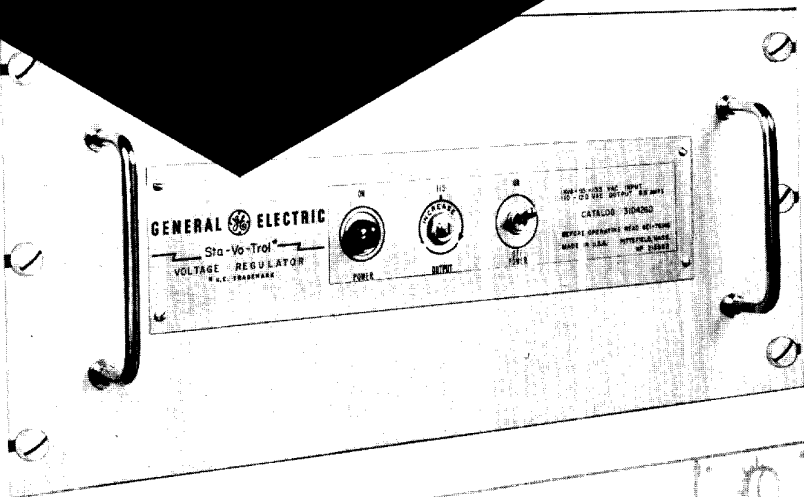


**A REPORT ON
GENERAL ELECTRIC'S
NEW STA-VO-TROL
VOLTAGE REGULATORS...**



GENERAL  ELECTRIC

**... and
how value analysis
"product evaluation"
was applied to achieve
value leadership**



John W. Butler
General Manager—Voltage Regulator Product Section

PRODUCT EVALUATION made it possible for us to cut 30% from our pre-production cost analysis of new product development.

The Sta-Vo-Trol* development is our proof that Value Analysis Product Evaluation procedure is a worthwhile and valuable tool to use when in quest of a quality product at the best possible price.

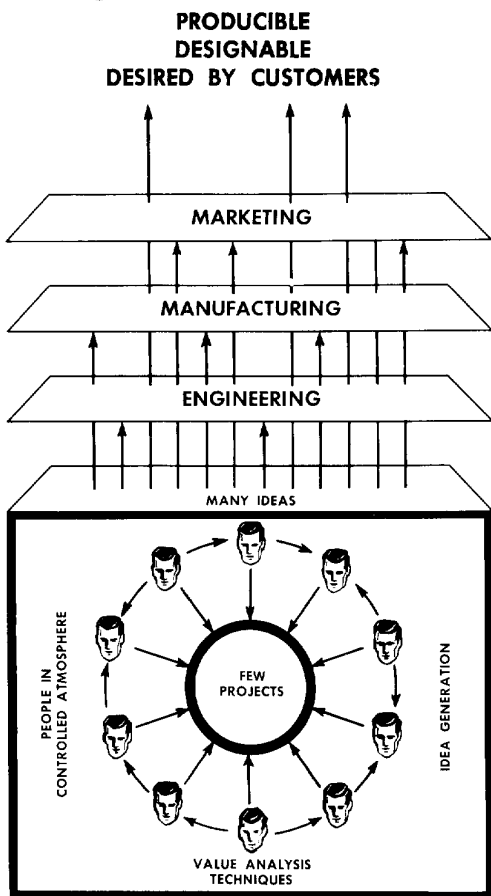
We were faced with the problem of filling a gap in our regulator line to meet a new market demand. We wanted a quality product, in a short time with minimum investment in facilities and manpower. We achieved our goal with the help of a Product Evaluation Workshop dedicated to the single purpose of doing the value job. By supplementing our regular manufacturing and engineering programs, this workshop imparted lasting value-knowledge to several of our key personnel. They will be able to apply this knowledge to building even greater value and performance into our entire product line.

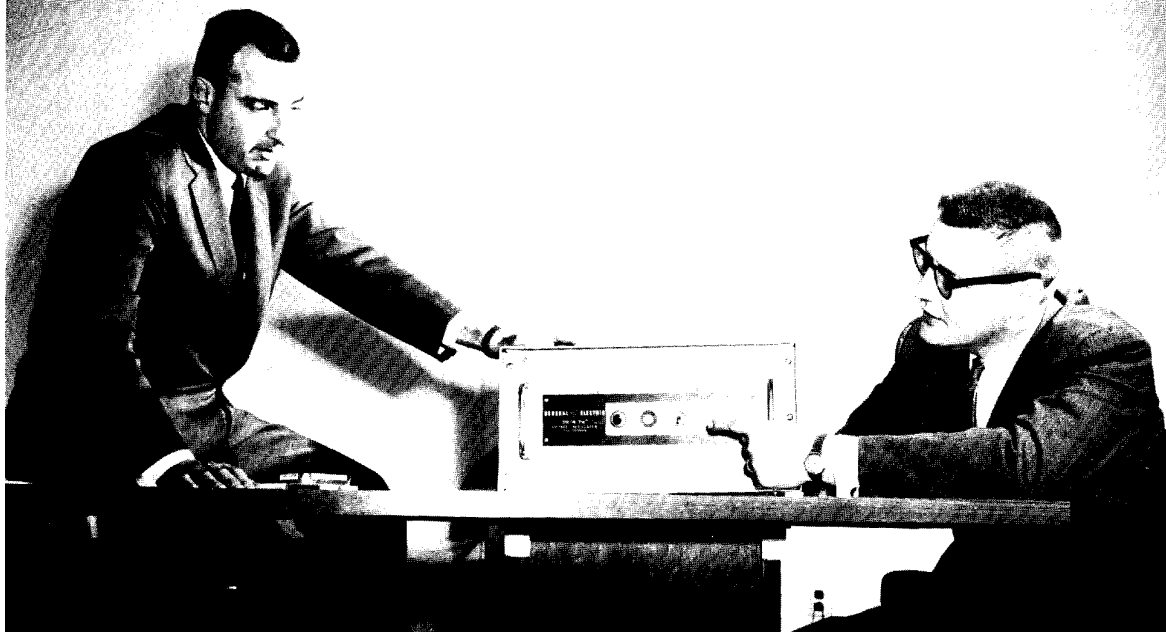
* *Trademark of General Electric Company.*

A handwritten signature in dark ink, reading "J. W. Butler". The signature is written in a cursive, flowing style with a large initial "J" and "B".

Applied Value Techniques Help Produce A Better Product At Lower Cost

Many people, representing all functions of the business, working in a controlled value atmosphere, devoting concentrated effort for a short time, on a few projects, using special techniques, generate many value ideas. From these many ideas come new ways to perform old and new product functions which must pass the scrutiny of the engineering, manufacturing and marketing functions. These innovations result in a better quality product at a lower manufacturing cost.





R. Bry, Marketing Manager, Voltage Regulator Product Section, and E. E. Wejman, Product Planning Specialist, look over a Sta-

Vo-Trol unit. Value Analysis Product Evaluation helped make the unit competitive.

OUR PROBLEM: Cut Pre-production Cost Analysis by 30%

Static voltage regulators are used for small critical loads requiring fast response and high accuracy—where the circuit conditions impose varying line voltage, power factor, and load. Typical applications include radar equipments, computers, communication relay stations, radio and T-V stations, automated test equipments, and industrial x-ray.

The recent growth of all these applications created an expanded need for static regulators heretofore in very limited demand. General Electric had no product to fill the need. Three of eight competitors moved in with quick designs to fit specialized applications as they evolved.

The Voltage Regulator Product Section in

Pittsfield, wanted a product fast, but would compromise neither quality nor customer needs. This meant creating a flexible and reliable product which customers could install, rely on, and forget about. To launch such a product successfully in our industry we knew that nothing short of recognized product leadership—extra features and performance at competitive prices—would capture the market.

The performance part of product leadership was achieved through careful planning, design, and tests. We had the product—we now needed the competitive price. In cooperation with Value Service, a Product Evaluation Value Workshop was organized. *Value leadership* was obtained. The chart below illustrates the performance results.

Analysis Factor	G.E.	Superior	Sorenson	Perkins
Wave Form Distortion	1	2		3
Control Accuracy	1	2	No	3
Rack Space	1	3	Customer	2
Weight	1	3	Test	2
Reliability	1	2	Data	3
Serviceability	1	1		1
Application Flexibility	1	3		2

Competitive product evaluation based on tests conducted by major customers for Sta-Vo-Trol regulators. Numbers indicate order of customer preference in the areas shown.

OUR SOLUTION:

Run the Product through Product Evaluation

Donnell MacCarthy, Manager—Engineering, and Ellsworth Sohles, Manager—Manufacturing at Voltage Regulator, answer questions about organization and procedure for using the Product Evaluation value-approach in the design and pre-production stages of Sta-Vo-Trol.

Q. How and whom did you organize?

A. 24 representatives from 12 product departments were organized into a value workshop with the help of Value Service. Value Service then provided the teaching and operation; we provided the problem and some technical assistance. The men were grouped in project teams of four, with each team being assigned a specific, predetermined parts grouping from the total product. The General Engineering Lab and Manufacturing Services provided additional help on a part-time basis.

Q. What is the first step in evaluating the product?

A. The total product is divided into major groupings of parts. Each of the parts comprising a group is necessarily interdependent in contributing essential performance to the total product. (see adjacent illustrations)

Q. What do you do with the groups once they are determined?

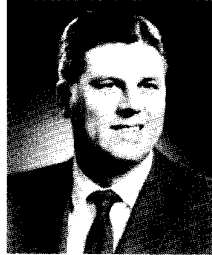
A. The identity and performance provided by each parts group and by each part within the group are translated into basic and secondary value functions. A value function is that which makes the product, the parts group or the part work or sell. At this point, the present functional costs are determined and new functional cost targets, in line with the total cost of the product, are established.

Q. Where does Value Analysis come in?

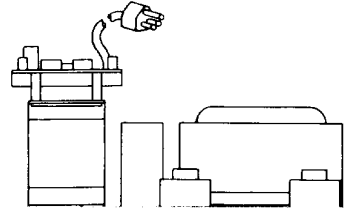
A. Evaluators select appropriate VA techniques for each specific function under evaluation and apply them to accomplish the objectives. This brings into focus an abundance of information and creativity and forces innovation. Thus, functional alternative parts are developed which provide all essential functions at substantially lower costs and which satisfy previously established functional cost targets.



D. D. MacCarthy
Manager—Engineering



E. J. Sohles
Manager—Manufacturing

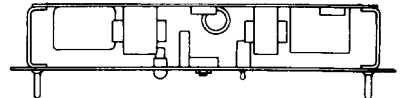


Parts Group A:

POWER STAGE

Function:

VARY VOLTAGE



Parts Group B:

CONTROL STAGE

Function:

MEASURE VOLTAGE

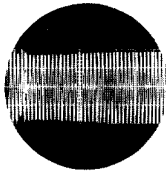


Parts Group C:

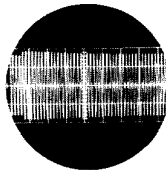
PARTS STRUCTURE

Function:

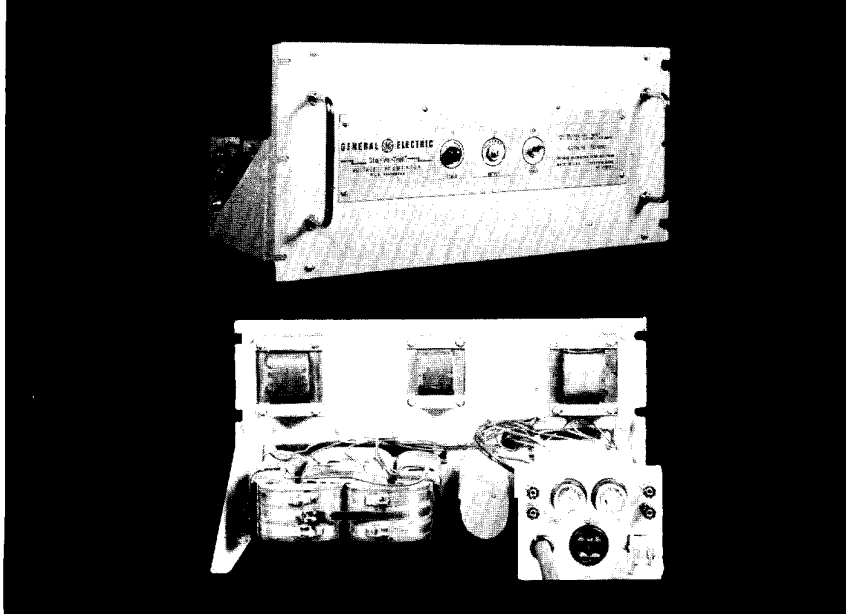
SUPPORT AND ORIENT



TYPICAL LOAD AND VOLTAGE CORRECTION—output setting, 115v—load change, 0 to 8.5 amps, unity power factor—input change, 115 to 95v.



TYPICAL VOLTAGE CORRECTION—output setting 115v—load, 8.5 amps, unity power factor—input voltage change, 115 to 135v.



SUMMARY

Reliable, Automatic Voltage Control for critical loads is now available with General Electric Sta-Vo-Trol Static Voltage Regulators. These regulators feature maintenance-free service with rapid response, remote sensing, compact size, and no moving parts.

Value Analysis Product Evaluation Procedure Applied to Sta-Vo-Trol Voltage Regulator Points Up Five Summary Advantages

1. Identifies alternatives to achieve value leadership in the design stage, thus avoiding expensive, after-the-fact changes to achieve competitive or leadership value. Eliminates drafting changes, retooling, customer re-test approvals.
2. Provides a total product evaluation that is entirely product oriented. This allows exploration of key value areas of materials, design, and processes to achieve best functional value for each part and for the total product.
3. Cuts time requirements for launching new products by providing a large temporary work force to apply an intense con-

centrated effort using definite procedures to improve the product and lower the cost.

4. Provides a Value bread-board to develop and demonstrate Value feasibility from many possible alternatives—before production. This is analogous to proving performance feasibility with a performance bread-board—before production.

5. A scientific body of Value knowledge works in all areas to improve the Value part of product leadership as a scientific body of performance knowledge works in all areas to improve the performance part of product leadership.

VALUE SERVICE

GENERAL  ELECTRIC

SCHENECTADY, N. Y.