A.T.E. and QUALITY
an user's view

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ABSTRACT

The test strategy in our company, a manufacturer of high technology electronic systems, is directly related to a more general strategy involving the implementation of industrial means to reach the high level quality standards requested in the company.

To meet these quality standards, quality improvement programs, involving the whole personnel as well as the manufacturing processes, are considered more efficient than systematic sorting.

These programs, though, affect the test implementation.

The continuous evolution of technology forces us to deal with two contradictory demands:
- New products use new technologies, stimulating the use of increasingly sophisticated ATE.
- Older products, or fielded products, favor the retention of obsolete ATE due to the cost and difficulty of transposing data between ATE from different generations.

The issue of supporting obsolete or at least not "state of the art" ATEs for our company will exist until this problem is solved.

1-DEFINING QUALITY POLICY STRONGLY GUIDES ATE CHOICES

Whether for components or equipment, testing is very important to assure a desired quality level.

Testing is performed throughout both the product manufacturing cycle and its operating life cycle, the main phases being:
- Incoming Inspection
- Manufacturing process
- Debugging
- Performance Verification
- Maintenance

The implementation is not only guided by technical considerations but also by the goals defined in the quality plan and the existing manufacturing environment.

The final goal is to achieve the global optimisation of the manufacturing processes, costs, and resources.

In other words:
- The choice of inspection points is related to the manufacturing process which has been set up to meet the goals of the quality plan.
- The choice of an ATE should not only be guided by its technical performances but also by the industrial environment. It must be adapted to the real needs.

2-QUALITY IMPROVEMENT PROGRAMS ARE REPLACING INJECTION-DIRECTED POLICIES THAT SORT PRODUCTS FOR REWORK OR SCRUB.

The introduction of Total Quality Control in large companies, changing the actions for quality improvement from defect correction to defect prevention, needing extensive training of the manufacturing personnel and related services, has greatly modified the approach for product quality.

Defect distribution is different than before.

The detailed analysis of defects encountered during manufacturing, their origins and consequences, allows us to investigate, evaluate, and set up new manufacturing processes and methods, and eventually to decide upon a technology change.

These dynamic programs are much more efficient than the classical methods of inspection and sorting.

IN PARTICULAR, THEY ALLOW THE ELIMINATION OF DEFECTS AT THEIR SOURCE BY GETTING RID OF THEIR CAUSES, WHICH IS OF THE GREATEST ECONOMICAL INTEREST.

By modifying the defects spectrum, they also imply the adaptation of certain test procedures, whose efficiency and usefulness must be reassessed: why test for defects that can no longer occur?

It is however necessary to periodically reassess their non-occurrence.

3-TESTING TODAY'S TECHNOLOGIES WITH YESTERDAY'S ATE IS THE PERMANENT CHALLENGE OF R&D ENGINEERS

With imaginative design engineers using all the possibilities of new technologies to realize increasingly complex and powerful equipment and with technology rapidly evolving, new needs are introduced in ATE.

The ATE supplier cannot easily satisfy them, and for many good reasons:

- The corresponding ATE is not commercially available.

No one has a magic wand or a crystal ball.

ATE design engineers, like our own engineers, can only minimize design and manufacturing cycles to a certain point.

In any case, they cannot specify nor, therefore, design their products before common needs have been expressed to them by the customers.

It is a filter to detect existing defects and only these.

It may be philosophically reassuring to protect ourselves against all possible defects and difficult to resist this temptation, but, in terms of efficiency, every unnecessary effort is a waste.

We must adjust to the real needs.

* LEAVE WELL ENOUGH ALONE */
As customer needs do not occur simultaneously, the "critical mass" to correctly specify the ATE is not reached immediately, and a time lag is usually observed between the needs expressed by the first potential customers and ATE availability.

- The production volume of a new product cannot justify an increase in the manufacturing test capability. This is particularly true for high technology equipment where quantities cannot compare to those in consumer electronics.

R&D engineers therefore are often facing these two ways, and the choice is not easy: to work with instruments less powerful and precise than desired, or to overinvest and transfer at very high cost their test programs from old ATE to new ATE.

4. SHORT TECHNICAL LIFE CYCLE OF ATE INTRODUCES NEW PROBLEMS:

- Difficulty in transferring data from obsolete ATE to new ATE.
- Maintainability guarantee offered by manufacturer.

Our responsibility as a manufacturer does not end when equipment has been delivered. We have to maintain it during all its operating life, sometimes 10 or 20 years after the last delivery.

In response to technological advances, testing and manufacturing methods may be changed several times during this period.

Due to the lack of standardization, however, transfer of manufacturing data to the newest ATE is a very costly operation, seldom beneficial, which leads us in many cases to extend the life of obsolete tools even if only for maintenance purposes.

This is also a problem for the ATE manufacturer, who is requested to maintain these seemingly antediluvian tools.

The difficulty of data transfer has other more immediate consequences: it is a constraint in the choice of subcontractors who must have equipment compatible with ours.

This problem is not specific to the test domain, but also applies to all design and manufacturing tools. It is a force against the modernisation of companies since the investment in a new tool cannot be used completely and therefore cannot be fully beneficial. There will be no good and lasting solution until we standardize altogether data formats, that is produce computerized processable files.

Efforts are being made in this direction by some international organisations. We must encourage them. It is in our interest as well as that of the manufacturing equipment suppliers.

The closed policies practiced by some manufacturing equipment suppliers, makes it difficult to transfer data between one type of machine to another, and therefore prevents the open competition necessary for growth the activity in any business. Those who live in a closed world, aiming at incompatibility with their competitors, will be limited in their own development.

ATE industry is no exception to the rule. Standardization and compatible programming practices should increase the market of ATE industry.