.2.1-1 for a view of an inspector conducting a visual inspection.



Figure 5.2.1-1: Inspector Conducting Visual Inspection.

5.2.2 Applications

Visual examination is applicable to all structures, either as a Routine Inspection or as the first step in any In-depth Inspection. It can identify where a failure is most likely to occur and identify when a failure has commenced. Visual examination is often enhanced by other surface methods of inspection, which can identify defects that are not easily seen by the unaided eye. Furthermore, visual examination may be aided with magnifying lens equipment or tools.

Any inspection should always proceed in a logical manner from element to element. Proper access is necessary so that the inspector can examine elements from a reasonable distance during Routine Inspections and from a maximum “arm’s length” (approximately 2 feet) distance during Fracture Critical and In-depth Inspections. Surfaces must be properly cleaned to expose the base material. The element being inspected should also be well lit,



either naturally or by the use of a portable light source. The inspector should have good vision (corrected if necessary) and color acuity. The inspector should also possess knowledge of the types of failures to look for. A variety of tools should be employed, when necessary, to aid the inspector. These tools may include binoculars, low power magnifying glasses, crack gages, and boroscopes to view inaccessible areas. Access equipment should also be used to allow the inspector reasonable proximity to the element being inspected.

5.2.3 Limitations

Because visual examination can only detect defects visible to the eye, the internal condition of an element remains unexamined. In addition, some small surface flaws may be difficult to locate, or once found, it may be difficult to accurately determine their extent. Badly deteriorated elements may be difficult to examine effectively due to heavy corrosion buildup. Furthermore, access to visually examine an item may be difficult even with the use of specialized equipment.



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