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Report on a Visit from Mr. E. Mikol and Mr. D. Weisenhaus of Honeywell, Inc.

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REPORT - March 3, 1967
Visit from Honeywell, Inc., Quality Assurance
Mr. Erwin Mikol and Mr. Duane Wiesenhaus

Mr. Mikol represents the Quality Assurance group from Honeywell, Inc., Morton Grove, and Mr. Wiesenhaus from the same facility representing the Honeywell contact with U/L for factory inspections.

Purpose of visit--to review our production facilities and procedures, making any suggestions which might be helpful for our purposes and therefore assist quality in the Honeywell product.

Items shown are in the order discussed, not in any particular sequence.

Materials ordering--serious concern with sole source of supply.

Example--Tri-Tronics printed circuit boards. Recommend inventory should represent a minimum quantity not only for re-order but to establish order with another vendor.

Contact meters--recommend securing alternate source of meters even though cost may be exorbitant--just to prepare for an emergency situation.

Sola transformers--recommend design of alternate power supply and submittal to Underwriters' Laboratories as soon as possible.

Amperex tube--discussion with Lyman (recommend forwarding parameters of our quality control to see if vendor will supply to our specifications by some pre-inspection.

Packing--recommend taking one complete unit and dropping it from a four foot height in eight different positions. If no damage occurs we may be overpacking the equipment. If damage does occur, field problems will be extremely costly and packing must be increased. Their opinion was that we were overpacked on the Series 400 equipment.
Test panels:

1. Contact meter check-out—make complete drawing of the panel and make a duplicate panel in the event of malfunction of this unit to prevent holding up production. This will allow sending out meter for calibration while another panel is in use.

Write up complete procedure in great detail exactly how the meter is calibrated using this panel so that an unknowledgeable person could follow without personal instruction.

2. Test panel for printed circuit checkout—same instructions as above. In addition, recommend a spare meter with two plugs be available and kept on a shelf as a means of alternately calibrating, or checking the calibration on each test panel. Recommend a date stamp showing last date of check and an interval beyond which the panel would not be used without checking. This will involve some slight modification of our panel to provide a switch-over to an alternate meter. Recommend duplicate panel for substitute meter to prevent an absolute breakdown.

3. Tube and detector head check out panel—same recommendations as for the printed circuit board test panel including the alternate meter switchover.

Note drawings on all test panels should be brought up to date.

Production Flow—work stations—procedure to establish balanced assembly.

1. Write up a complete work station assembly procedure in complete detail.

2. Work stations should represent one set of operations which one person could do in one position continuously for eight hours.
3. Establish a time for each work station operation.

4. To balance assembly load, determine from the time of work at each station whether parallel stations should blend into one, etc., so that one station does not represent a bottleneck to the total assembly flow.

Most important—first step—write up complete "method layout" for each work station in detail.

Do not use prints to describe method layouts for work stations. Some people are not capable of understanding a print. Use a sample or a color photograph. One layout for each job.

Keep one person to one operation—don't intermix operations for one person. If work load requires one person do two operations, try to allow them to do only one operation for one whole day and start the second operation the next day.

Incoming materials inspection—

Die-formed parts—a complete inspection of one part on receipt would identify any problems in all parts, usually,

Capacitors—resistors—use sampling technique. Make sure samples are at random throughout the packages and test only the samples for acceptance. If defects are found in samples:

1. Inspect more samples to the point where the total shipment may be rejected as being below spec.

Contact meters—sampling inspection—be sure to get cross-section of units from incoming boxes—beware that our reject meters do not find their way back into the next shipment from the vendor,

Transistors—diodes—relays—pots.

If in doubt about any item critical, begin 100 per cent quality inspection until such time as each particular component proves reliable—then revert to sample inspection.
Field problems—keep a continuous log of any field problem and its solution—this serves two purposes: 1) it will prevent loss of time in solving a field problem in the future—long after the first problem may have been forgotten. Second, these problems can be summarized prior to any major redesign.

Incoming Inspection—more.
Write up detailed procedure for incoming inspection for each component.

Product log—listing component purchase problems, sources, production methods, fixtures, list of problems (with solutions); all of this to prevent a product design from leading back into former problems.

Repair facility—advantages. Set up a repair/replacement procedure now. We can anticipate an increasing quantity of repair requirements as the products are in the field longer.

Advantages—provides overflow personnel to handle production peaks.
Provides a source of fast new materials from repair.

Production planning—plan for a quantity of production of each product. Predict numbers of work stations, machines, test fixtures and personnel to fit that production quantity.

Then prepare the same production plan for quantities substantially below that estimate and extend the necessary personnel requirements, space, fixtures, etc. for that reduced plan.

Establish a plan for 100 per cent over the estimate and extend requirements for personnel, space, etc.

The above type planning will prevent serious mistakes in underestimating or overestimating capabilities.
Further, it will establish immediately the limits of your production relative to those fixed investments such as leased space, finances, capital machine investments.

Production procedures:
Write out formal production procedures originally on vellum--hand written. As instructions are followed and procedures are improved handwritten notes can correct much easier than retyping the entire procedure. After the procedure is properly "wrung out", then type the procedure.

Each step by step production procedure should be written out completely without regard for any person or personality. It should be adaptable to any unknown personality.

Change Orders--Establish one change order form. This change order should apply to changing production techniques, changing production quantities, changing engineering design or anything else. Avoid more than one change order form.

Engineering drawings--part numbers, etc.
Establish complete part number and drawing number system.

Drawing numbers should be the same as part numbers.

Drawing numbers should indicate in the title block the latest revision instantly.

The title block should exactly identify what the drawing relates to.

Product log should include master component parts list with provisions for making revisions, drawings and drawing references to the various products, components and component reference to the various products.

When a drawing is revised it should instantly indicate what other products may be affected.

Establish job descriptions for everyone. Have each person currently doing a particular job write out
exactly what he is doing in each job activity. From these
detailed job descriptions prepare a chart of total jobs and
the parameters of each job. With this format, an organization
chart and work flow chart can be prepared.

Each person must know the limits of his res-
ponsibility and these job descriptions must be kept up to
date.

Personal opinion from Mr. Mikol relative to
production quantities versus sales department estimate:

From his experience Sales will usually estimate
their requirements before they are required. However,
orders will usually be in excess of the quantities which
Sales estimate--but at a later requirement date.

There is no known way to properly estimate the
production requirement and all sales estimates are only
guesses.

The above represents the notes I have taken during the
Honeywell visit. Please add any items which you recall
pertinent which are not listed above. Please distribute
your notes to Lyman Blackwell, Marg Frisbee, Harold Brooks,
and myself.