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FOOTWEAR DESIGNS, PATTERNS  
CUTTING DIE, LASTE AND UNIT SOLES ✓

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## INTRODUCTION

The subjects for this paper cover most of the areas of a shoe manufacturing operation. Some of these functions in large organizations are the responsibilities of separate individuals; of course, each very closely coordinated with the other. Because of this I cannot claim complete authorship for this presentation. It is the joint effort of a number of people within our organization, and you will note reference to them at the end of this paper.

The subjects that should be covered should start with the function of design, but design starts in the market place. Therefore, before we can even consider developing a line of shoes to be manufactured, design should be determined by a complete market research program. Thus, I will start by covering the market itself.

### I. THE MARKET

The market that is available to us today is one that is no longer confined to the boundaries of the countries in which we live. It is world wide, one that offers enormous opportunities to organizations who can produce the right product at the right price of the right quality and can deliver it at the right time.

The above qualities are extremely important, whether for an overseas market or your own domestic one and can only be developed by a thorough and extensive research program. These world wide opportunities have been created by the speed of communication and transportation, and by the desires of consumers to have products styled and made by countries

overseas. Another contributing factor is, of course, the economic one -- because of the high labor costs in many of the developed countries, imports can be extremely competitive and will represent good value to the consumer.

The successful companies of today must be market oriented. The demand in the market place is such that it is becoming more and more difficult to sell purely what you can make. Today you must make what you can sell. Whatever segment of the shoe market you are aiming for, whether it be women's casual, women's dress, men's work, men's dress, or children's shoes, the research must be done systematically, intelligently, and with great attention to detail.

An appreciation that footwear is purely an accessory to the ready-to-wear business is very important. Style trends of the shoes should be directed towards complimenting the clothing which one anticipates will be in vogue at the time that your product reaches the market place. Information can be obtained by going to shoe centres such as Florence, London, Paris, by attending trade shows, and by keeping up to date with the various clothing and shoe magazines that are available.

From this one can decide on:

1. The type of designs that will be needed, whether they will be tie shoes or slip-ons, and whether they will have very heavy or very little ornamentation.

2. Indications on what colors and textures of materials are needed to compliment clothing (such as whether suede or smooth type finishes are important).

3. Trends as far as last expression, whether the toes of the shoes should be broad, round, square, slim, or pointed, or whether heels should be slim, thick, low or high.

4. What sole treatments to use.

After the above considerations have been established, one should then - on the assumption that you are selling to an overseas market - look at the market from the point of view of the last itself. Fit is extremely important, and therefore you must have the right last for a specific market. The foot changes quite dramatically from one hemisphere to the other. For example, the foot of the North American is long and slim, whereas the European foot has a tendency to be shorter and broader than its North American counterpart. Another differential is sizing. It might be Paris Point, English, or American sizes. If you are selling to the U.S. market, you will most probably have to supply your shoes in various fittings or widths.

Therefore, last selection is extremely important, and my advice is to go to one of the last makers within the specific country and get them to recommend the last that you should use.

Construction obviously has to be one that you are capable of producing, but flexibility of manufacturing is important, and one should be prepared to change methods to suit the demand of the market place. For example, in the men's dress shoe field, although the consumption generally for welted type shoes has decreased, the fact that this is a labor intensive production method means that there are attractive opportunities for this construction

in the markets of the developed countries. Certainly the most dramatic construction method change that has taken place has been that of unit soles, and this is one area that I have paid extra attention to in this paper.

The cost of the product, of course, is of the utmost importance and one should know the appropriate price level in order to be competitive within a given market.

And finally, a delivery date must be established which is acceptable to both the purchaser and your organization.

## II. LAST SELECTION AND DEVELOPMENT

The design of the lasts, which is the form around which a shoe is made, is the first requirement. These normally are made of a plastic material and are made from the beginning with several requirements being incorporated basically toward the fit properties. The individual toe shape and heel height is varied to provide the necessary style that would be required in the Market. Figure 1 shows the basic change required to raise or lower the heel height.

The basic fit of a shoe is determined by the volume around the instep area of the foot and by length. The area from the ball joint forward is used for two purposes only; one being to allow ample toe room, the other to display the fashion characteristic of the product. The importance of a correct fitting last cannot be over-emphasized, and it is very advisable to make and foot-fit shoes under close scrutiny before approving the master model last. In some cases, it may be necessary to modify the desired



last character slightly to insure good fitting properties, for no matter how good the style appeal is, unless it is comfortable to wear, the sales potential will be minimized.

Remember that the last represents the master from which you work and these can vary from one to another. You should, therefore, set up a system for checking the lasts upon receipt against the master model.

### III. PRODUCT DESIGN

To determine the particular styles of shoes to go on the last requires the same basic process as determining the last itself. The consumer, not wanting to repeat forever what style shoes he wears, demands style changes from season to season. These fashion trends come about because of ready-to-wear fashion changes and tend to repeat themselves throughout the years. We go through periods of time where tie-type shoes are in vogue and the consumer, after having had tie shoes for some period of time, begins to seek out something else -- perhaps shoes with metal ornament trim, or slip-ons, or other types.

At the same time the consumer may evolve from high heels to low heels or vice versa. To determine the gradual change in consumer demands, the world market must be looked at because trends become contagious from one country to another (although perhaps on a somewhat different time cycle).

To be up to date on future style direction on shoes demands that a great deal of time be spent in the market place attending trade shows, studying retail trends, and reading the various trade and fashion publications.

It must be pointed out that only trends are determined by this explanation, and the specific design of a shoe is then determined by the design people in a particular company. They all "do their own thing" in this regard.

Remember when designing a line of shoes to always develop groups of shoes with three or four designs developed on the same theme and using the same material. Avoid, if possible, developing just one shoe.

#### IV. MATERIAL SELECTION

Now that we have the last and design trend input, it is time to decide upon the components which make up the shoe. These will include leather and lining materials in specific colors, texture, and design, the type of bottom construction, and the design and type of material for the sole and heels.

Leather tanneries must avail themselves of what colors and styles of ready-to-wear are being programmed and then coordinate the textures and colors of their leathers accordingly. They go through the same exploratory process that is generally done to determine the particular shoe fashion trend. Almost all of our important information in this area comes from the leather tanner.

The outsole and heel is largely determined by what type of shoes your particular company will be making. There still is an eye toward the market as to whether to make heels and soles bold and heavy or to make a lighter looking bottom.

Currently on the market today a great amount of shoes are made with unit soles, which are made from either rubber, PVC or urethane base material. Two distinct advantages for unit soles are flexibility in design, and lower cost, which is important in determining a retail price range for the product.

There are some styles, however, that demand a separate sole and heel which, while costing on the average a little more money, are necessary in order to prevent a look alike condition across the entire product line.

As I am sure you realize, it is necessary to go to the market place with a variety of shoe styles and lasts, as one shoe in one color on one last would not bring in enough sales volume to maintain a sound economical company. A casual look at any shoe department will certainly illustrate the extreme style range on the market at any particular time.

It might be pointed out that in the collection of the various components, the one that is possibly the most important to the consumer would be the type and color of material used in the upper portion of a shoe. It bears repeating that footwear is an accessory to ready-to-wear, and thus the color and texture coordination toward the ready-to-wear is of extreme importance.

#### V. PATTERN DEVELOPMENT

Plans now require that manufacturing techniques be considered and detailed. Having gone through the first three steps as outlined, we are now ready with the ideas and materials to physically construct the product.

The designer's rough drawing or sketch, perhaps a picture of another shoe or even a purchased shoe itself, is normally the starting point. In using a picture or even a shoe, in all probability only one small part of that particular item might be what the designer wants, the rest of the shoe being different in some degree. (e.g. a different upper material, a different sole, heel, or perhaps a new last.)

For each prototype last that is selected the pattern designer first develops a last draft. Figure II which is a flattened outline of the last itself.

The second step is to establish a shell layout to this particular last draft, Figure III. This master blue print that we call the shell is the detailed outline of a given shoe. This is done to establish the basic fit characteristic of the last and also to be used as a guide or base outline to work from for subsequent style development. Normally one would use a basic pump or slip-on style as these require the more exacting fit characteristic.

While we end up with a three-dimensional product, it is necessary to blue print the upper portion of the shoe on a flat plane. This is necessary because we are working with animal hides or materials which only come in a flattened condition and must then be conformed to the three-dimensional aspect by being applied over the last.

When detailing this blue print, the manufacturing procedure is started. As the shell is the master blue print, it does contain a great deal of information. Figure IV. It must detail the particular shape of the

shoe, what ornaments will be used, if any, how it will tie, and how it will look and fit.

This first shell is then dissected to provide all the patterns required on that particular shoe, including and identifying the inside lining as well as the upper patterns.

There are many necessary regulations required in making a shell which will provide the proper amount of materials and the proper positions, so that when assembled over the last they will provide the required adequate fit and will also provide lines of the styles in the proper position. These will be areas of compromise between the designer and the technical pattern maker when laying out the shell, for it is the pattern maker's responsibility to insure that the shoe style requested is functional, fits the foot well with comfort, and can be manufactured under the processes available at the minimum cost, and yet will result in a product with the style appearance required.

Once these patterns are all made, a detail sheet, Figure V, is then originated which contains information concerning all the components required to make the shoe. The heels, soles, upper material, lining material, and so forth are collected.

The upper materials are cut using the patterns as the guide. The bottom structure, which includes insoles, outsoles, heels, will be cut as necessary or supplied in the finished state. Normally, a heel is provided from a heel making company. Some soles are provided (as in the case of unit soles from a sole making company), while other soles are constructed from component material.

These items are then assembled giving us one style of upper on one style of last in one color and one size.

After it has been determined that the style and the fit are both satisfactory, the shoe is ready to be presented for possible adoption to the product line. This particular model process is repeated over and over again until enough styles are provided to enable the sales division to select a line of shoes that will cover all the trend areas as required for their particular company. This could mean 5, 10, 50, or 100 patterns.

The adoption meeting starts the cycle of a particular shoe into the manufacturing units. All the models that are adopted must first be detailed for that variety of color and material that each particular shoe will demand. All of the various styles and colors will carry an individual identifying stock number. All of the material and trim requirements are passed to the purchasing people to obtain from outside suppliers the necessary quantity to manufacture samples to be carried by the salesmen.

While the component materials are being obtained, the patterns are made and then sent out to die making companies to have steel cutting dies provided. These steel cutting dies are used to cut the various component materials in the manufacturing units.

As soon as the sample equipment is provided the next step in engineering a particular shoe is fit-checking various sizes. Up until this point we have been working with one size of shoe only. Now it is necessary to have this one size graded up and down so patterns are available to make this variety of sizes. These are then sent to the manufacturing unit where

they will make finished shoes, which will then be tried on the model feet.

To make sure the particular style is not distorted through the various size runs, we would change the grading requirements to correct whatever problem is apparent. It is important that all sizes look in proportion to one another.

The various trial size runs are used also to give the manufacturing units assurance that the various sizes can be produced at the proper allowances as required for their purposes. This is the final look that the manufacturing unit will have at the shoes from the standpoint of having any changes or improvements made prior to their receiving the equipment for bulk production.

Both manufacturing and industrial engineering will study the shoes in great detail in order to insure that the product is made as efficiently as possible and still maintains the required standards of quality and appearance. This is an in-depth study. Each operation required to make the shoe is gone over from the very first to the last. The hope of any new shoe is that it will be made on a volume basis and one or two cents saved per pair would substantially decrease the cost and make the product more competitive in the market place.

## VI. CUTTING DIES

The buying of dies and special equipment required should be analyzed and weighed against labor cost saving. The type of cutting dies required will vary according to volume being scheduled into the plant. Cheaper,

lighter dies can be bought for short run styles, and more expensive sophisticated die equipment for big volume work, or longer basic style runs.

The necessary steel die cutting equipment is expensive to purchase, and a great deal of money would be wasted if it were discovered after starting production that further changes would be required. To have several thousands of pairs perhaps cut and fitted together and then discover that they could not be presented to the last properly would mean that great expense has already been incurred. This would come about by the value of the material as well as the labor charges used to get the shoes to that point in the production line.

#### VII. FITTING TRIALS

It is essential to insure proper fit of all sizes. As the shoes are put on the various feet, they are looked at very closely from both a pattern and last standpoint. If it is a new last pattern, attention is paid to how the foot fits in the shoe, checking very closely for proper fit throughout the general instep area and around the heel. It is necessary to note that the shoe is not too tight to be comfortable nor so large that it will slip.

This same check for proper fit is made around the toe area. In the case of a slip-on pattern, special attention should be given to the entry properties. In checking a tie-type pattern, the width of the lacing should be watched very closely in order to be sure that the shoe will tie on the foot with the proper opening and still look attractive.



In all types of shoes, but especially in women's high heels, the tread properties of the heel are checked. Figure VI. To feel correct and comfortable, the heel must be made at a height that is compatible with the particular last involved. It also must have an angle relation between the last and the floor in order to prevent an incorrect angle of the heel up from the floor. The best fitting heel would remain slightly off the floor at the back.

While this checking procedure is being carried out, close attention should also be paid to the various angles and sweeps of the upper portion. Any corrections or changes to further finesse the design or improve the fit properties are made at this time.

The importance of the fit trial procedure cannot be over-emphasized, and because of this a set procedure should be established. A group of people representing typical feet sizes should be identified. Ideally, they can be found within your own organization but, more important, they should be individuals capable of being consistent in their observations and must be willing to tell you not what you want to hear about the fit but tell you exactly how it feels. Try to do this fitting towards the end of the day at a specific time. Remember the foot swells a little during the course of the day and, therefore, what could be right at 9:00 a.m. would be too tight at 4:00 p.m.

Note that companies who gain a reputation for a good fitting shoe do not achieve this by accident. It is because they are thorough in last selection, exacting in their fitting procedures, and then keep on record

all of the information that they obtain on each specific last and pattern. This is their bible, historical facts that are referred to whenever a new last or a new design is to be used. This historical information on lasts is then used to create a set of standards for the area of the last which is always constant, the area from the ball joint to the heel. So, therefore, all lasts ordered would be with their specific standard back characteristics, with the forepart representing today's fashion.

#### VIII. COST

After the above items are accomplished, we approach the important area of determining the cost of the shoe. Figure VII. This includes cost of the equipment and the machinery necessary to produce it, the cost of the component materials, and the labor cost necessary to put it all together. Before putting any particular shoe in the line, cost must be obtained in order to provide a wholesale and retail price range. The prices established on a shoe must provide for a profit for the manufacturer, as you can understand, but yet must arrive at the market place at a competitive level.

#### IX. UNIT SOLES

As I previously mentioned the most dramatic construction change of recent years has been that of the unit sole system. There are a number of reasons for this. After the introduction of the direct vulcanizing and PVC injection process, it became very evident that the direct system of attachment was not only expensive because of machine and mould cost

but a very inflexible system as far as design was concerned. Small organizations could not afford the capital investment and even for larger organizations it was difficult to justify mould costs unless a very large volume of sales was achieved.

Companies wanted the benefits of this system in terms of labor savings and fashion trends and yet they could only use small runs in specific styles. Therefore, today most organizations are using the services of companies who specialize in the products of unit soles.

One further development in this area - one which I recommend people to use - is to go to the companies who not only produce lasts but also produce a series of unit soles to fit these lasts (so that, in fact, you buy a package comprising of lasts, insole paper patterns, and unit soles which does assure you of the unit sole fitting the last you are going to use).

Because this process is a recent development it is very necessary to cover it in greater technical detail than the other areas in this paper.

## I. Design Specifications, Figure VIII

### A. Cement Margins

Cement margins on all unit soles should have a minimum of 1/2" in all bonding areas. The bonding area at the toe should be extended to a minimum of 9/16" to give the greatest possible bonding surface in this area.

B. Contour of Cement Margin

The contour of the cement margin should follow the contour of the lasted upper for which the sole is designed. Where there is a side wall or imitation welt on the sole, the arc going from the cement margin to the side wall is critical and should be held to the contour of the lasted upper. This contour will be determined by the sole design, but can be altered by the cutter used for roughing the sole when applicable.

C. Shank Location

All molded soles should have a shank area recess in them to allow the sole to fit tight to the shoe upper without excessive shank bridging. In some unit soles, it is possible to have the shank molded into the sole itself.

D. Sole Extensions

No unit sole should extend farther from the shoe than 3/16" if the soles are to be attached to the upper with adhesives. In wear, extensions exceeding 3/16" cause excessive stress on bonding footwear.

2. Materials

There are several materials available for molding unit soles, such as Poly-Vinyl-Chloride, synthetic rubber compounds, Kraton, and urethane materials

A. Poly-vinyl-chloride Materials

1. PVC materials are probably the most common used for unit soles. There has been some problem with cold cracking and plasticizer

migration with some of the earlier compounds. However, these have been corrected in the better grades of PVC.

2. PVC materials are rather difficult to rough in preparation for cementing, as they tend to melt and gum up and not give a uniform bonding surface. Therefore, in preparation for cementing, many companies use a wash such as MEK to clean the bonding area.
3. This compound must be cemented with a urethane adhesive which will not be attacked by the plasticizing oils in the compound.

#### B. Synthetic Rubbers

1. There are a great number of compounds of various synthetic rubber materials that are used in unit soles. Most of these lend themselves to roughing very well and this is the most common method of preparing the soles for cementing.
2. Generally, these compounds are cemented with a neoprene adhesive as they give better bond strengths than a urethane adhesive, and there are not as much plasticizing oils present to soften the neoprene adhesive.
3. Some of these synthetic rubber compounds lend themselves to a chlorination process and then a urethane adhesive. This depends on the particular compound and has to be tested for each compound before a method is adopted.

#### C. Kraton

1. Kraton is a specialized synthetic rubber compound designed for unit soles.

2. This material must be chlorinated before it can be bonded. The best procedure for this is to have the sole dipped in an aqueous chlorinating solution immediately after the sole is removed from the mould. The urethane adhesive can then be applied and bonded to this material.

D. Urethane Compounds

1. There are two classes of urethane compounds; one being a rigid and the other being a flexible material. The rigid is used primarily in clogs and heavy wedge platform type soles. The flexible material is used in more conventional unit soles.
2. Both of these materials can generally be roughed in preparation for cementing with a urethane adhesive.

3. Bonding Procedures For Unit Sole

A. Sole Preparation

1. Preparation of a sole depends on the compound used. There are two acceptable procedures for unit soles; one roughing and two washing.
2. Roughing is generally accomplished with a grit stone or wire brush. These are various machines available which will follow the contours and shapes of the unit soles.
3. Washing is generally done with a good degreasing solvent and also one that will attack the particular sole. With compounds such as Methyl Ethyl Ketone for Poly-Vinyl-Chloride compounds, it is essential that the complete bonding area be thoroughly cleaned in preparation for cementing.

B. Cementing

1. Urethane adhesives are used on all PVC materials and on any soling compound which has been chlorinated. There are machines available which will cement only the bonding margin or this can be done by hand with a brush. The proper amount of adhesive must be applied and this has to be determined by the particular compound; as some adhesives will absorb into some compounds more than others. There must be an adequate amount of adhesive solids remaining on the surface but not a puddling of the adhesive.
2. Neoprene adhesives are generally used on rubber compounds. Again, these can be applied either by machine or by hand with a brush. An even coat of adhesive is essential and again too little or too much adhesive can cause bonding problems.

C. Drying

1. A minimum air drying time of 1½ hours after the sole is cemented and before it is activated is necessary. Neoprene cements will generally dry faster than the urethane adhesives. The maximum drying time is generally held to three days. However, some adhesives can be activated after a considerably longer time. If the adhesive is not sufficiently dried, the cement will separate after the sole is pressed to the shoe, especially in high stress areas; such as the arch area. If the adhesive has been dried too long, it can not be activated and simply will not adhere to the cemented upper.
2. Force drying can be used with either neoprene or urethane adhesives. However, more rapid drying can be accomplished with

the neoprene adhesive than urethanes. The best method for forced drying is a warm air circulation of approximately 130°F. If the cement surfaces are exposed to the warm air circulation for approximately eight minutes and a cooling time of approximately twenty minutes a drying equivalent to 1½ hours air drying is achieved. With some urethane adhesives an additional 15 minutes cooling time is necessary.

D. Activation

Activation is extremely critical in sole attaching. Both the sole and the upper are heated to activate the adhesive to obtain the proper spotting tack. If the adhesive is under-activated, you will not have a uniform bond of the sole to the upper. If the adhesive is over-activated, this can allow the adhesive to stretch open in high stress areas. Neoprene adhesives in general are activated in a temperature range of 120°- 145°F. These adhesives give very good spotting tack and are easier to activate than urethane adhesives. Urethane adhesives are generally activated from 110°- 130°F.

E. Pressure

It is essential that the two bonding surfaces make good contact in order to obtain proper bond. The unit sole must be properly fit to the pad of the press to make sure that proper pressure is applied to all areas of the sole. On conventional hard pad sole presses, pressure used is from 100 - 175 PSI, depending on the design of the sole and the compound used. On the sole press which uses an air bag to apply uniform pressure to the sole, the pressure is generally set at 30 - 50 PSI.



#### 4. Bonding Procedures for Uppers

##### A. Roughing

1. Uniform flat and properly roughed bottoms are essential in any good bonding procedure. Any pleats or wrinkles formed at the toes and heels must be pounded flat with a coarse roughing stone before roughing with the wire wheel. Leather uppers are generally roughed with a medium wire-filled power brush. For some leathers, such as medium weight calf or kid leather, a coarse wire-filled brush is recommended. A properly roughed upper should have the grain layer completely removed and the smooth surface exposed, as the grain layer is not very firmly attached to the leather. If just the finish is removed and not the grain layer, this grain layer will then strip away from the remaining leather at a rather low strength.
2. For most synthetic upper materials, such as vinyls, fabric suedes, or cotton flock, a short trim, fine wire-filled power brush is recommended for roughing. For some vinyl coated fabrics, a nylon brush can be used for roughing. In roughing synthetic materials, it is generally recommended to remove the synthetic vinyl or surface material to expose the substrate or backing material. Most synthetic upper materials are more difficult to prepare properly than leather uppers, as it is very easy to rough completely through the material leaving no bonding margin

## B. Cementing

1. Leather uppers are generally cemented with neoprene adhesives. However, if a vinyl PVC or chlorinated unit sole is to be attached, a urethane adhesive must be used. The adhesives should be applied to give proper penetration and still leave an adequate coat of solids remaining on the surface. This can be done by using two coats of adhesive; the first coat being rather thin and penetrates into the leather, after which a second coat of heavier adhesive is applied to give the necessary surface. An alternate procedure can be to use a single coat of a rather high solids content adhesive with a somewhat slower solvent system, which will give penetration and adequate solids remaining on the surface. As leathers vary considerably in their firmness, both of these procedures may be needed, depending on the quality of the leathers being used.
2. Synthetic upper materials, in general, use urethane adhesives. A single coat is usually adequate, as the adhesive does not soak into the substrate as much as it does in natural leathers, but requires more of a chemical adhesion to the material. A uniform coat of adhesive is essential, as too little will leave dry or inadequate bonds and too much adhesive can form lapping bonds especially in high stress areas.

## C. Drying

1. In general, neoprene adhesives can be air-dried in one hour. Urethane adhesives should be allowed to dry 1½ hours. A forced

drying system similar to the one used for unit soles will also apply to cemented uppers.

## 5. Testing

- A. Neoprene adhesives give very good immediate bond and can be tested one hour after the sole has been laid. Pull tests made with these shoes generally should give a rupture of either the soling material or the upper material. For men's semi-dress or dress shoes, a minimum value of 45 pounds is an acceptable standard. On men's work shoes, generally, this is increased to a minimum of 60 pounds and on women's shoes a value of approximately 25 pounds is acceptable.
- B. Urethane adhesives generally have a lower initial bond than neoprene adhesives and should set for a minimum of 24 hours before pull tests are made. However, bonds can be checked within a hour, realizing that the bond has not fully cured and will have only about 80% of its final strength. Again, the final strength of the bond should be a rupture of either the soling or upper materials, with the same standards as given for neoprene adhesives.

The major problem with the unit sole construction method is sole bond failure. Nothing is more expensive or harmful to a company's reputation than having shoes returned because of the sole not adhering to the uppers. Therefore, I cannot overstress the importance of establishing in factory procedures which will insure the proper bond adhesive qualities for each pair produced. Then, of course, it is necessary to enforce the strictest of discipline to insure that those procedures are exactly followed.

## Conclusion

The subjects for this paper were too extensive to cover in great technical detail. What has been attempted is to explain how an idea or design is taken, and then go through the steps in order to turn it into a finished saleable product.

This requires a great deal of coordination, involving not only people within an organization such as marketing, designing, pattern cutting, manufacturing, costing and material purchasing, but in addition the involvement of outside suppliers such as last makers, tanners, unit sole producers, etc. Therefore, it is recommended to develop and strictly adhere to a corporate planning calendar. See Figures IX and X. This insures that everyone is aware of the overall development program and can gear their areas of responsibilities to meeting the required schedule.

Successful companies don't just happen, they come about by having a group of dedicated people who work to a planned program.

Remember --

1. Companies must be market oriented, not production oriented.
2. The only way to develop the right product is to be aware of what is happening in the market place.
3. Shoes are purely an accessory to the ready-to-wear business.
4. There are only a few original designers in the world, the majority take ideas - designs from either other shoes or sketches. When you know that a specific style is successful and you are going to copy it, make sure you do it exactly stitch for stitch. Many good products have failed in the

market place because some designer thought that he could improve an already proven saleable design.

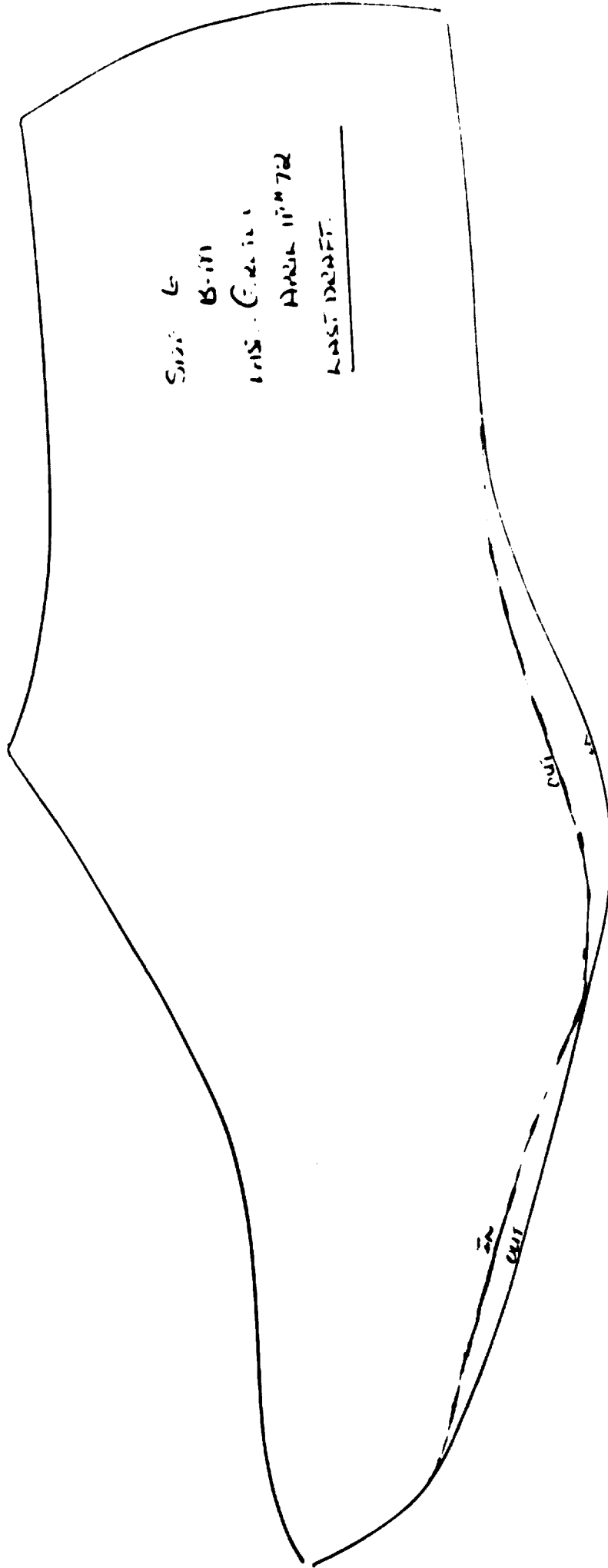
5. There are opportunities for the organization who can deliver the right product at the right time at the right price and of the right quality.

The author acknowledges help given in preparation of this paper to  
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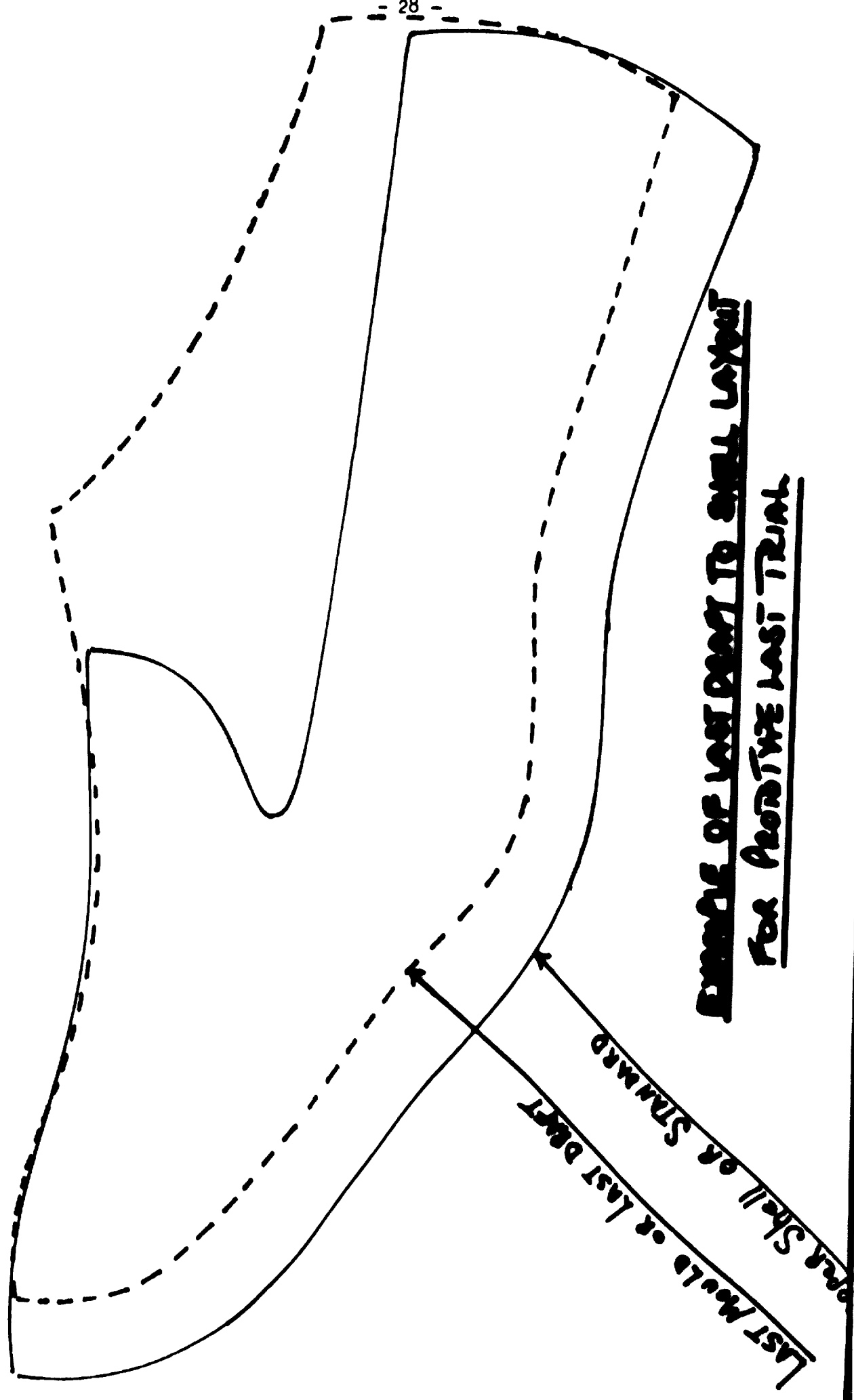
FIGURE 1



EXAMPLE OF DRAFT TAKEN FROM MODEL LAST.



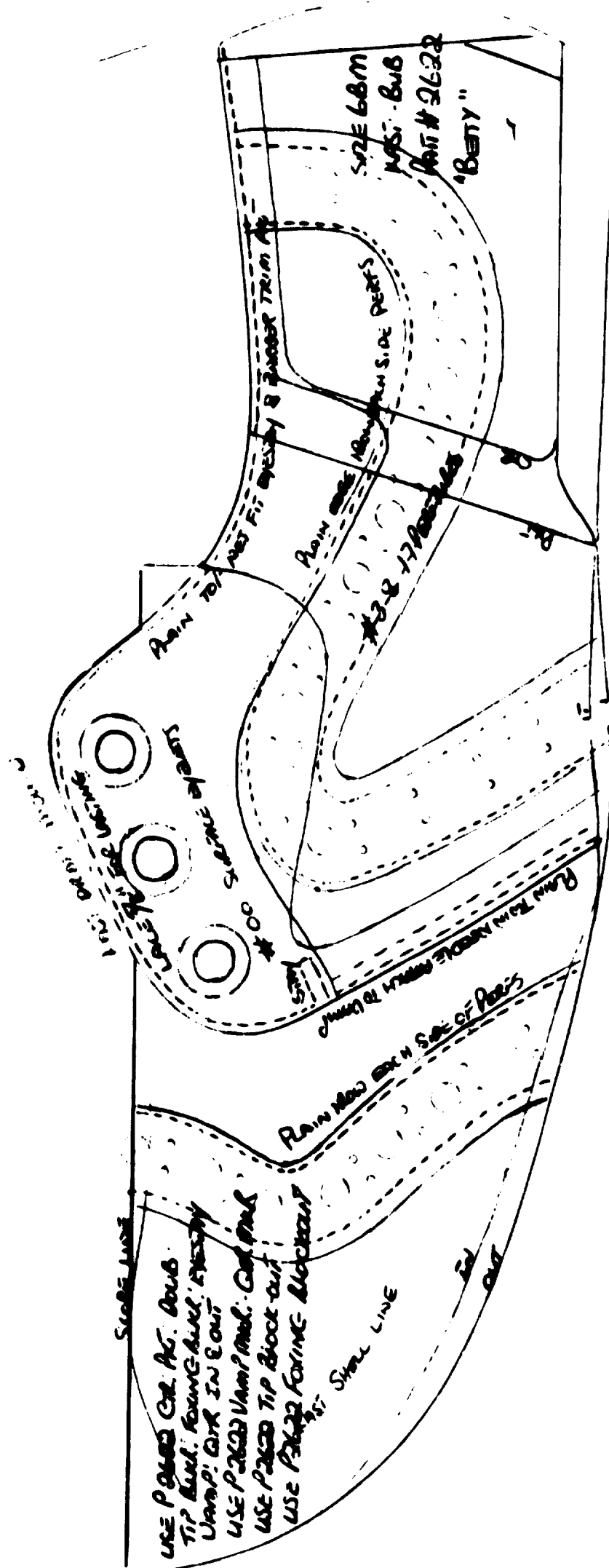
F FIGURE III



EXAMPLE OF LAST PART TO SHELL LAYOUT  
FOR PROTOTYPE LAST TRIAL



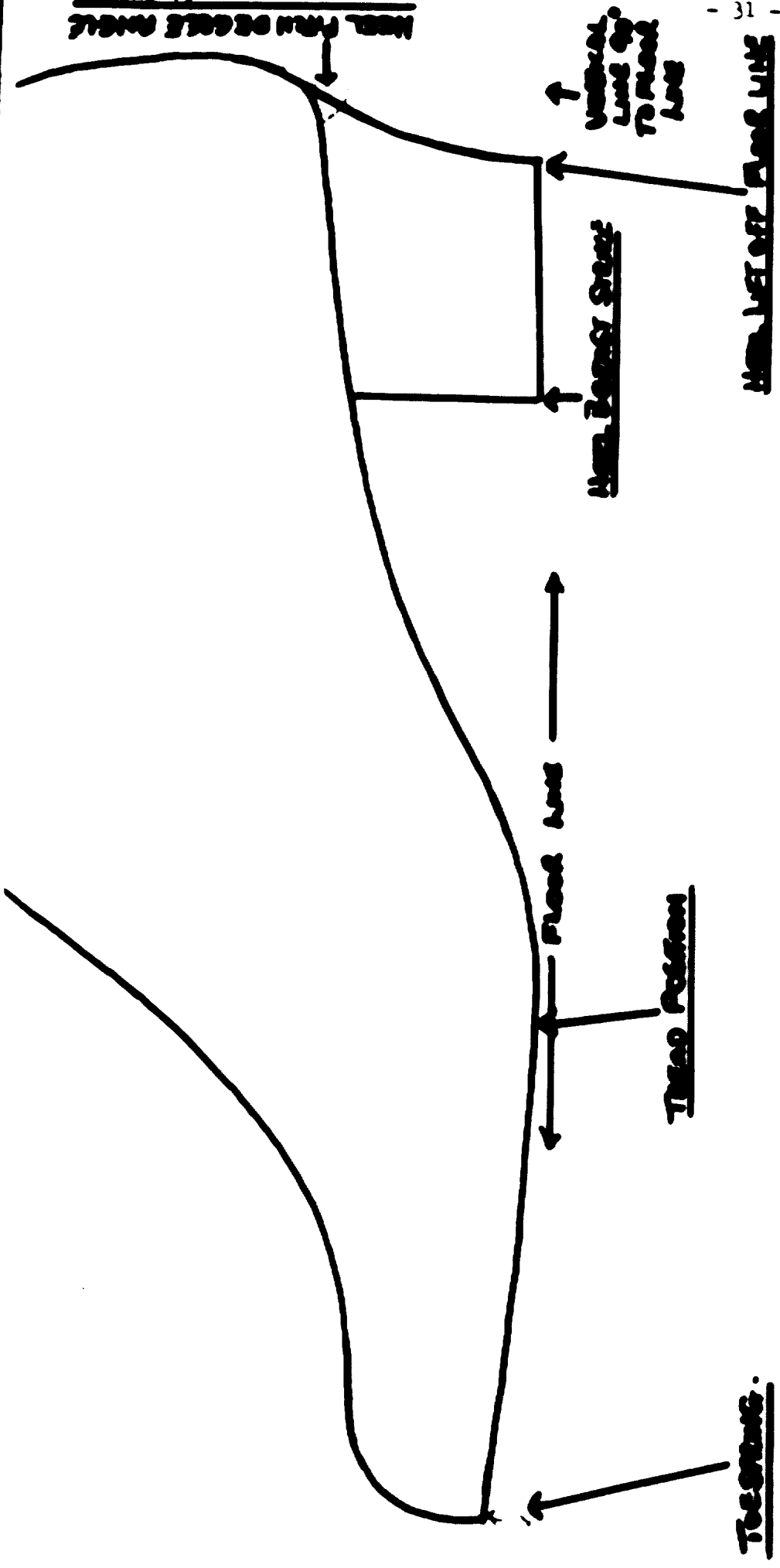
# EXAMPLE OF SHELL LAYOUT FOR SAMPLE SHOE



**ALL DIMENSIONS ARE DISCREED FROM THIS MASTER SHELL.**

STYLING \_\_\_\_\_ PURCH. 6-10-72 DATE 6-10-72 LAST Tahoe NAME Picnic  
 PATT. \_\_\_\_\_ PURCH. \_\_\_\_\_ REV. \_\_\_\_\_ FACT. A & D STOCK NO. 16142  
 SALES \_\_\_\_\_ PURCH. \_\_\_\_\_ COLOR \_\_\_\_\_ SIZE Men's PATT. NO. 1471  
 Q.M. \_\_\_\_\_ PURCH. F 6/29 DESC. Mocc Toe 2 Eyelet Tie

QTY	INDT	PAT NO.	PART	LEATHER	USAGE	UNIT
100	0,2	B	CUT UPPER		1,000,000	P
		13419R		632 Fresh Earth		
		1471	IN VAMP	632 Fresh Earth		
		1471	OUT VAMP	632 Fresh Earth		
		23323R		Hayride Veras HM		
		1470	FOXING	Hayride Veras HM		
		1471	PLUG	Hayride Veras HM		
		1467	WEDGE COVER	Hayride Veras HM		
		10781N		#98 Beige Brown Ceelon	1.00	P
		1471	IN QTR LINING	#98 Beige Brown Ceelon		
		1471	OUT QTR LINING	#98 Beige Brown Ceelon		
300	0,1	A	FINISHED UPR		1,000,000	P
300	0,2	B	CUT UPR.		1,000,000	P
		71219P	QTR TOP	1/2" English Bind W/Tape Hayride Veras		
		18194P	TOP LINE CORD			
			ORN.	2 #2 Bronze Eyelets	8.00	P
		16121R	VAMP TAPE	1/2" #275 White Drill	.08	
		16026P	BOX TOE	Transbeck HPN 023	1.00	P
			THREAD	CSb 69 Chestnut & ORL #7 White		
		1471	MKR. VAMP			
			foxing bk seam-close & rub			
			foxing to qtr- HH close			
			front seam-close & rub			
			plug to vp-ORL #7 cord			
			vamp to plug-bartack			
300	0,0		FINISHED SHOE		1,000,000	P
300	0,1	A	FINISHED UPPER		1,000,000	P
300	8,0		LAST	Tahoe		
		00117M	INSOLE	5 Iron Texon #437	1.00	P
		11125M	CTR.	030 Bixlon 1443	1.00	P
		18116P	SHANK	Steel Code A	2.00	P
		00203M	BTM. FILLER	Pigskin	1.00	P
			OUTSOLE	12/12 Iron Anti Krinkle & Suede Dura.		
			HEEL			
		14594	HEEL	Tahoe	1.00	P
		07121G	OUTSOLE ASM	12/12 Iron Anti Krinkle & Suede Dura.	1.00	P
		18541P	HEEL		.00416	P
		20352P	HEEL STUFFERS		1.00	P
		03001C	HEEL PAD / XXXXXNXXX	Black Vinyl	1.00	P
			BTM. EXT.	Flat		
			UPPER FINISH	Clean & Brush		
		20059P	LACE	18 #361 Friar Brown	.014	P
		20013M	CARTON TOP	#6	1.00	P
		20012M	CARTON BOTTOM	#6	1.00	P



EXAMPLE OF COLLECT' LAST TREAD

FIGURE VII

FIGURE VII

PRICING SHEET

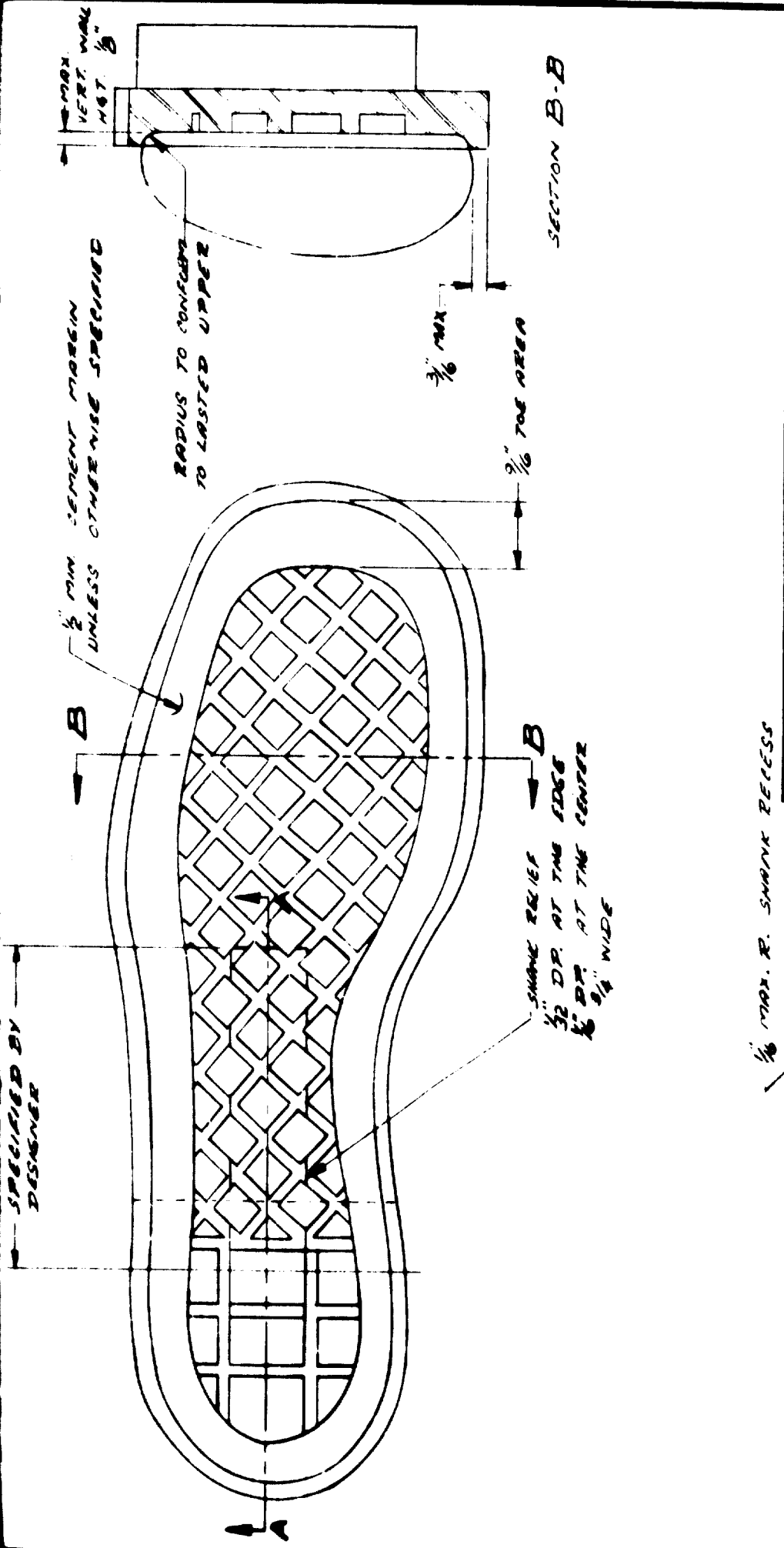
TYPE  
LAST

NAME

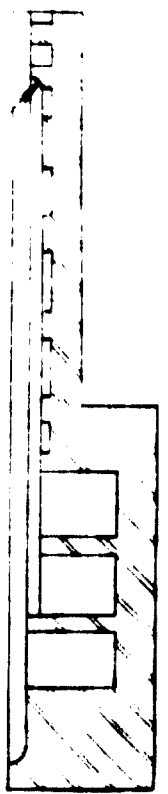
STOCK NO  
PATT NO

DESC	DATE			DATE			COST	DATE			COST		
	USAGE	PRICE	RATIO	USAGE	PRICE	RATIO		USAGE	PRICE	RATIO			
UPPER													
LINING													
GORE													
BEAM TAPE													
DOUBLER													
QTR TOP													
EYELETS													
ORNAMENT													
BOX TOP													
INSOLE													
COUNTER													
SHANK													
MIDSOLE													
OUTSOLE													
HEEL													
HEEL													
SOCK													
UPPER FINISH													
LACE													
BOXES & CARTONS													
FINDINGS													
MATERIAL SAVINGS													
MATERIAL VARIANCE													
TOTAL MATERIALS													
LABOR	DATE			DATE			FACTORY COST	DATE			DATE		
	LSC	SDL	TOT STD	LSC	SDL	TOT STD		STD	RATIO	EXT	STD	RATIO	EXT
CUT							TOTAL MATERIALS						
FIT							TOTAL LABOR						
LAST							VARIABLE BURDEN						
CEMENT							FIXED BURDEN						
FINISH													
TOTAL							TOTAL FACTORY COST						
COST OF SALES	DATE		DATE		DATE		DATE		DATE		DATE		
	RATIO	EXT	RATIO	EXT	RATIO	EXT	RATIO	EXT	RATIO	EXT	RATIO	EXT	
FACTORY COST							SALESMENS COMMISSION						
PURCHASING							OTHER SELLING						
CENTRAL STORES							ADVERTISING						
MFG ADMIN							PROFIT						
WAREHOUSE & DIST							NET SELLING PRICE						
CARTONS							MARK DOWNS & DISCOUNTS						
PRODUCT DEVELOPMENT							SUGGESTED LIST PRICE						
RESEARCH & DEVELOPMENT							LABOR SAVINGS AT LIST						
ADM & GENERAL							MATERIAL SAVINGS AT LIST						

A 87 D PMS



DATE: 3-28-77	APPROVED BY	DRAWN BY MLTX
SCALE: 1" = 1"	ENGINEERING DIVISION	REVISED
PROJECT: UNIT SOLE		
DRAWING NUMBER NO - 00123	SPECS	



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FIGURE IX

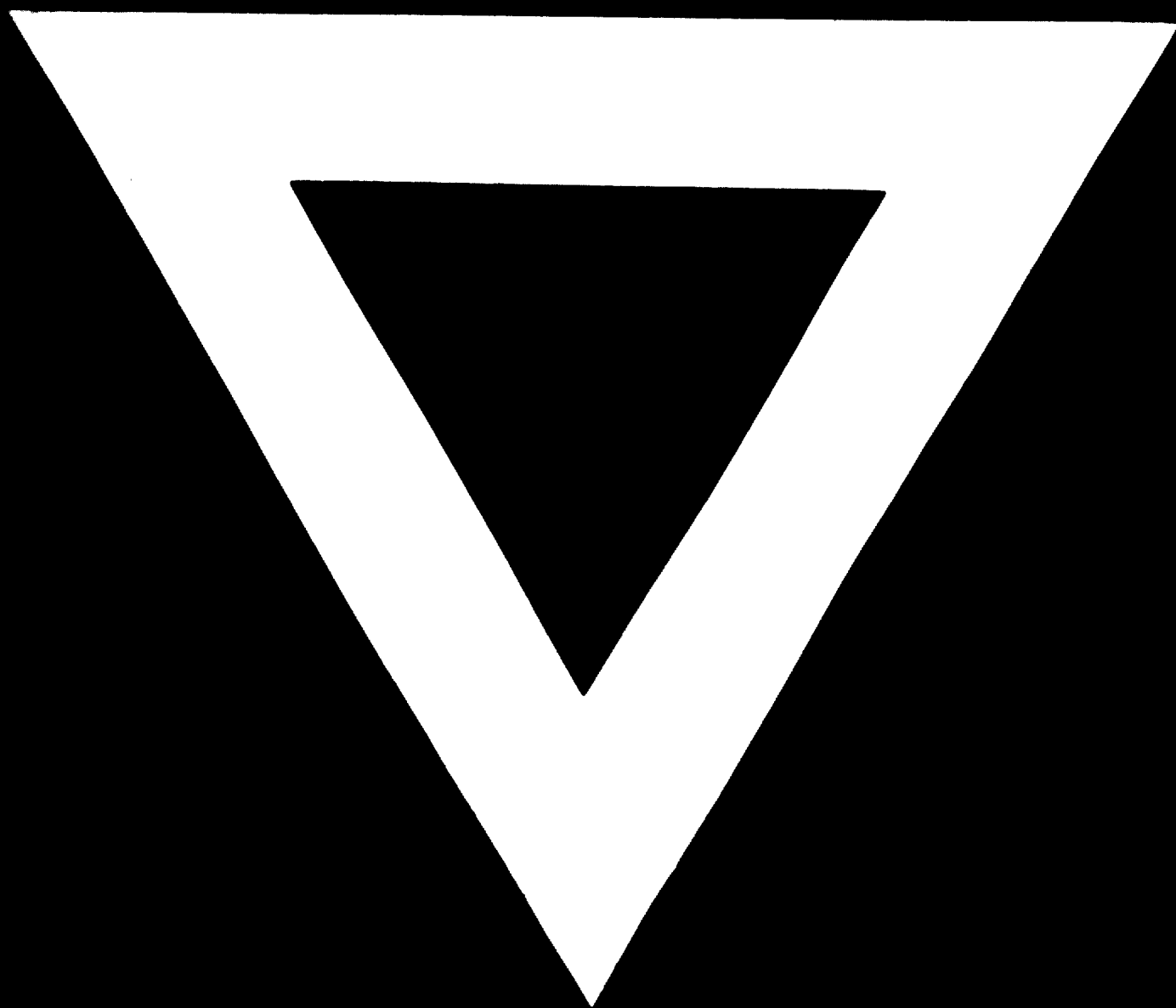
4th PERIOD PLANNING CALENDAR MARCH/APRIL 1973

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
25 Prod. Wk. 378	26	27	28	29	30 7th Direction Meeting	31
1 Prod. Wk. 379	2	3	4	5 1st Pattern Adoption Meeting	6 Color Line Start 2 Pr. Lots	7
8 National Designer Guild New York Prod. Wk. 380	9 National Designer Guild New York	10 National Designer Guild New York	11	12 2 Pr. and Sample Material List Must Be Available	13	14
15 Prod. Wk. 381	16 2 Pr. Specs Available	17	18	19	20 20% of Line Costed	21

6th PERIOD PLANNING CALENDAR MAY/JUNE 1973

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
20 Prod. Wk. 386	21 Color Line	22 Material List Must Be Completed From Purchasing	23	24	25 Advertising Must Have All Copy, Stock Nos. Last, Heel Heights, Etc.	26
27 Prod. Wk. 387	28	29	30 2 Pr. Specs Available From Final Adoption Meeting	31 Schedule Samples on New Colors in Carry Over Patterns	1 20% of 2 Pr. Lots Completed and Priced	2
3 Prod. Wk. 388	4 Selling Season Begins "74 Sandal Line"	5	6	7	8 40% of 2 Pr. Lots Completed and Priced. Sales Approval Buyers Guide Layout	9
10 Prod. Wk. 389	11	12	13	14	15 60% of 2 Pr. Lots Completed and Priced	16





**74.09.27**