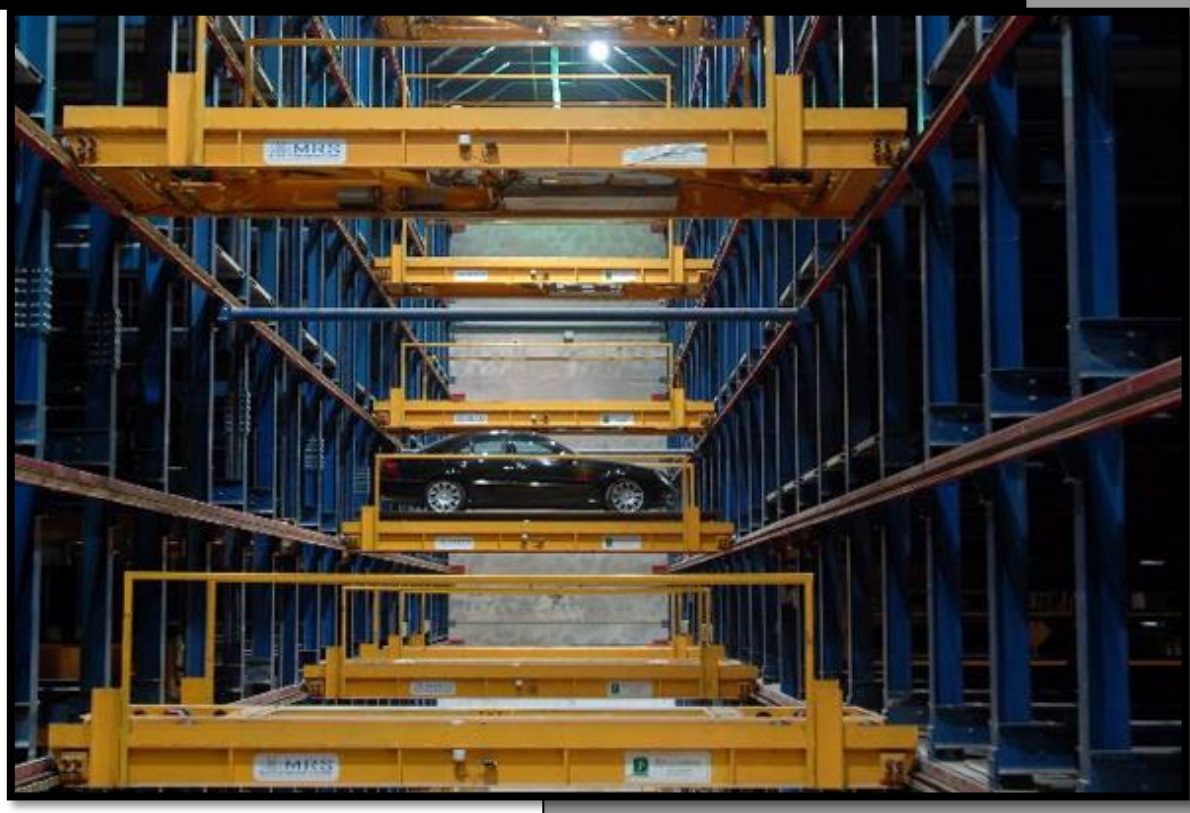
Basics in Automation



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Basics in Automation

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CAN THE SYSTEM OR IT'S COMPONENTS FAIL?

1 NOTHING IN THIS UNIVERSE IS ABSOLUTE.

2 YES, FAILURES CAN OCCUR.

3 WE HAVE TO CONSIDER BREAK DOWNS.

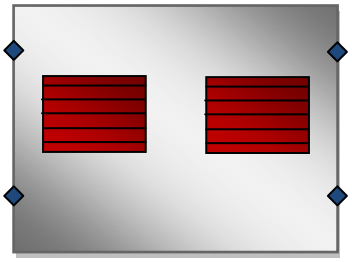
4 A POSITIVE APPROACH IS NEEDED FOR A SOLUTION.

- The basic answer is the safety philosophy of **"the one out of two failure."**

- It is accomplished by applying strict **redundancy**.

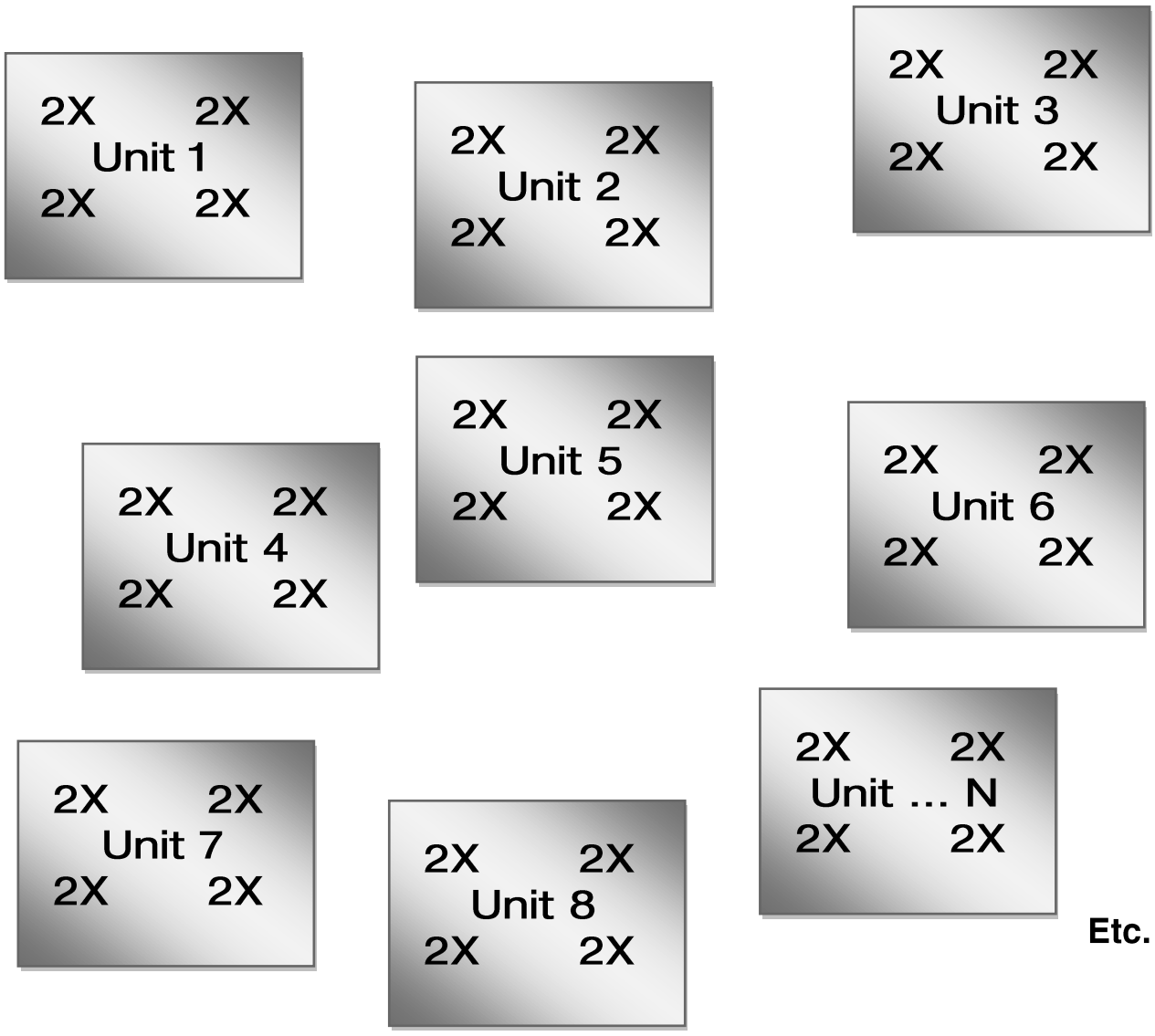
  This means that each machine or unit has a double or multiple number of parts performing the same task where possible, for example:

One unit has
2X of its needed
components
where possible.



WE CALL THIS REDUNDANCY OF THE 1ST DEGREE = N + N

Besides this redundancy of the units, there is the redundancy of the system solution; of the entire units working together as a team.



WE CALL THIS REDUNDANCY OF THE 2ND DEGREE = N X N

1ST & 2ND degree of redundancy together result in its exponential function, the

REDUNDANCY OF THE 3RD DEGREE
(N + N) + (N X N) → N^N = RP =

"TRUE REDUNDANCY"

Thus, we see that true redundancy requires a multiple number of units (redundant in itself) performing the same task simultaneously. Subsequently, the idea of having less units and so having less failures is inaccurate!

AUTOMATION AXIOMS

AA1 : AUTOMATION - A X I O M 1

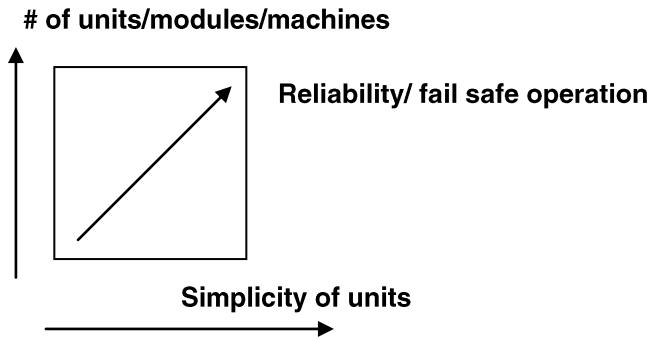
True redundancy is accomplished only by

- Making the units redundant in itself
- Supply a multiple of the units which can perform all tasks for all the locations simultaneously
- Reduce the moving parts per unit to a minimum possible → simplicity

AA2 : AUTOMATION – A X I O M 2

Optimize the system by minimizing the number of moving parts per unit.

Rather than having one or two huge units with a lot of parts, it is desirable to have a lot of units with a few moving elements in them.



AA3 : AUTOMATION – A X I O M 3

Increase fail safe operation by diagnostics and maintenance.

A consistent and rigorous preventive diagnostic program detects in advance possible interruptions.

A carefully executed maintenance plan supplements this and prevents failures.

And, the on-site spare parts package completes this axiom.

THE ANSWER TO THE ORIGINAL QUESTION:

YES, THERE CAN BE FAILURES. HOWEVER, IF THEY SHOULD OCCUR THEY WILL NOT SHUT THE SYSTEM DOWN!
