



EUROPEAN ADHESIVE ENGINEER

MODULE 8.1

INTRODUCTION – THE ADHESIVE BONDING PROCESS



8.1 Introduction – The Adhesive Bonding Process

Objective

- ✓ Understand the need of:
 - A quality management system and control
 - Its procedures
 - Its implementation

ISO 9000

“Quality Management Systems – Fundamentals and Vocabulary” [1]

BACKGROUND:

The ISO 9000 family of standards has been developed to assist organizations, of all types and sizes, to implement and operate effective quality management systems:

- **ISO 9000** describes fundamentals of quality management systems and specifies the terminology for quality management systems
- **ISO 9001** specifies requirements for a quality management system where an organization needs to demonstrate its ability to provide products that fulfil customer and applicable regulatory requirements and aims to enhance customer satisfaction
- **ISO 9004** provides guidelines that consider both the effectiveness and efficiency of the quality management system. The aim of this standard is improvement of the performance of the organization and satisfaction of customers and other interested parties.

“Normative References” [2]

As quoted directly from ISO 9001:2015

“The following referenced documents are **indispensable** for the application of this document:....”

“ISO 9000:2015, *Quality management systems — Fundamentals and vocabulary*”

Adhesive bonding vs Other joining processes [3]



Adhesive: non-metallic substance capable of joining materials by surface bonding (adhesion), and the bond possessing adequate internal strength (cohesion)

Bonding: material joining technique that, in the traditional sense, cannot be broken without destruction of the bond

Adhesive bonding vs Other joining processes ^[4]

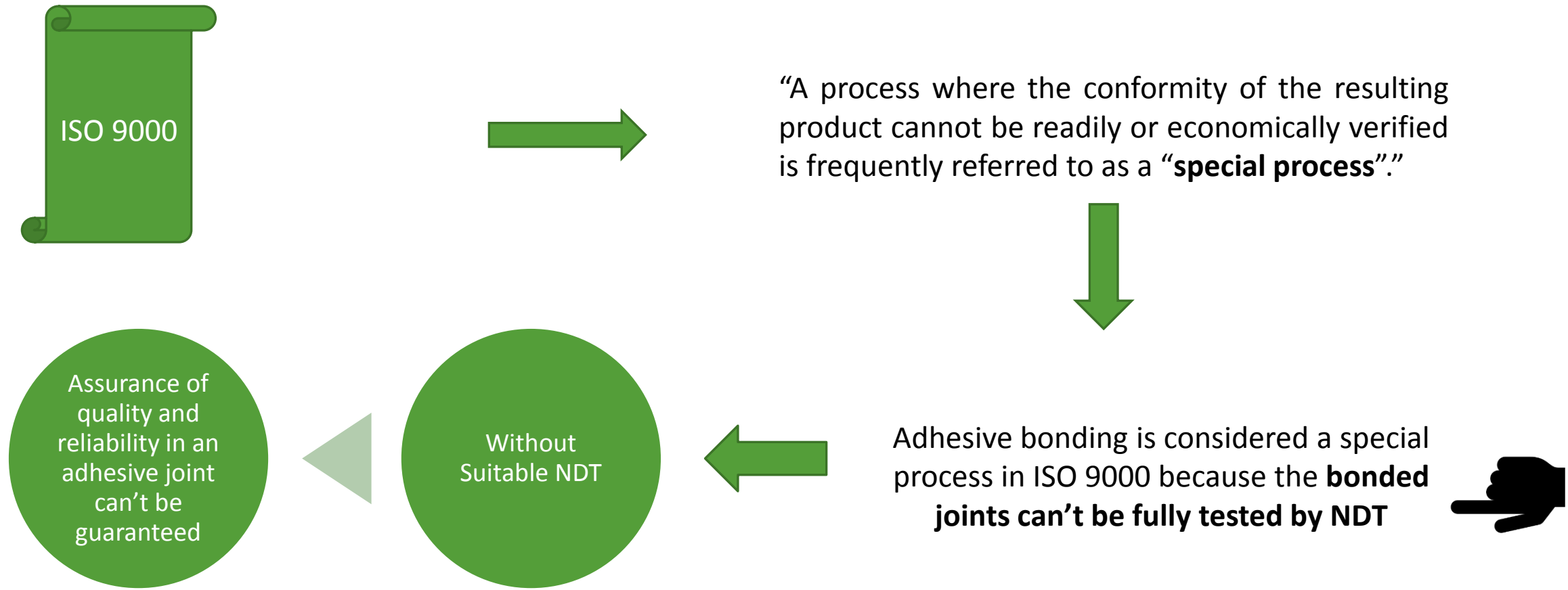
Adhesive bonding offers the designer many advantages, especially in being able to join dissimilar materials without bolts, rivets, etc.

But...the use of adhesive bonding in safety critical structures has been limited by a lack of adequate NDT procedures

Why are the NDT limited in adhesive bonding compared to other joining processes?

Because one cannot “see” the level of interfacial adhesion forces that are present and even if the level of adhesion forces are initially sufficient to give a strong joint it is known that the disruption of such forces, via migration of water to the interface, e.g., may subsequently occur and lead to weak joints

Adhesive bonding as a special process [1], [5]



Absence of Suitable NDT Methods [4], [6], [7]

How do you know how strong the joint is without breaking it?

Inspection of adhesive bonds isn't a feasible way of assuring quality



In Modern Manufacturing Philosophy, inspection is:

- After the event
- An unnecessary activity in a well-controlled process

There are certain situations when it is possible to be reasonably confident of the initial strength of a joint if :

- it has been carefully made by a well-established process
- there is a record of previous destructive tests

But....this cannot be guaranteed for the lifetime of the joint!

Absence of Suitable NDT Methods – Solution ^[5]

It is necessary to guarantee:

- An efficient quality management
- A suitable quality assurance measures
- Trained staff

What does this mean???

Systematic management and control of the whole operation [6]

The only way to provide assurance is to:

- Systematically manage
- Control



the whole operation from design of the joint through to final assembly

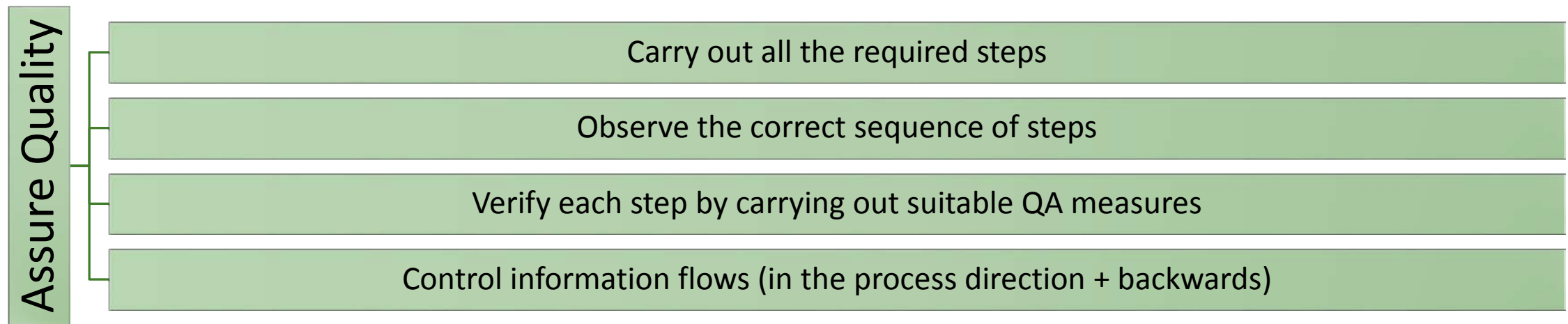
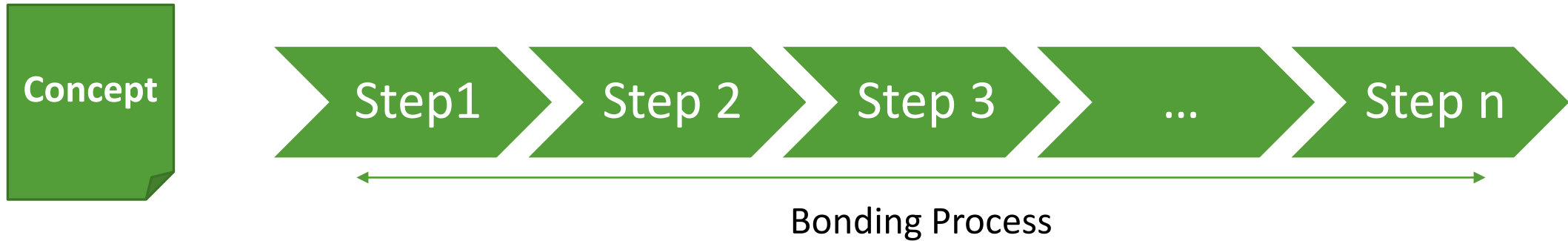


The possibility of poor quality joints being produced is reduced to a minimum because proven procedures are being followed at all times

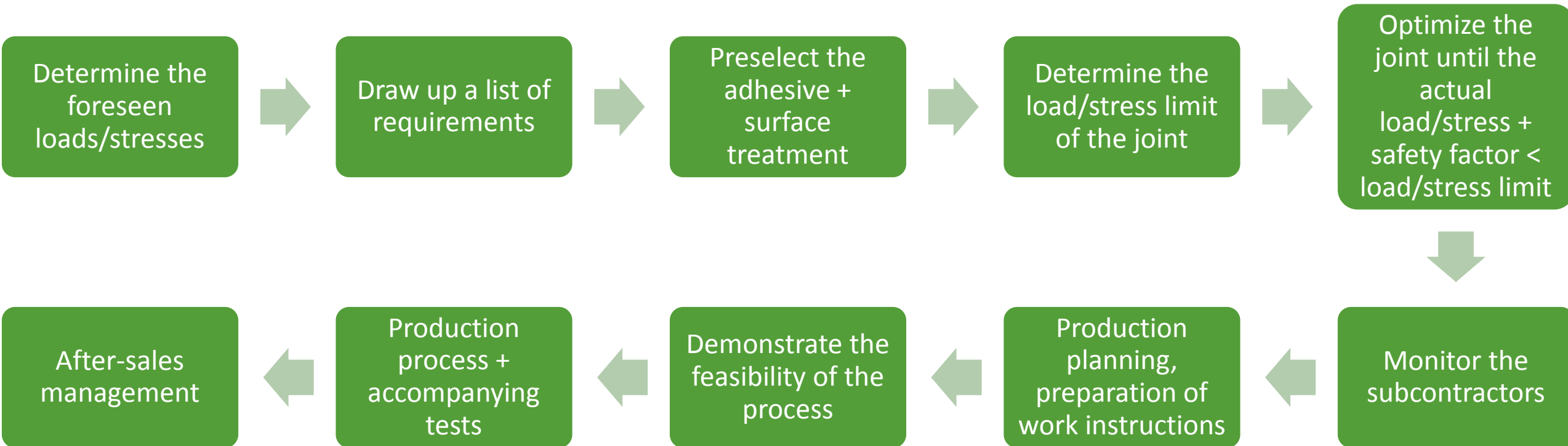
Objectives of Quality Assurance [8]

- Zero-fault production (prevent faults rather than have to rectify faults)
- Customer Satisfaction
- Quality Statements to the marketplace
- Deliberate and controlled actions of employees
- Traceability/fault analysis

Quality Assurance Measures [8]



Quality Management for the development of bonded products [8]



Bibliography

[1]	ISO 9000:2015, Quality Management Systems – Fundamentals and Vocabulary
[2]	ISO 9001:2015, <i>Quality Management Systems – Requirement</i>
[3]	[Online]. Available: https://application.wiley-vch.de/books/sample/3527318984_c01.pdf . [Accessed 20 07 2017].
[4]	A. Kinloch, Adhesion and Adhesives: Science and Technology, Springer, 1987, p. 248.
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