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FOOTWEAR DEVELOPMENT

DP/HUN/76/001

HUNGARY

Technical report:
SHOE DESIGN AND PATTERN CUTTING

Prepared for the Government of Hungary by the
United Nations Industrial Development Organization,
executing agency for the
United Nations Development Programme



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Based on the work of K. H. Longman, expert in
shoe designing and pattern cutting

United Nations Industrial Development Organisation
Vienna, 1976

Explanatory notes

The following abbreviations are used in this report:

CMEA Council for Mutual Economic Assistance
MC Minőségi Cipőgyár (quality shoe factory)

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ABSTRACT

This is the report of the project "Footwear Development" (DF/HUN/75/001). The project was requested by the Government of the Hungarian People's Republic in order to assist the Minőségi Cipőgyár (MC) (quality shoe factory) group in increasing its exports of footwear to Western markets. This would be achieved by reorganizing the group's management structure and capacities and by making products more flexible to compete in both domestic and export markets.

According to the project document, which was approved by the United Nations Development Programme (UNDP) in May 1975, a team of four experts under a project manager was to be attached to the Ministry of Light Industry in the main MC factory at Budapest which would then be used as a model for other Hungarian factories. The expert for footwear development and marketing arrived in late 1975, the project manager arrived in May 1976 and the shoe design and pattern cutter in mid June 1976. For various reasons the number of the team was reduced from five to three. Although an extension was requested for the designer in 1976, it was not possible for financial reasons.

The initial objective of the project was to increase exports to Western Europe. However, Minőségi had previously entered into an agreement with an American company to export a large quantity of shoes directly to the United States of America. This agreement will take up spare capacity for some time to come, and it will use American technology. It was therefore decided that the project would direct its efforts to improving the footwear produced for the local market and for export to the Council for Mutual Economic Assistance (CMEA) markets, thus eventually helping to promote the export of footwear to Western Europe.

There is considerable room for improving the quality and cost effectiveness of the MC group through improving the method of designing and pattern cutting, and the materials, components and technology used, particularly by reducing the amount of hand work done. A different boot closing technology, described in annex II, would be timesaving, and a practical method of shoe designing and pattern cutting (annex III) should also prove valuable. A programme of standardization should be introduced for lasts, patterns, heels, stiffeners etc.

MC is affected a great deal by almost all the components used. Standards should be agreed on with the suppliers and these should be strictly adhered to, especially those applying to lasts, leathers, moulded soles, insoles and sole

material. Because of these problems with components a control staff of 33 is necessary for the Budapest factories alone. Channels of communication between departments should be improved as should the communication between factories in the group.

It would help if each factory specialized in making a certain type of shoe, i.e. if flow-moulded shoes were made in one factory, shoes with a certain heel height in another, and shoes above this height in another.

Much more care should be taken in making samples and tests. It is most important that sample shoes be made on the same types of machines as those used for the bulk production. This also applies to the leathers and materials. Samples and tests should be treated as development samples from the first shoe cut and made.

The factories of the MC group are reasonably well equipped with modern machinery, and working conditions appear to be very good so that there is no apparent reason why quality and productivity cannot be improved.

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INTRODUCTION

The Hungarian footwear industry, which has a total annual production of approximately 48.4 million pairs and employs about 42,000 workers, satisfies market requirements only to a limited extent, owing to its relatively obsolete modes of production and its inability to adapt to changing demand. It is therefore unable to compete effectively on world markets, although its major exporter, the Minőségi Cipőgyár (MC) (quality shoe factory) group, maintains a consistent standard of quality in conservative styles, over half of its output being exported, mainly to countries belonging to the Council for Mutual Economic Assistance (CMEA). To remedy this situation, the Government of Hungary, as part of its five-year plan for the period 1976-1980, intends to increase and upgrade footwear production considerably, and to modernize the industry to achieve greater efficiency and to adapt to the rapidly changing and highly fashion-conscious Western markets. To that end, it submitted in March 1975 a request for the project entitled "Footwear Development" (DP/HUN/75/001), which was approved by UNDP in May 1975, with the Hungarian Ministry of Light Industry designated as government counterpart agency and UNIDO as executing agency. The original budget proposals provided for government and UNDP contributions of respectively \$82,160 and \$72,550.

The main objective of the project was to find ways of increasing the volume of exports from the MC group to Western Europe. A team of experts consisting of a project manager (for a period of 9 months, later increased to 12 months) and four experts (for a period of four months each) was to be based at the main MC unit at Budapest.

This report covers a four-month mission (mid-June to mid-October 1976) carried out by the expert in shoe design and pattern cutting within the framework of the project. The duties of the expert as laid down in the job description (see annex I) were the following: to assist the shoe design and pattern-cutting sections of MC in preparing styles and designs for markets in Western Europe; to work closely with the expert in footwear production (preparation and upper stitching) in introducing a standard measurement system for cutting leather; and to assist the project manager and the other experts in a co-ordinated effort to increase the efficiency and flexibility of the technical operation of the MC by studying possible ways of reorganising the design and pattern departments.

Before the project became operative two important changes had occurred which affected it: the first was that the number of experts had been reduced from five to three; the second was that MC had entered into an agreement with an importing organization in the United States of America to export a large quantity of shoes to the United States. This MC did not have the capacity to increase exports to Western Europe in the foreseeable future.

After discussion of the new situation it was decided that the objectives of the project would principally remain the same but that MC would concentrate on the local market and export to the CMEA countries.

Because of the reduction in the number of experts the project manager and the expert in shoe design and pattern cutting had to enlarge their fields of study. The designer had to assist the project manager in all departments besides designing and pattern cutting. An extension of two months was requested for the designer and though agreed to in principle it was later refused on financial grounds.

The counterpart of the designer was an English-speaking member of the technical staff of MC. As he was the only member of MC with fluent English he was required for translation duties and during holidays. Therefore the expert was without his counterpart for about half of the project time and encountered language difficulties which resulted in his being misinformed.

This report analyses and evaluates the existing situation with special emphasis on design and pattern cutting, and deals with such related problems as materials used, components, tools, machinery and methods of production. In addition, the expert was asked by the management of MC to prepare a paper on his method of design and pattern cutting which is given in annex III of this report.

The expert visited both of the other MC units at Budapest and the factory at Szigetvár. It was not possible to visit the remaining factories in the group. He also visited the Budapest last factory, the Graboplast plastics factory at Győr, the Pécs tannery at Pécs and the Research Institute of the Leather, Artificial Leather and Footwear Industries. These visits proved to be most helpful and enlightening to the expert and made it easier to understand their problems which consequently affected the Hungarian footwear industry.

Further useful information on the over-all situation of the MC is provided in F.G. Bailey's report of May 1974, in the periodical reports of J.J.A. Berg, project manager, and in E. Paschkusz's report of April 1976.^{1/} Another report, which the writer found to be very helpful at the initial stage of his assignment, was that of B.G. Lunden, dated November 1975, giving information on the Hungarian leather industry in general and the Pécs tannery in particular. The Pécs tannery is one of the main suppliers of upper leather to the MC group. Both the project manager and the expert feel that

Both the project manager and the expert feel that this project, after initial problems were solved, has been a success. Interest in the expert's field of work has increased and requests from the Design Department for assistance have become more and more frequent. Unfortunately, because of lack of time the expert was unable to comply with all of these requests.

^{1/} DP/ID/SER.A/48.

I. FINDINGS

General observations

The MC group was formed over ten years ago by the amalgamation of several smaller factories located at Budapest and in other parts of the country. There are now eight factories in the group with an annual production of 7.3 million pairs in 1976. Of this figure 3,191,000 were for the domestic market, 3,872,000 for export to countries belonging to the Council for Mutual Economic Assistance (CMEA) and 236,000 for export to Western European markets. In 1975 the total production was 6,651,000 pairs, of which 2,697,000 were for the domestic market, 3,948,000 for export to CMEA markets and 5,700 for export to Western European markets. The following production is scheduled for 1977: total production 7,550,000 pairs, domestic market 3 million, CMEA exports 3,750,000 and exports to Western Europe and the United States of America 800,000 pairs.

The shoes produced by the MC group can be classified by Western European standards as ranging from low grade to low medium grade with some medium grade. They are solid, heavy looking and conservative in appearance and feel, but meet the requirements of the home market, which is not very fashion-conscious. However, a demand for light, more flexible shoes with up-to-date fashion lines must be expected in the near future. To cope with this change in demand it will be necessary to have softer leather, better components and the right technology. The technicians in all departments must be prepared to accept new ideas and changes in the technology.

Design Department

The duty of a designer consists of designing or specifying the end product. The task of the shoe engineer or pattern cutter is to find ways and means of achieving the desired result.

The Design Department is situated in a pleasant, well-lighted room at the main MC unit at Budapest. It has a staff of seven, consisting of the chief of the department, the chief designer (who is occupied with administrative duties), four designers and one trainee. There is also one designer working at home.

This Department prepares the designs for all factories in the group, producing a total of 1,600 to 1,700 designs a year, of which about 400 are selected for production. There seems to be an adequate supply of foreign fashion magazines and the designers visit foreign shows and trade fairs once a year or every second year. Foreign designs in "pullover" form have been purchased for the first time in 1976 and there is also a reasonable supply of foreign trimmings and buckles. The style information available seems to be adequate to cater to the needs of the CMEA and local markets. With regard to increased exports to the western markets, which is the main concern of this project, there will be a need for more information and more travel to foreign countries, and for a wider range of leathers, trimmings, buckles and other accessories.

The Design Department is not only responsible for the design of a new model but also for the production of the original patterns and sample shoes. But, whereas the designers are well trained to design shoes, it is felt that their technical qualifications are not sufficient to prepare the patterns as well. It must be realized that on the basis of the patterns produced in this Department the initial costings are calculated and the sample shoes are the ones displayed to buyers. Many of the designs produced, however, require too much labour and waste material (for example require too much folding, join in the wrong place, use two rows of stitching where one would do or use quarter linings that are too long).

It was found that the designers do not have sufficient time to make the styles exactly the way they want them to look. The first effort is often sent straight from the jury meeting to sample-making before the designer is satisfied with the result of his work. If "pullovers" or lasted shoes only were prepared for the jury or selection meetings, these could be modified a lot easier if selected, than a finished sample shoe.

Until a style is ready to be sold, no pattern technician from any of the production units has seen it or been involved in developing it. Both the method and the machinery used in the Design Department to produce the sample shoes are different from the ones used in their mass production. The original patterns are prepared in a very haphazard way and bear hardly any resemblance to the final production patterns. This means duplication of work because new patterns have to be prepared for mass production, more tests and development work undertaken, and new costings made.

The Design Department comes under the Main Product Development Department; the Technical Pattern Making Department comes under the Technical Department of the various factories. There appears to be very little contact between the Design Department and the Technical Pattern Making Departments of the factories.

Technical Pattern-Making Department

The Technical Pattern-Making Department visited by the expert serves the Budapest factories. The other MC units situated outside of Budapest have their own Technical Pattern-Making Departments which work independently of the one based at Budapest.

This Department produces the actual patterns used in the production of shoes. It is responsible for ordering press knives, perforating dies, markers and moulds for flow moulding, carries out production tests and solves production problems. This Department comes under the Technical Department for the Budapest factories. It has a staff of 10, consisting of the chief of the department, five pattern technicians, one assistant, one clerk, and two operators for the pattern-grading machines. It carries out the grading of patterns only for the Budapest factories, since the factories at Szeged, Szigetvár and Nyirbátor have their own grading machines.

The standard of grading at Budapest does not appear to be particularly high: when checking insole patterns against last patterns the expert found errors of up to 1.5 mm in length on the insole patterns. There seems to be little checking of graded patterns, since this error had gone through to the production of cutting knives.

Because there is no standardization of patterns it can happen that when the Budapest, Szeged and Szigetvár factories use the same last they arrive at three greatly different patterns. Figure I gives such an example. There is a marked difference between the patterns, although they are for the same last. This example is not an isolated one: it is a recognized fact that Budapest cannot use patterns made in Szigetvár or Szeged and vice versa, although the machinery is practically the same. Consequently there can be no transfer of production without new patterns being made and costings recalculated.

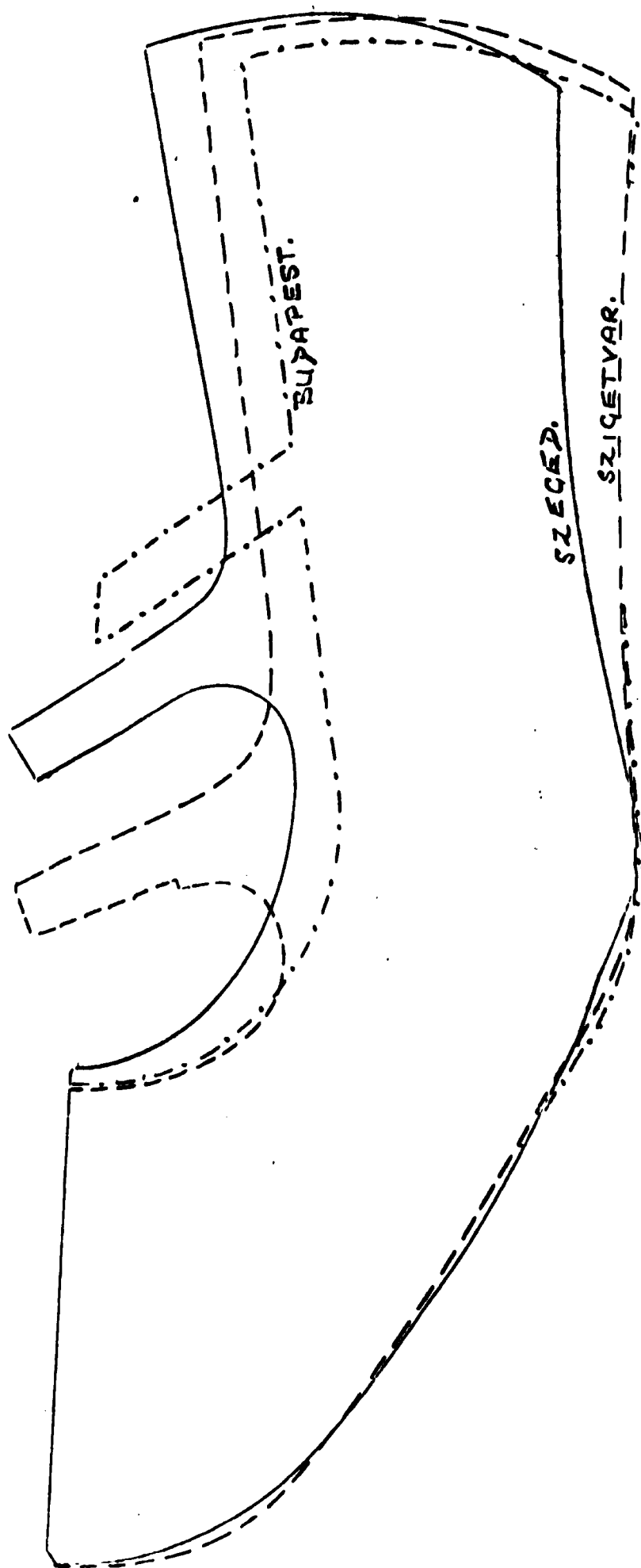
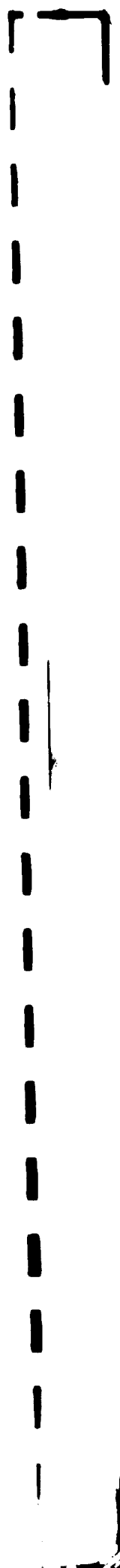


Figure I. Different patterns prepared for the same last at the
Budapest, Szeged and Szegetvár factories



In addition, the method of pattern cutting used at the Budapest factory is considered to be wasteful of upper material. The expert recut about 10 existing styles and for all of them 2.5 to 5 per cent of the material could be saved. By using a better technology in the closing room, the saving in labour was 25 per cent. A detailed cost analysis of a boot is given in annex II.

It is a great disadvantage that often not fully developed models are seen and ordered by buyers. Later improvements of the technology, which would result in savings of time and material, cannot be introduced if they affect the design of the model. It is therefore felt that the staff of the Technical Pattern Making Department should be involved in the development of new styles at a very early stage.

Product Development Department

In the Product Development Department practically all required components such as lasts, heels, insoles, soles, socks, shanks, unit soles are developed and tools such as wiper plates for the toe lasting machines etc. It has a staff of five consisting of one bottom-stock development technician, one bottom-stock production technician, two pattern cutters and one trainee.

All bottom patterns used in the MC group are developed here. The patterns are graded by the grading section of the Technical Department for the Budapest factories although the Product Development Department comes under the Main Product Development Department. It is responsible for checking patterns after grading prior to ordering the press-knives, but in view of the errors found by the expert in some graded bottom patterns the checking cannot be very thorough.

Another duty of this department is the checking of all new bottom-stock press-knives before delivery to the cutting rooms, but it is not responsible for the accuracy of the knives once they are being used in production. The accepted tolerance in knives is ± 1 mm in length and width.

One cause for concern in this Department is the inaccuracy of lasts. When a new model last has been prepared, it is sent to the last factory to have a copy made. This copy has to be checked by the MC last designer. Sometimes the copy from the last factory is not accurate, but because time is short the last designer has to accept it.

Lasting Department

There are several important factors in this Department which affect the patterns and consequently the appearance of the finished shoes. There is no measuring device for controlling the length of vamps on the forepart lasting machines nor does the operator make any physical check of the vamp lengths. The expert observed that vamp lengths can vary by as much as 6 mm between the left and right foot. It was also noted that sometimes one foot was forepart-lasted on one machine and the other foot was lasted on a different machine. With this method it is virtually impossible to make pairs of shoes that match. When the shoes are side-lasted, it is normal practice at MC for one operator to last one foot and another operator the other foot. Again this is not good shoemaking practice and one is bound to get different left and right shoes. Also, sometime ago the pincers on the lasting machines have been removed, resulting in badly lasted shoes which require bigger patterns in the waist and therefore more material.

For the production of samples a special lasting track is used, which is old and not at all like the machinery being used on the production track. Consequently the sample patterns have to be revised for bulk production whereas if samples were made on the production track, development for bulk production patterns could start with the initial samples and much time could be saved.

Labour is also wasted in the way the uppers are prepared for lasting. At present latex is applied by hand to both the insole and the upper. If a neoprene cement were used, this could be applied by machine or if the connexions were made to the forepart lasting machines, thermoplastic cement could be applied directly to the upper and insole during the lasting operation. This method is being used at Szigetvár.

Furthermore there seems to be a lack of wiper plates, toe bands and pincers of the right shapes for the forepart lasting machines, causing badly lasted toes.

The roughening of uppers before attaching the sole is creating problems. In fact, uppers are not being roughened but are being scoured with some sort of emery cloth. If wire roughening-brushes were used the results would be far more satisfactory.

Components

Lasts

The lasts used in the MC group are generally not of a particularly high standard and most of them are not made to the determined standards and tolerances. The tolerance laid down by the Hungarian Bureau of Standards is ± 0.5 mm, but MC works with ± 1 mm. The UNIDO team considers this tolerance to be too high. However a check carried out by the expert brought the following results: out of a total of 42 lasts of style "Rita" (in 7 different sizes), 23 were found to have an error in length of more than 1 mm, some had errors of up to 3 mm in length. The average error on this last was 1.5 mm. The rate of error in those checked was 54 per cent. Two other lasts, "Xasi" and "Ursula", were also checked. For "Xasi" 62 per cent of the 42 lasts checked (covering 7 sizes) showed an average error of 2 mm in length, and for "Ursula" 26 per cent of the 42 lasts checked had an average error of 1.5 mm in length. According to the tolerances of ± 0.5 mm established by the Hungarian Bureau of Standards, the rate of error would be about 90 per cent. Faults were also found in toe shapes.

Insoles

The biggest problem with insoles is again the lack of accuracy. Errors in grading were found on the insole patterns. These patterns are used to produce the insole knives. By using an incorrect pattern inaccurate knives are being produced and even if the new knives are acceptable, they quickly lose their shape in use. Out of three sets of insole knives checked by the expert, not a single one of any of the sets would have been passed by him. The errors varied from an acceptable tolerance in some places to as much as nearly 4 mm. These knives were still in use, although regular controls are supposed to take place. The reason given for the inaccuracies of the knives was that the quality of steel used was poor.

Another problem with insoles is the bevel at the backpart. In most cases it is practically non-existent, which causes soft seats on the shoes and can affect the fit of the heels.

The moulding of the insoles is generally good. The steel shank, however, is much too wide. MC is using shanks 17 mm in width whereas in the United Kingdom shanks of 9 mm width are generally used for ladies' shoes. This is a waste of material and adds to the weight of the shoe.

Stiffeners

The type of stiffener used at MC is a flat thermoplastic material. While this material is suitable for the cheaper type of shoes, i.e. for flow-moulded shoes, it does not give the required quality in ladies' fashion shoes. For most of the shoes produced by MC leather is used for uppers and they are fully or partly leather lined. This is an expensive style. The shoe is then cheapened by using a stiffener material which spoils the look of the finished shoe.

Upper leather

The problem with the upper leather is that actual deliveries often do not conform to samples and that bulk deliveries differ in quality. Colour differences exist between samples and delivered products and the finish is generally hard and stiff. All these facts make it very difficult to produce shoes of the same standard as the samples. It is also understood that difficulties are experienced in the delivery of leather and that it is sometimes necessary to change from one supplier to another during production or before. This can cause problems with upper patterns.

Lining leather

Most of the lining leather used by MC is sheepskin which is heavy and has a loose grain. This type of material needs correcting involving extra time and labour and also tends to shrink when used for vamp linings when the upper is being conditioned for forepart lasting. Moreover, MC is the only user of sheepskin for lining leather and therefore has to take all grades from 1 to 4. This obviously will result in some shoes having a lining of very poor quality.

Wiper plates for forepart lasting machines

There are not enough wiper plates of the required shapes available. With the present fashion trend away from round or broad toe shapes to the finer or more pointed toe, it is essential that suitably shaped plates are obtained. When new lasts are being developed, a check should be made at that time to see if the appropriate plates are already available at MC; if not they should be ordered. For bulk pattern tests it is most important that the right plates are at hand. It cannot be expected that well-lasting toes will be obtained when the wrong toe plates are used.

Toe bands

The forepart lastings machines are designed for the use of toe bands. In the Budapest factories of MC these toe bands are not used at all. The reason for this is rather obscure, but if they were used the result could only be better-lasted shoes and better-shaped toes.

Soles

The method of cutting the sole patterns was checked by the expert and was found to be satisfactory.

Backpart moulding

There seems to be an adequate supply of backpart moulds. Three sets of moulds are used to produce the backparts for six different heel heights. Heels of 4 and 5 cm height are moulded with the same mould, 6, 7 and 8 cm heels on another one and 9 cm heels on the remaining mould. Better results would be obtained if separate moulds for each heel height were available. What is aggravating the situation is that altogether wrong moulds are being used (e.g. uppers for 4 to 5 cm heels are being moulded on 6 to 8 cm moulds).

II. RECOMMENDATIONS

Pattern Development Department

As a more technical approach to the designing and pattern making for new styles seems appropriate, it is recommended that the Design Department and the Technical Pattern Making Departments be amalgamated into one department (with the exception of the Pattern Grading Section) and be based at Budapest. The internal structure of the proposed department is shown in figure II. The new unit for which the name "Pattern Development Department" is suggested, should be responsible for the development of all patterns and components. It is believed that this department would be much more efficient in technical standards; that standardization of patterns would be easier; that interdepartmental communication would improve and that duplication of work would be avoided.

The department would consist of specialized teams, each dealing with one or two types of shoes only. The following five teams are suggested: children's shoes; flow-moulded shoes; boots and sandals; luxury shoes and footwear for western markets; and foot-wear for home and COMEA markets. The reason for assigning boots and sandals to the same team is that both types are produced for about half a year only, which would keep one team employed throughout the year.

The composition of each team would largely depend on the number of styles produced in each manufacturing unit but should have a core consisting of one designer, one designer/pattern cutter and at least one pattern cutter. The team should be centred around the designer/pattern cutter who should be a technician rather than an artist. This person should be able to translate the designers' ideas into practical and economical shoes and to produce designs of his own, when required.

The duties of a designer should be solely to design and produce ideas in the form of sketches or lasted pullovers. The only patterns he would produce would be for his own use in making pullovers. He would design only the type of shoe that his manufacturing unit is making. He should be given a free hand in the use of colour, materials, buckles, trimmings etc. Information should be passed to the designer through the designer/pattern

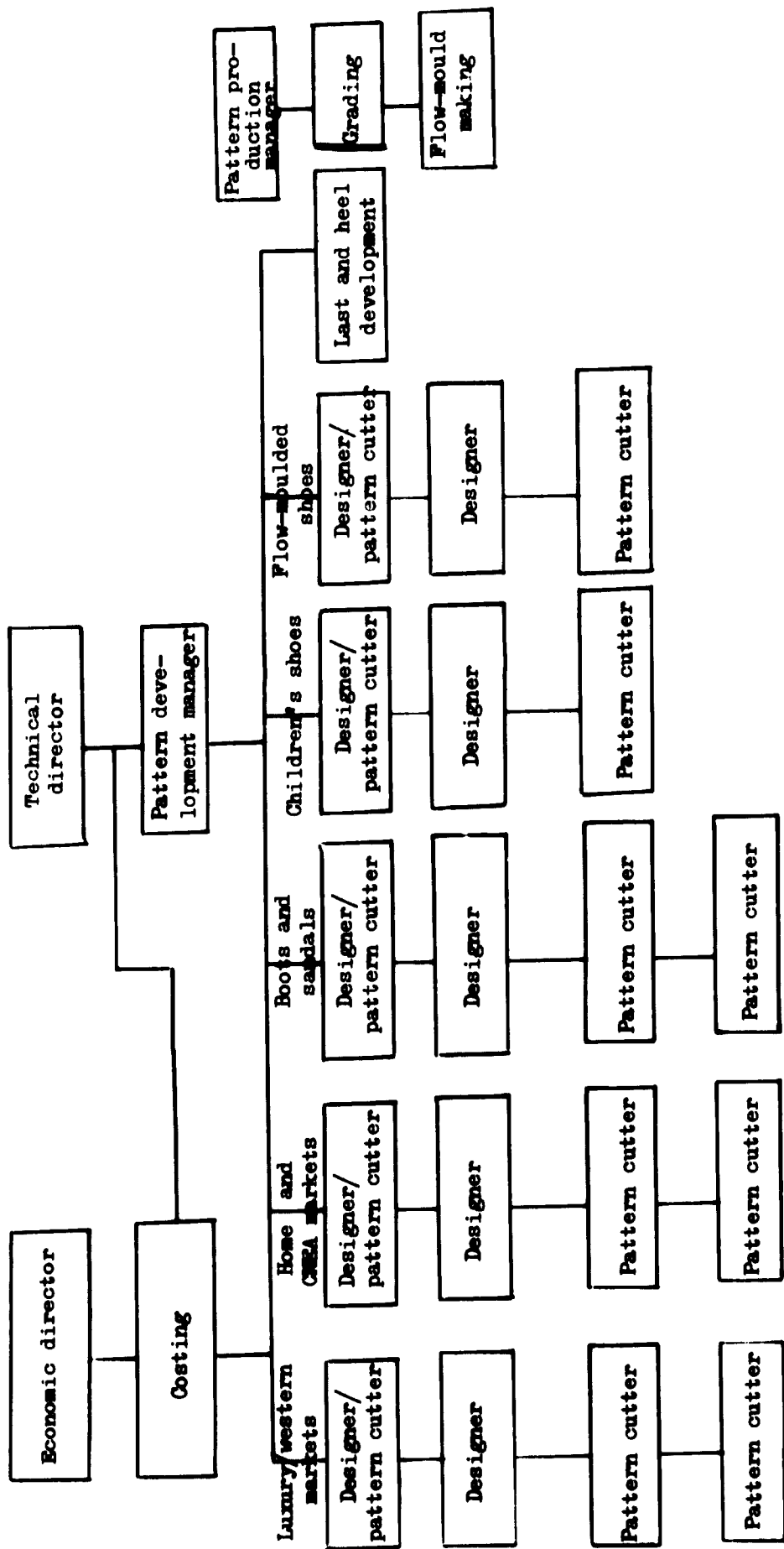


Figure II. Suggested reorganisation of the Design Department and the Technical Pattern Making Departments of the MC group

cutter to whom he would be responsible. He should, of course, attend jury or selection meetings and should be able to turn to the designer/pattern cutter for advice and consultation.

The designer/pattern cutter should be in charge of the team since this person would be the technically most qualified person of the team. The designer's work should be evaluated by the designer/pattern cutter who should also choose the designs from which sample pairs are to be made. The designer/pattern cutter should be supplied with information and requirements by the technical director and sales director who would see the resulting samples at jury and selection meetings. All communications to or from the team should be channelled through the designer/pattern cutter who would thus be aware of all faults and problems encountered by the production and other departments.

The components departments too should deal only with the designer/pattern cutter who would be responsible for ordering patterns, knives, markers, model and test sizes of lasts and heels and any other component used in the factory. It should also be the designer/pattern cutter's responsibility to check that bulk deliveries are made to the required specifications and tolerances, and if not, to reject them.

When a new style is selected, the designer/pattern cutter should produce the first design standard and then pass it to the third member of the team, the pattern cutter, who would then cut the patterns as directed by the designer/pattern cutter. The number of pattern cutters would depend on the amount of work the team would have to accomplish. All sample patterns for all components would be produced by that team.

This reorganization should improve the efficiency and technology of the department. The outlying manufacturing units should each have a resident pattern cutter to assist in pattern tests, fitting of markers and other patterns; he would report back to the head of the team. The five teams should work very closely with all manufacturing departments who would be expected to report any problems and faults immediately to the team.

The Pattern Development Department should be headed by a pattern technician of considerable knowledge. The main duties of this person would, however, be of administrative nature and he should be available for consultation and guidance should any team require it.

Pattern Production Department

It is recommended that another department be set up under the title of "Pattern Production Department". The duties of the head of this department would be similar to the ones of the head of the Pattern Development Department.

At present patterns are graded by each factory, and there are five grading machines in the MC group the capacity of which is not fully utilized. If a central department were set up at Budapest which would undertake the grading for the whole group, this would lead to savings, a more uniform system of grading with less errors and to a reduction of duplication. It might even be found that five machines would not be required to satisfy the grading needs of the group.

The new department would supply not only graded patterns but also moulds for bulk flow-moulding, brass bound patterns, marker patterns, die patterns and any other patterns needed for bulk production. It would also undertake grading for the last and heel model office. If capacity were available, it could also supply graded patterns etc. to factories that are not in the MC group.

Lasting Department

Shoes should be made as pairs and not as singles. A system of colour coding for pairs should be introduced. Different coloured tapes could be inserted between the outside and the lining at the topline at the back of the upper at topstitching in the closing room. These tapes would be of different colours for each pair on a ticket of work thus identifying a separate pair.

Vamp depths should be to a tolerance of ± 1.5 mm from the specified vamp depth and should be the same for a given pair. The operator of the forepart lasting machine should be responsible for obtaining the correct vamp depth. This should be checked by measuring with dividers or lighting devices on the machines.

For side lasting pairs should be lasted by the same operator. Some form of pulling in the upper should be introduced at this stage. At present the operator just lays the upper to the last with his thumb, which does not

give a satisfactory result. The pincers of the lasting machines should be replaced and if this is not possible, the purchase of new machinery should be considered.

Sample shoes should be made on the same type of machines that are used in the bulk production and the number and sequence of operations should be the same. To accommodate the different toe shapes a much wider range of differently shaped parts for the forepart lasting machine should be available. During the development of new lasts a check should be made to ensure that correctly shaped wiper plates, toe bands and pincers shall be available for the samples.

Components

Lasts

The tolerance for the foreparts should be not more than ± 0.25 mm. This is even lower than the standard laid down by the Hungarian Bureau of Standards, which is ± 0.5 mm. From the joint back a tolerance of ± 0.5 mm would be acceptable. Particular attention should be paid to the accuracy of the toe shape.

The checking of lasts as well as of other components should be more strict and the MC last checker should be reinstructed in the ways of checking lasts. MC should abandon its tolerance of ± 1 mm and at least adopt the tolerances laid down by the Hungarian Bureau of Standards and rigidly enforce them with the last manufacturer.

There is apparently a plan for further investment into the only last factory in Hungary in order to increase its production. It might be advisable to establish another last factory instead in order to create competition which the expert feels would improve quality.

Insoles

In the manufacture of insoles a more stringent form of control should be imposed comprising the following operations: regular checking of graded patterns and knives to ensure accuracy; daily distortion check of knives; immediate replacement of inaccurate knives. It might be advisable to order extra knives of the middle sizes to have replacements at hand.

The bevelling on the insole should be improved by keeping the operation under close control. The machine should be adjusted at regular intervals to give the correct bevel.

Tests with narrower steel shanks (about 9 mm wide) should be carried out. The method of cutting the insole pattern should be revised as shown in figure III, i.e. the insole pattern should be reduced by 1.5 mm behind the joint on the inside. The upper would thus lay closer to the last and would give a better feather line. The sole pattern should be cut to this insole pattern.

Stiffeners

The flat thermoplastic stiffener should be used only for the cheaper types of shoes produced by the MC group. For the better quality shoes fully moulded leather board stiffeners should be used. This would improve the appearance of the finished shoes considerably and at the same time facilitate production particularly at side and seat lasting.

The thermoplastic stiffeners being used are too long and should therefore be shortened to end at approximately the middle of the waist.

Upper and lining leather

Since the project manager will be dealing in depth with the quality of leathers available, recommendations are limited to suggesting that some effort be made to obtain softer, light-weight leather of a more uniform thickness and colour. The leathers in use at MC are too stiff and too heavy.

Backpart moulding

In the preparation of the backparts for the six different heel heights, only moulds of the correct size should be used, preferably a separate mould for each heel height. Checks should be carried out to ensure that the right moulds shall be utilized.

A new method of cutting the counter lining and stiffener, as shown in figure 14 of annex III, should be adopted. The stiffener or counter should be cut the same way as the lining; a V is cut out in both the lining and stiffener, these are pre-fitted in the closing room and the two sides of the V are then brought together and held with zig-zag stitching. The advantage of this method is that the counter lining and stiffener are pre-shaped before moulding, and because there is less material at the lasting edge the fitting is better. This method should also be applied when pre-moulded leather-board stiffeners or counters are used.

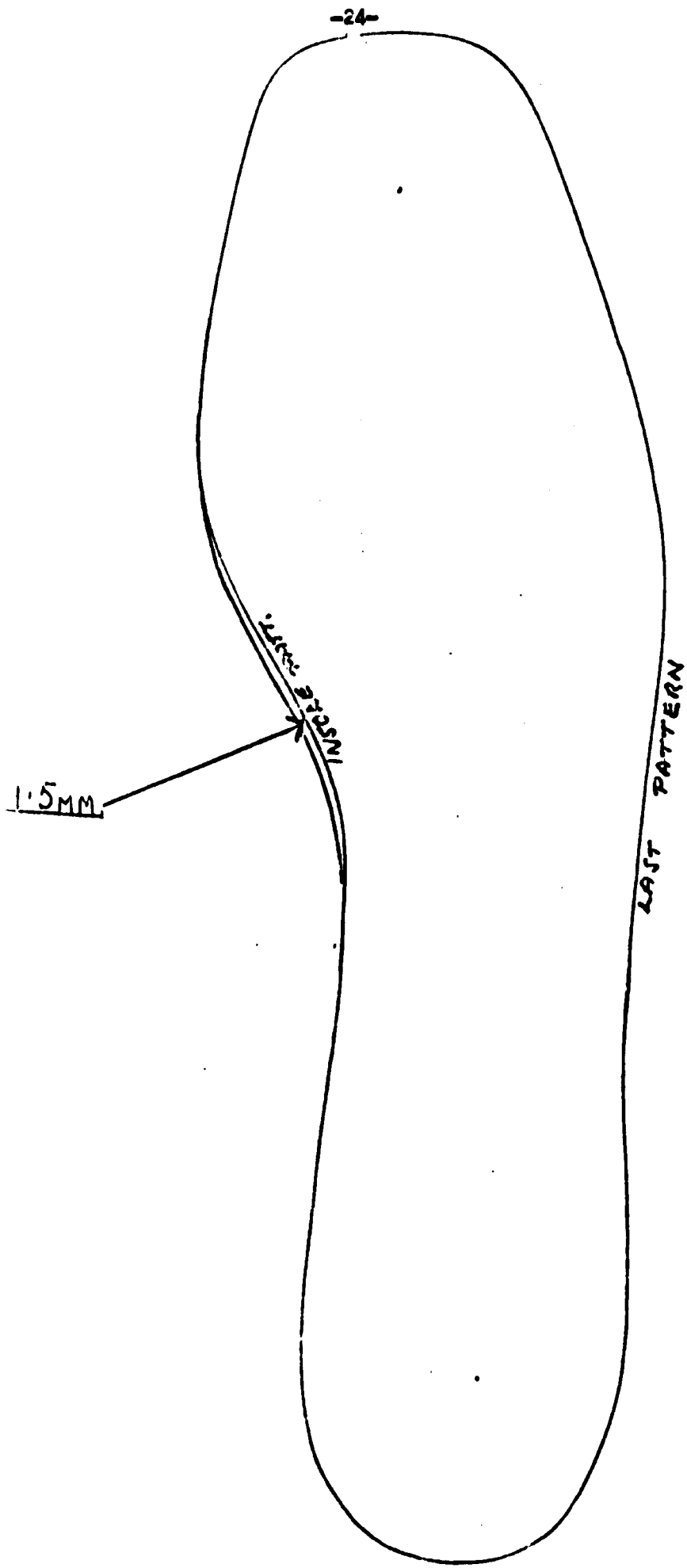


Figure III. Revised method of cutting insole patterns

Press-knives

The quick loss of shape experienced with the knives for the Morbach insole cutting machine was attributed to the fact that neither the proper type of steel nor a suitable knife-bending machine were available in Hungary. As a short-term measure it is recommended that the insole cutting machine not be used until knives of better quality can be obtained. The proper type of steel and machinery should be ordered as soon as possible.

Wiper plates, toe bands and pincers

When a new style has been designed, the wiper plates and other tools required for the production of that model should be developed too or ordered from outside.

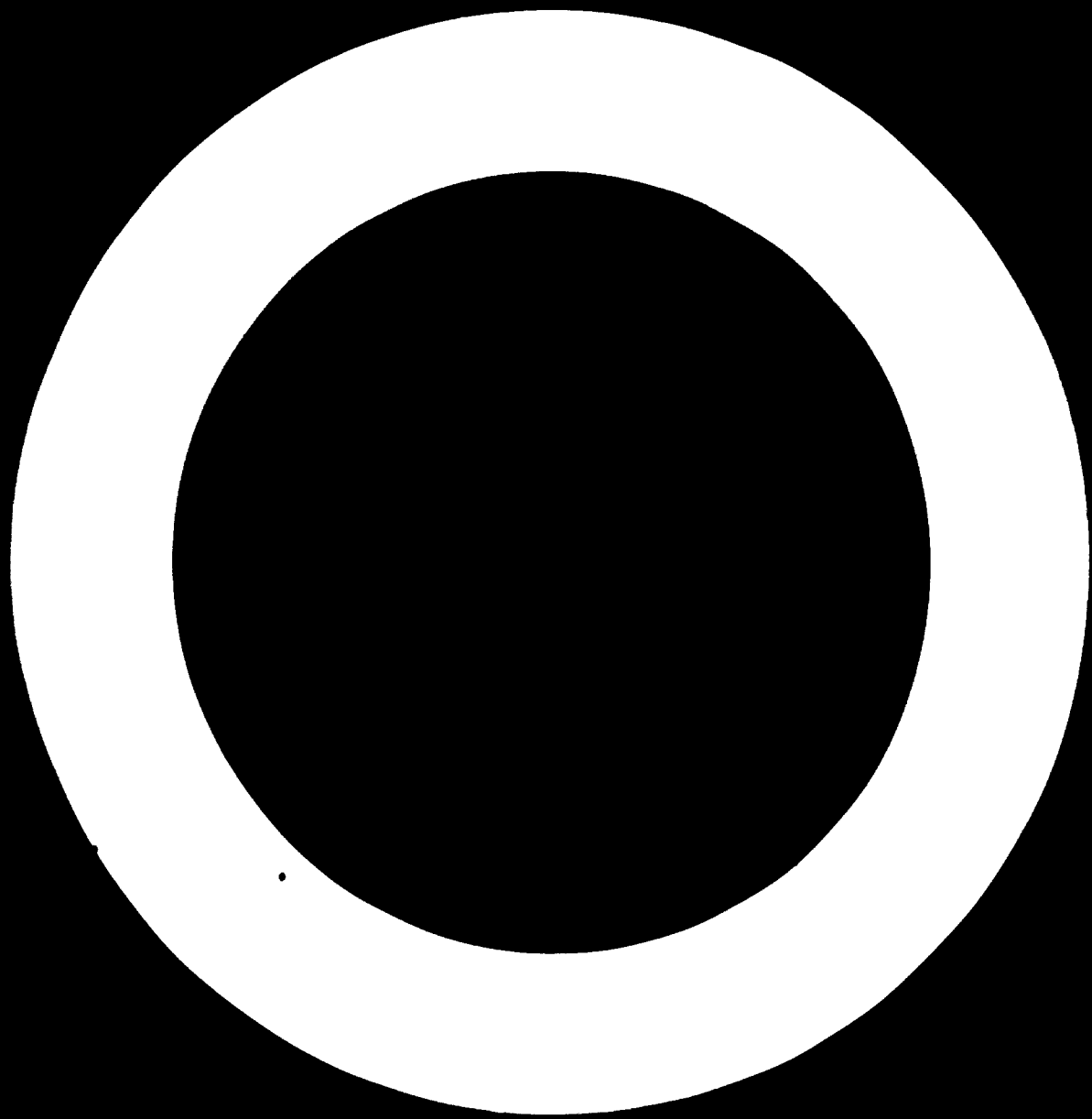
Toe bands should be used again since the forepart lasting machines were designed for the employment of such devices. If they cannot be made by the Engineering Department of MC, there should be no problem in obtaining them, since the toe lasting machine is a Hungarian product.

Efficiency of work

On the whole, most of the problems the MC group has to cope with originate from substandard components. Deliveries of tools and accessories have to be accepted by MC even if they are not within the agreed tolerances and subcontractors take advantage of that situation. If MC did not accept faulty deliveries, it would not be able to fulfil its production target and the subcontracting companies would not be able to dispose of their products.

In order to reach the goals of the project - to achieve through the MC group a model enterprise, to increase the volume of export of the Hungarian shoe industry and to achieve a strong competitive position in world markets - the production of MC will have to be upgraded with respect to finish, style and fashion. Auditing control will play an important role in this. The staff of MC at large should therefore be encouraged to observe tolerances prescribed for a given component or operation and to report inaccuracies or faults to their respective supervisors. The supervisory staff of the production departments should, if necessary, impose tighter standards on their operators. The production departments should pass complaints about inaccurate components to the supply departments, which, in turn, should reject deliveries of inaccurate material.

It is felt that the overall quality of MC's products will improve only by imposing stricter controls throughout all departments of this organization.



Annex I

JOB DESCRIPTION

(DP/HUN/75/001/11-02/06)

Post title: Shoe designer and pattern cutter

Duration: Four months

Date required: As soon as possible

Duty station: Budapest, with travel within the country

Purpose of project: To increase the export of the footwear industry by re-organization of the management structure and production capacities, and to achieve flexibility of products for the domestic and export markets

Duties: The expert will be one of a team of five experts attached to the Ministry of Light Industry and will work with the Minőségi shoe factory group. Under the guidance of the project manager, the expert will be expected:

1. To provide direct assistance to the shoe design and pattern cutting sections of the factories;
2. To work closely with the project manager and the other experts in a co-ordinated effort to increase the efficiency and flexibility of the technical operations of the organization;
3. To train, instruct and work with counterparts for future expansion, especially for West European markets;
4. To work with the expert on footwear production (preparation and upper stitching) in introducing a standard leather measurement system of cutting leather.

Qualifications: Well qualified in shoe design and pattern cutting of ladies' footwear for international markets. Experienced in introducing methods and systems for change and flexibility to cater to the requirements of exports

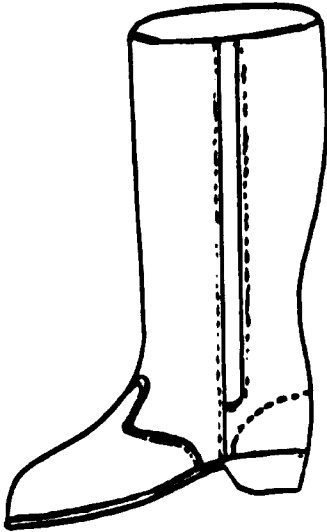
Language: English, German would be an asset

Background information: The total annual shoe production in Hungary amounts to about 44 million pairs. The industry employs some 40,000 persons. The Minőségi shoe factory has seven production plants producing ladies' shoes. The factory exports 60 per cent of its total production, and accounts for 15 per cent of the total Hungarian shoe production. The Hungarian shoe industry satisfies market requirements to a limited extent only, as a result of the

relative backwardness of production, of product development and of production techniques and of inflexibility in adapting to market requirements. The Hungarian Ministry of Light Industry would like to achieve through the organization of the Minőségi shoe factory group a model enterprise. The experiences gained in this enterprise could be made useful for the whole national shoe manufacturing industry. The Government has also requested expert assistance in the improvement of upper leather manufacturing at the Pécs leather factory, which produces about 30 per cent of the total Hungarian leather output, mainly for the local shoe industry.

Annex II

BOOT CLOSING TECHNOLOGY

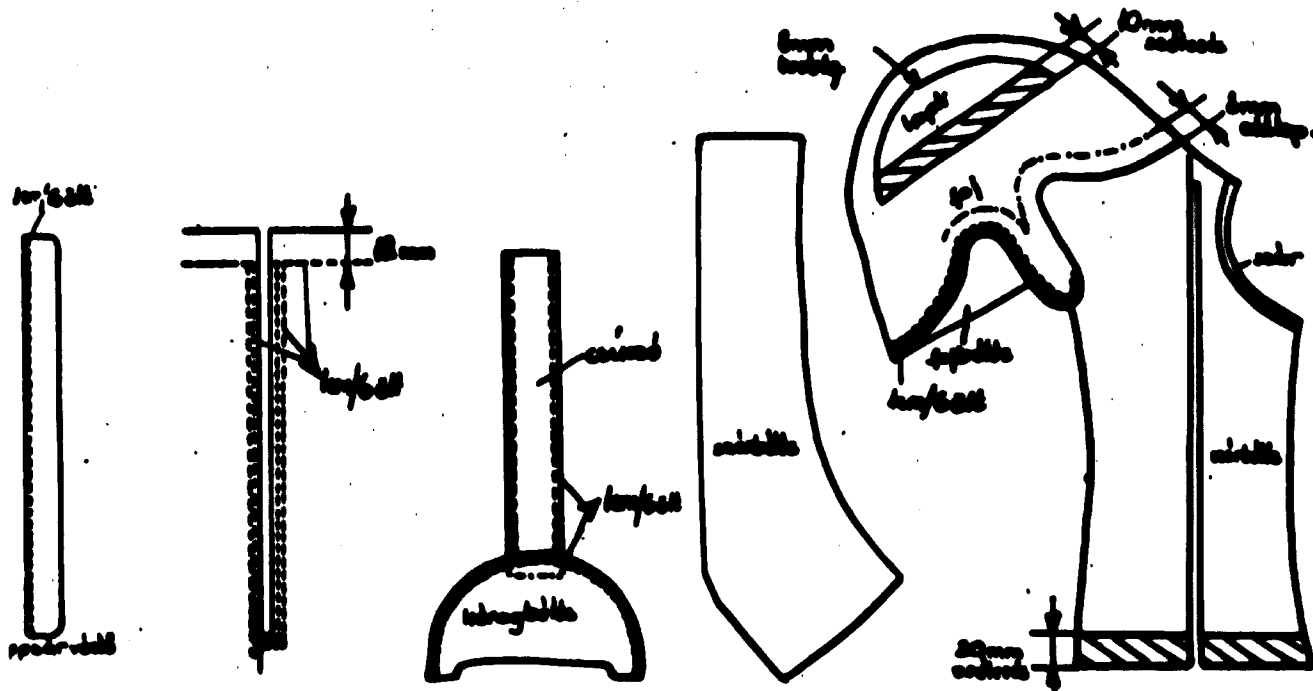


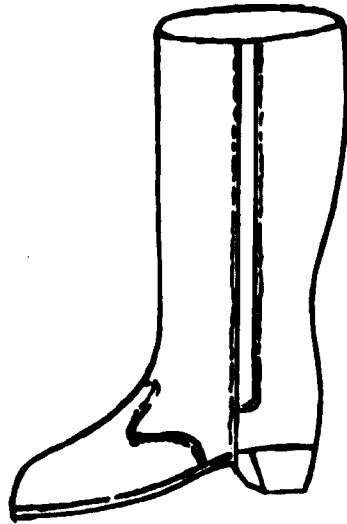
Model: 56-1309
Last: Irisz
Upper: Corrected grain side
Lining: Imitation fleecing

A. Technology used at present

<u>Operation</u>	<u>Minutes per pair</u>
1. Skive upper	2.60
2. Skive toe puff	0.14
3. Skive lining back strap	0.30
4. Load conveyer	0.80
5. Ink edge	1.10
6. Mark upper	1.68
7. Press toe puff	0.40
8. Stitch tongue on zip fastner	1.44
9. Zigzag lining back seam	1.20
10. Stitch on lining back strap	1.20
11. Close back seam	1.44
12. Stitch down back seam (2-needle)	1.44
13. Cement zip and upper front	0.30
14. Fit zip and upper front	1.92
15. Cement and fit forepart lining	1.40
16. Stitoh on zipfastner	1.44
17. Trim lining front	0.96

<u>Operation</u>	<u>Minutes per pair</u>
18. Cement zip and upper backpart	0.30
19. Fit zip and upper backpart	1.92
20. Cement and fit lining	3.36
21. Stitch zip backpart	1.44
22. Trim lining backpart	0.96
23. Burn lining pile for counter pocket stitching	1.60
24. Condition leather	0.64
25. Stitch on counter pocket (2-needle)	1.92
26. Close front	1.92
27. Turn boot	0.80
28. Stitch down front seam (2-needle)	1.92
29. Zigzag lining side	1.60
30. Burn lining pile on top	1.60
31. Cement top	0.80
32. Fold top	1.60
33. Stitch top	1.76
34. Cement and fit vamp	3.60
35. Stitch vamp	4.00
36. Bundle	<u>0.48</u>
Total	51.93





B. Suggested technology

<u>Operation</u>	<u>Minutes per pair</u>
A. <u>Upper</u>	
1. Skive upper and toe puff	2.740
2. Ink edge	1.100
3. Marking	0.960
4. Press toe puff	0.400
5. Close side	0.457
6. Stitch on zipfastner	1.800
7. Close front	1.440
8. Rub front seam	0.400
9. Tape front seam	1.400
10. Vamp	4.000
11. Close back	1.440
12. Rub back seam	0.500
13. Tape back seam	1.500
14. Turn upper	0.960
15. Folding	0.800
16. Cement lining	1.800
17. Fit lining	3.000
18. Stitch and trim top	0.960
19. Stitch around zip 2nd row	1.800
20. Trim lining	0.600
21. Cement vamp lining	<u>0.872</u>
	28.929

Operation

Minutes per pair

B. Lining

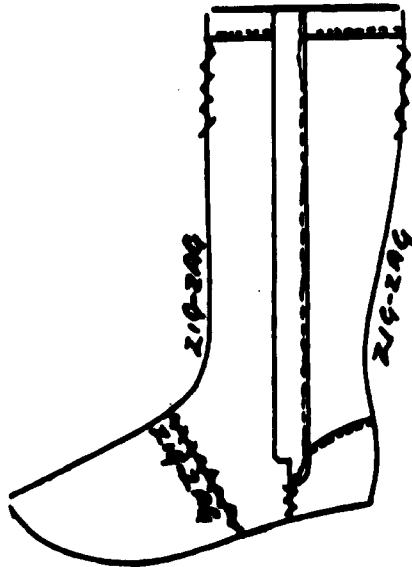
1. Skive lining	1.700
2. Zigzag lining seams	2.160
3. Stitch on counter pocket	1.920
4. Stitch collar lining together	0.800
5. Stitch on collar lining	1.400
6. Stitch on tongue	1.440
7. Zigzag lining side	<u>0.600</u>

Total 10.020

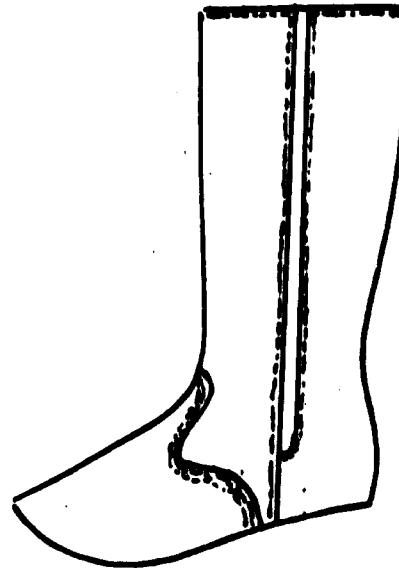
Total upper 28.929 min

Total lining 10.020 min

Grand total 38.949 min



Lining



Upper

Annex III

A PRACTICAL GUIDE TO SHOE DESIGNING
AND PATTERN CUTTING

Introduction

This guide describes in detail the method of shoe designing and pattern cutting used by the expert. It begins with the preparation of the last mould and the basic court or pump standard and shows how it is possible, from this standard, to construct standards and designs for other types of footwear. The method is simple, quick and accurate. A great deal of the information needed for shoe manufacture is obtained from the last, either by taking measurements from the last itself or by drawing on it and then taking measurements.

The figures are intended for illustrative purpose only and are not drawn to scale.

Preparing the last mould

The following items are required: a thick rubber solution; cotton drill or tightly woven, unelastic cotton material of medium weight; the model last and pattern paper.

Cut two pieces out of the material, large enough to cover slightly more than half of the last. Apply the rubber solution to one side of the two pieces of material and to the outside half of the last, making sure that a good coating of solution is used. Be sure that the solution is applied generously to the feather edge of the last and also for about 1 in. past the centre onto the inside half of the last, on both the forepart and the backpart (see figure 1).

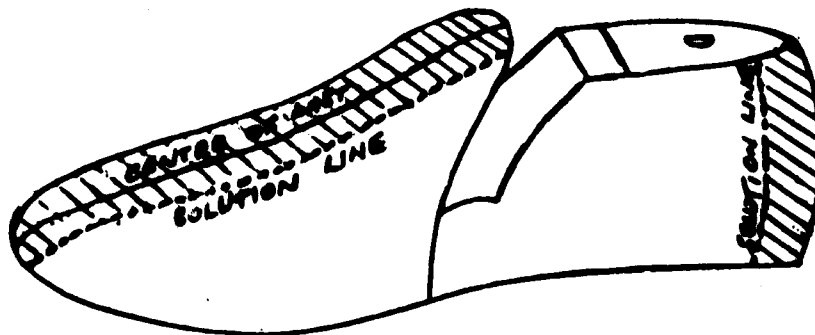


Figure 1

When the solution on the fabric and the last is dry, place one piece of fabric flat on a table. Put the last on the fabric so that you have sufficient material to cover one half of the last without creases or pleats and without stretching the material. The material is taken about 1 in. onto the inside half of the last at the toe, instep and backpart, where the solution has previously been applied.

Excess material can now be carefully trimmed off at the feather edge and the top of the last. If an unplated last is used, then the last bottom pattern is used to mark the line on the fabric before cutting.

Repeat the process on the other side of the last. The last is now covered with material except for the top and bottom.

The advantage of this method is that at this stage the design can be drawn on the covered last and used in constructing the standard. Draw a centre line on the forepart and backpart of the last as shown in figures 2 and 3; in doing this, it helps to mark the centre of the toe and the cone of the last on the forepart and to connect these points with a straight line.

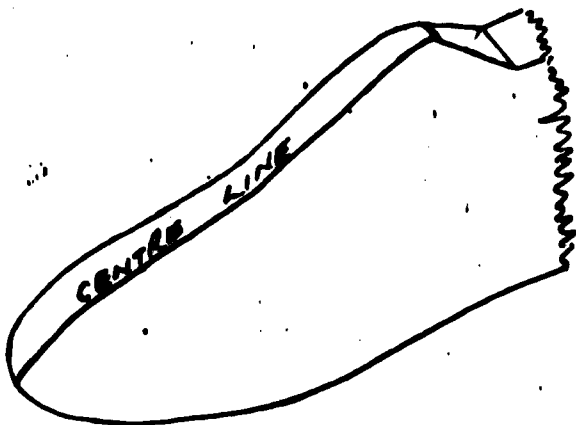


Figure 2

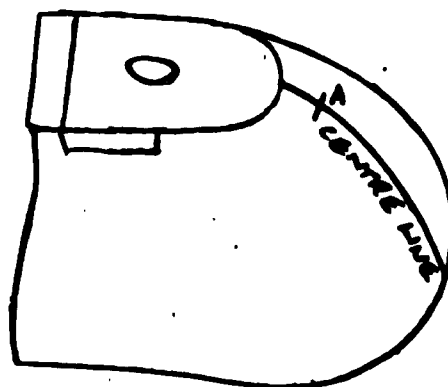


Figure 3

Now mark the back height position (point A on figure 3). This is done by measuring up from the feather edge at the seat. The back height is constant for a given size of shoe, i.e. it does not change for different heights of the heel. The increment between the sizes is 1/16 in. (see table 1).

The vamp position can now be marked on the centre line on the forepart of the last. This position will depend on size and design. For a court or pump shoe of size 4 it will be about 3 in., the increment per size being $\frac{1}{8}$ in.

When both the back height and the vamp position are marked, cut the material carefully on the drawn lines and remove it from the last. Take care not to stretch the material. Now you have two pieces of material representing the inside and outside of the last.

Place one of the pieces flat on the table with the sticky side up, and the other on top of it, sticky side down, registering the point of the toe and the cut edges as accurately as possible while at the same time easing out any fullness towards the backpart. Concentrate on getting the two edges together at the feather edge at the backpart. A slight difference between the two cut edges on the forepart and backpart is not too important, but if the difference is large, the last mould should be discarded and a fresh start made. If there is only a slight difference between the cut edges on the forepart, then half of the difference should be cut off. This out edge is represented by the dotted line in figure 4.

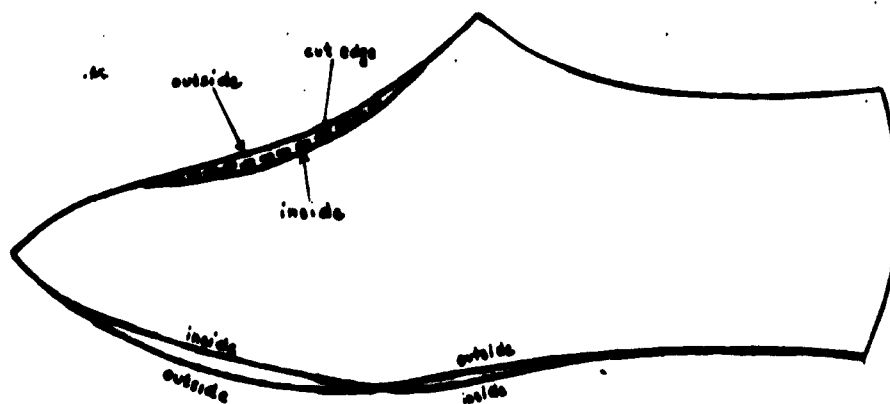


Figure 4

You now have one piece of fabric representing the complete area of the last in a flat form. This is the basis for the patterns and it should, therefore, be as accurate as possible. To check the accuracy of the last mould, two measurements are taken from the last. The first is taken from the toe to the back height position and back to the toe (make sure that the

tape measure is fully in contact with the contours of the last!); the second measurement is taken from the toe to the bottom of the seat and back to the top. These two measurements are now halved and the dimensions thus obtained should correspond to the respective dimensions of the last mould. For example, if the measurement from the toe to the back height position and back to the toe is 24 in., then the measurement on the last mould from the toe to the back height should be 12 in. If the last mould is not exact, corrections are always made at the backpart. The tolerance of error should not be more than $\pm 1/8$ in.

Now prepare a copy of the last mould on pattern paper by carefully drawing round the contour in pencil and marking in the back height and vamp positions. This copy should be as accurate as possible. The measurements taken from the last are used again to make any necessary correction. Corrections are made at the back part. The copy of the last mould should be as shown in figure 5.

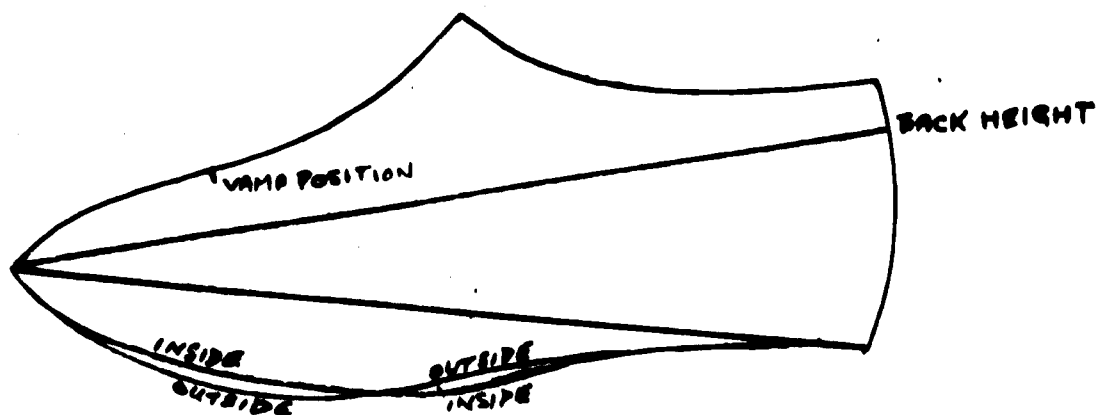


Figure 5

Preparation of the back curve template

A template of the back curve of the last can be made by two different methods, depending on the existing equipment. If a profile gauge is available, simply apply the gauge to the back of the last and copy the shape of the back curve. If no profile gauge is at hand, procede as follows: place the last on the pattern paper with the bottom of the last perpendicular to the paper. With a pencil follow along the backcurve, thus transferring the shape onto the paper. This line should be brought around the bottom of the last for about $\frac{1}{2}$ in. The template is then cut out and checked for accuracy; the result should be as shown in figure 6.

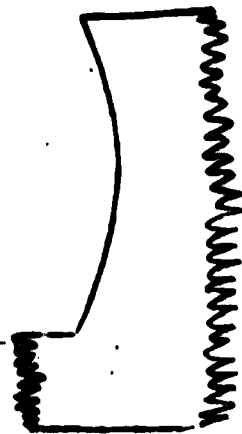


Figure 6

Table 1 gives the back heights (in inches and millimeters) for children's, ladies' and men's shoes.

Table 1. Back heights for children's, ladies' and men's shoes

Children's			Ladies'			Men's shoes		
Size	in.	mm	Size	in.	mm	Size	in.	mm
6	1 12/32	35	2	1 30/32	49	6	2 5/32	55
7	1 14/32	35.5	2½	1 31/32	50	6½	2 6/32	56
8	1 16/32	38	3	2	51	7	2 7/32	56.5
9	1 18/32	39.5	3½	2 1/32	52	7½	2 8/32	57
10	1 20/32	41	4	2 2/32	52.5	8	2 9/32	58
11	1 22/32	43	4½	2 3/32	53	8½	2 10/32	59
12	1 24/32	44.5	5	2 4/32	54	9	2 11/32	60
13	1 26/32	46	5½	2 5/32	55	9½	2 12/32	60.5
1	1 28/32	47.5	6	2 6/32	56	10	2 13/32	61
2	1 30/32	49	6½	2 7/32	56.5	10½	2 14/32	62
3	2	51	7	2 8/32	57	11	2 15/32	63
4	2 2/32	52.5	7½	2 9/32	58	11½	2 16/32	64
5	2 4/32	54	8	2 10/32	59	12	2 17/32	64.5

Court or pump shoe, size 4

Preparation of the standard

Place the cut-out copy of the last mould prepared according to the instruction given on page 36 on a piece of paper and trace its contours, distinctly marking in the back height, sole and vamp positions and lettering them with BH, S and V respectively. From BH measure $\frac{1}{4}$ in. up and mark point BH₁. With V as pivot, turn the cut-out copy of the last mould counter clockwise until mark BH of the out last mould coincides with mark BH₁ of the drawing. Trace again the contours of the last mould (see dotted line in figure 7) and mark the new sole position S₁.

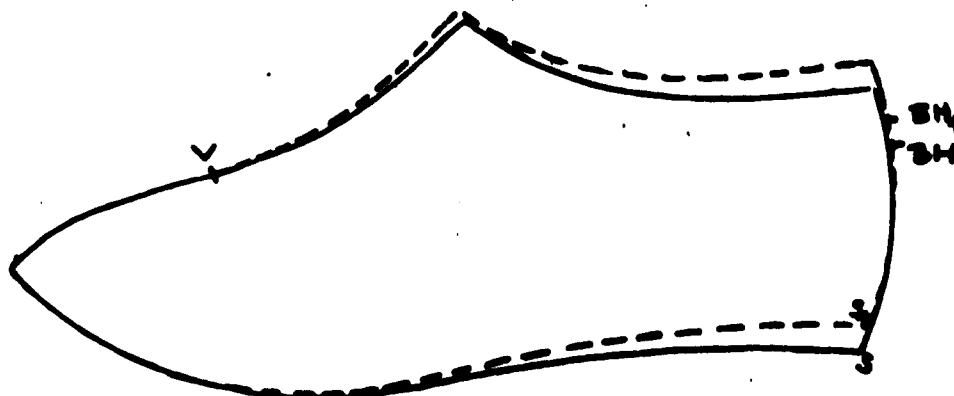


Figure 7

From BH₁ measure in $\frac{3}{16}$ in. and mark this point with BH₂; from S₁ measure out $\frac{1}{16}$ in. and mark this point with S₂ (see figure 8). Mark S₂ is the allowance for the stiffener and has to be provided only for such models for which a stiffener is used. Now connect S₂ and BH₂ using the back curve template.

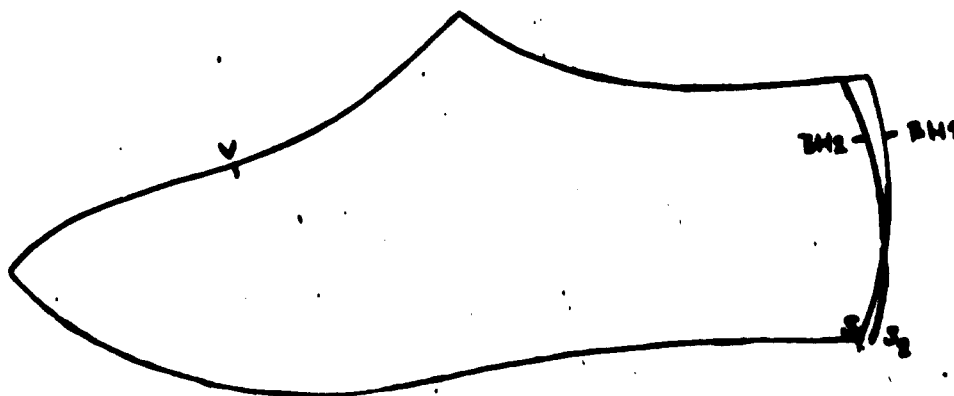


Figure 8

Measure $1/16$ in. up from the highest point of the toe and mark this point with A; A represents the toe puff allowance and is not needed for models without toe puff. From V measure down $1/16$ in. and put a mark V_1 ; from V_1 measure $1/8$ in. to the right and mark this point with V_2 (see figure 9). This is the allowance for the vamp movement in lasting.

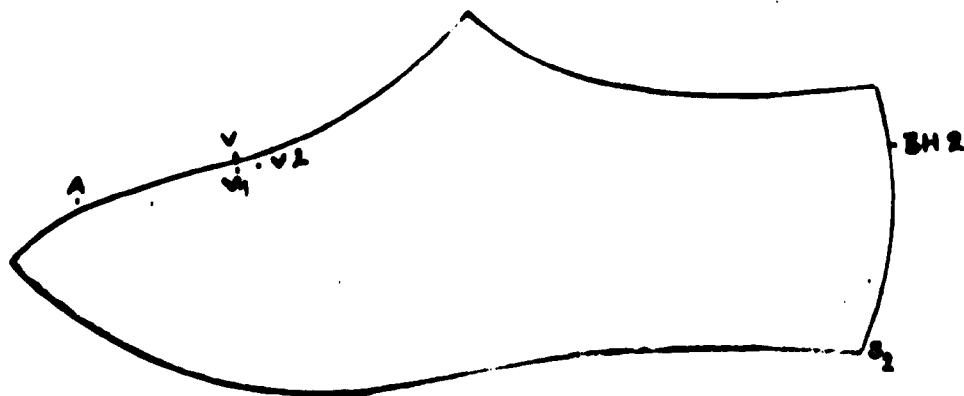


Figure 9

Draw a straight line from V_2 passing through A as shown in figure 10; this is the vamp line. From S_2 measure 3 in. along the bottom and put mark C; now measure $1\frac{1}{2}$ in. up on the outside quarter from C and put mark D, the under ankle position, which is used as a reference point in determining the height of the quarter (see figure 10). The inside quarter can be $1/8$ in. higher.

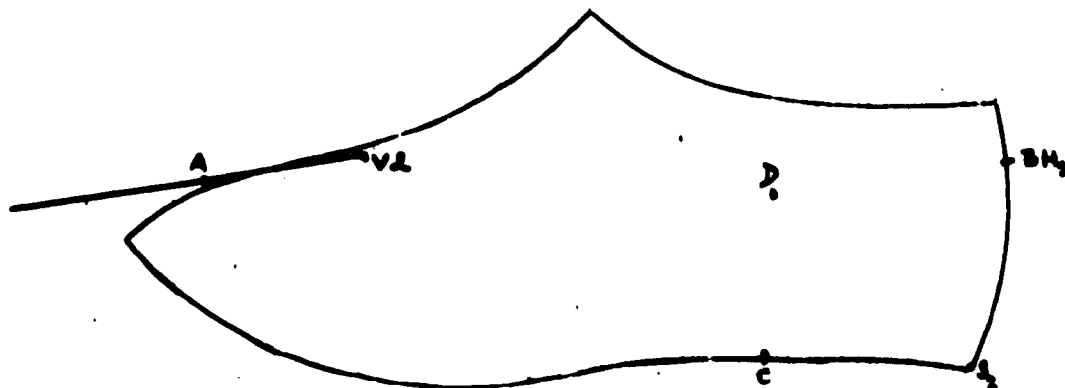


Figure 10

Table 2 gives the back height and under ankle measurements for children's shoes and figure 11 illustrates how these measurements are taken.

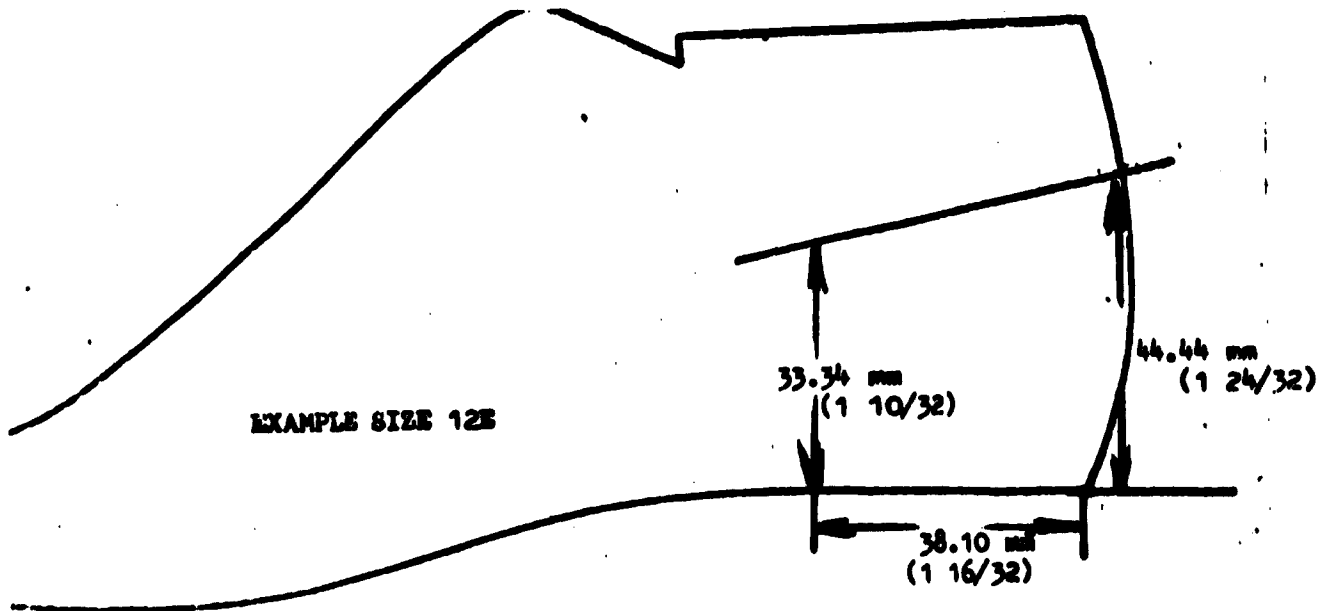


Figure 11. Example of measurements taken from table 2 (children's shoe size 12)

Table 2. Back heights and under ankle measures for children's shoes

Size	Back height		Under ankle		Measure from inside back of shoe	
	in.	mm	in.	mm	in.	mm
9	1 18/32	39.5	1 4/32	28.5	1 10/32	33.5
9½	1 19/32	40.5				
10	1 20/32	41.5	1 6/32	30.0	1 12/32	35.0
10½	1 21/32	42.0				
11	1 22/32	43.0	1 8/32	31.5	1 14/32	36.5
11½	1 23/32	43.5				
12	1 24/32	44.5	1 10/32	33.5	1 16/32	38.0
12½	1 25/32	45.0				
13	1 26/32	46.0	1 12/32	35.0	1 18/32	39.5
13½	1 27/32	46.5				
1	1 28/32	47.5	1 14/32	36.5	1 20/32	41.5
1½	1 29/32	48.0				
2	1 30/32	49.0	1 16/32	38.0	1 22/32	43.0
2½	1 31/32	49.5				
3	2	50.5	1 18/32	39.5	1 24/32	44.5

For ladies' shoes size 4, the back height is $2 \frac{2}{32}$ in. and the under ankle measurement, taken 3 in. from the inside back, is $1 \frac{16}{32}$ in. For men's shoes size 8, the back height is $2 \frac{9}{32}$ in. and the under ankle measurement taken 3 in. from the inside back is $1 \frac{28}{32}$ in. From this, the measurements for all sizes can be determined by adding or deducting $\frac{1}{32}$ in. for each half size. The under ankle measures for the inside quarters are $\frac{1}{8}$ in. higher than those for the outside quarters.

Draw in the top line by connecting points V_2 , D and BH_2 . The shape and width of the vamp opening will, of course, depend on the style; it should, however, be not less than 1 in. on a folded paper (i.e. 2 inches unfolded). The standard should now be in the stage illustrated by figure 12.

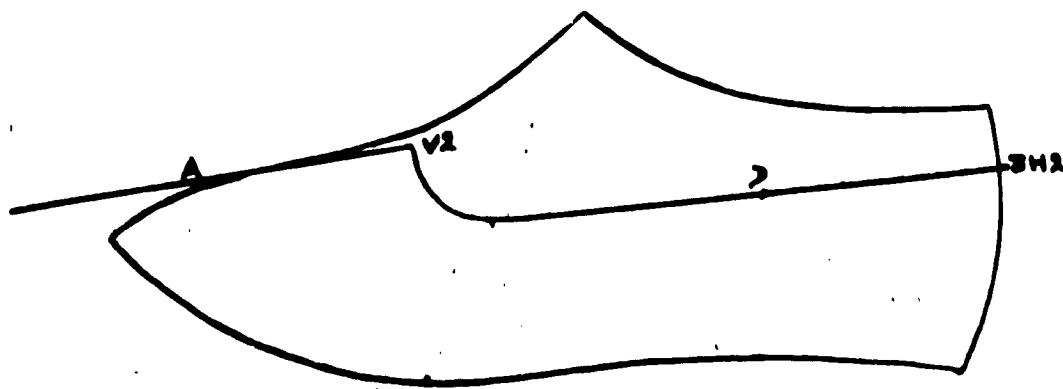


Figure 12

If D and BH_2 are connected with a straight line, it is advisable to slightly curve it upwards as this will give a better line to the quarter in lasting. It now has to be decided where joins are to be made (e.g. $\frac{3}{4}$ out, vamp and two quarters etc.). Finally add the lasting allowance which is $\frac{1}{2}$ in. at the toe, forepart and seat and $\frac{9}{16}$ in. in the waist (see figure 13). These measurements are only for general guidance and will depend on the type of upper material and machinery used.

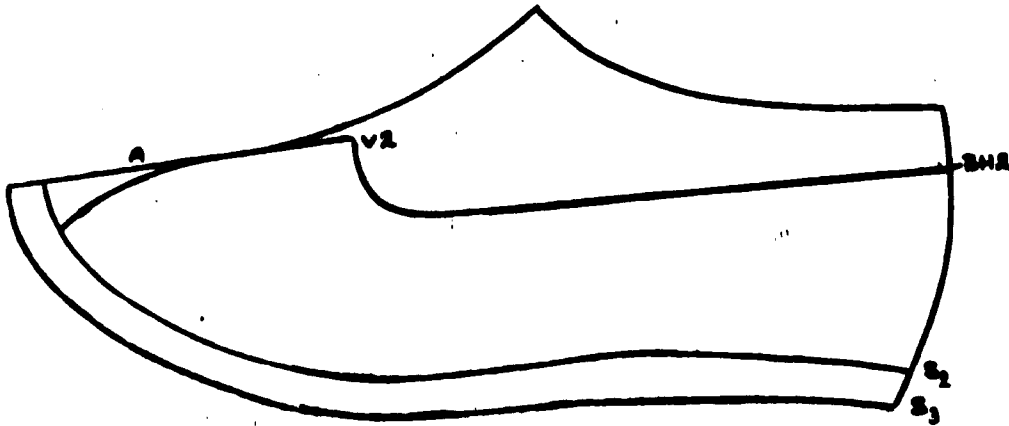


Figure 13

Lining

Two types of linings, the counter lining and the through quarter lining, will be described.

For the counter lining measure from BH₂ along the quarter 1 3/4 in. and put mark E; from mark S₃ measure along 2 1/4 in. and put mark F. Connect E and F with a straight line (see dotted line in figure 14). Then measure from V₂ 1/2 in. along the vamp line and mark point G where the quarter lining should begin. Make a line 1/2 in. parallel to the vamp mouth and continue this line to the bottom, trying to avoid any joins on the outside (see figure 14). This line should be a nice smooth line, making an end behind the joint of the last (mark K). Finally measure from BH₂ 1/8 in. on the vamp line and put

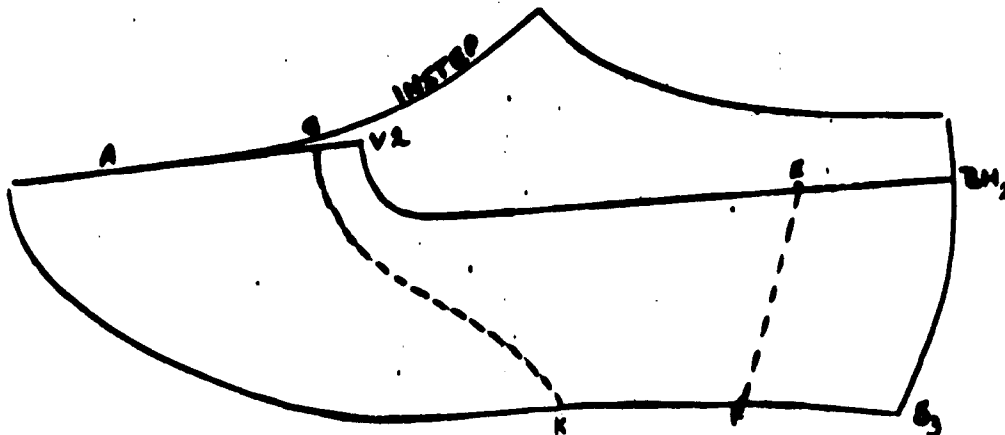


Figure 14

mark H in; draw a line $\frac{1}{4}$ in. from and parallel to line S_3-BH_2 for a length of $\frac{7}{8}$ in. and mark this point with J. Connect points H and J with a straight line (see figure 15). This is the fold line to which the counter lining is cut. Line E-F represents the position where the quarter lining will be attached. The counter lining will have a V cut out at the bottom which has to be stitched together. Line G-K will be used for cutting the vamp. The allowances used on the linings are $\frac{1}{4}$ in. for laps and $\frac{1}{16}$ in. for seams.

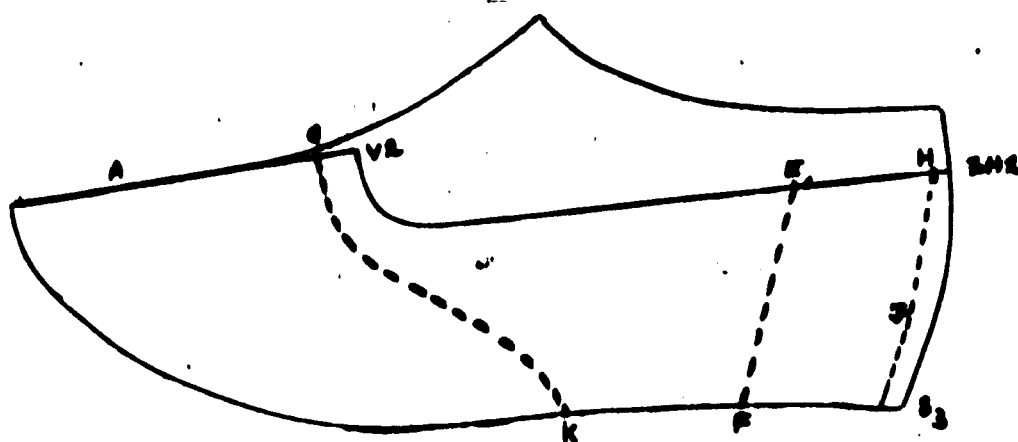


Figure 15

For the through quarter lining the same method and measurements are used as for the counter lining, the only difference being that line E-F is done away with and points H and J are connected by a curved line instead of a straight line. This is done by placing the standard on top of the lining and aligning point BH_2 on the standard with point H on the lining, pivoting the standard until the back curve passes through points H and J and connecting them with the line of the back curve. Linings should have $\frac{1}{8}$ in. trim allowance. The allowances for seams and laps on the outsides are $\frac{1}{16}$ in. and $\frac{5}{16}$ in. respectively. An allowance of $\frac{7}{16}$ in. is required for laps if there is punching etc. involved.

From the court or pump standard thus obtained it is possible to produce many other styles.

Basic Oxford, size 4

Preparation of the standard

To make a standard for an Oxford style, the contours of the court or pump standard are copied. Point V_2 is lifted back to the original last mould line (see figure 16). A new vamp line is made by connecting V_2 and A with a straight line. From V_2 a straight line is drawn up the instep line of the last mould by placing a ruler on V_2 and pivoting the ruler until it touches the end point of the instep line (dotted line in figure 16). The vamp length remains the same as for a court or is moved, if the designer wishes, by measuring the required amount from V_2 on the last mould and straightening the instep line from this point. Through point V_2 draw a line perpendicular to the vamp line which will serve as a guideline for the vamp shape.

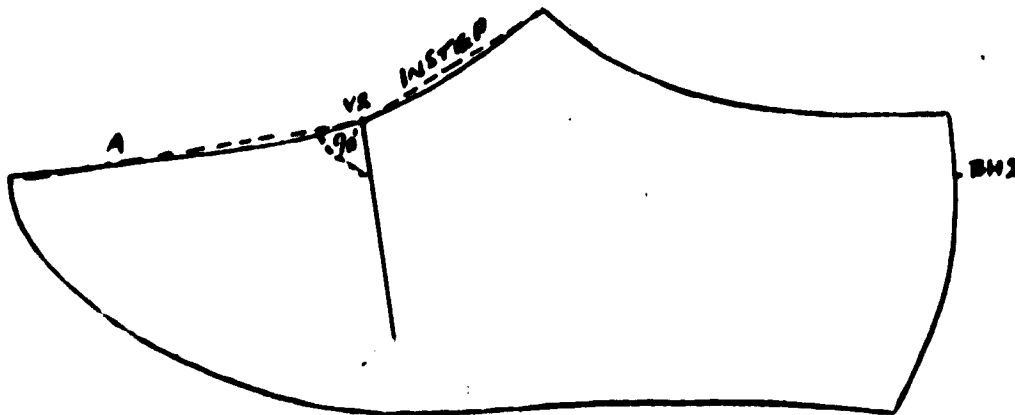


Figure 16

The length of the facing depends on the number and the size of the eyelets to be used. The basic Oxford has 5 eyelets and for size 4 the facing is about $2 \frac{3}{8}$ in. long. This means that the eyelets are $\frac{7}{16}$ in. apart. From point V_2 measure $2 \frac{3}{8}$ in. along the instep line and insert point L marking the length of the facing. From point L measure down $\frac{3}{16}$ in. and mark point M representing the actual top of the facing. Connect M and V_2 by a straight line; this is the facing (see figure 17).

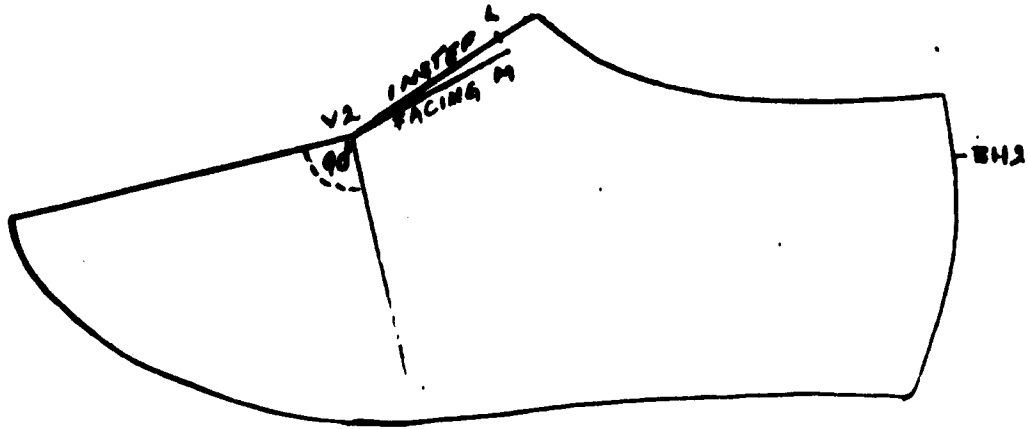


Figure 17

The under ankle position (D) is determined the same way as for the court standard and the same measurements are used, i.e. 3 in. from the seat (C) and $1\frac{1}{2}$ in. up (see figure 18). Connect points M, D and BH₂ with a curve; this is the outside quarter line. The inside quarter line can be $\frac{1}{8}$ in. higher.

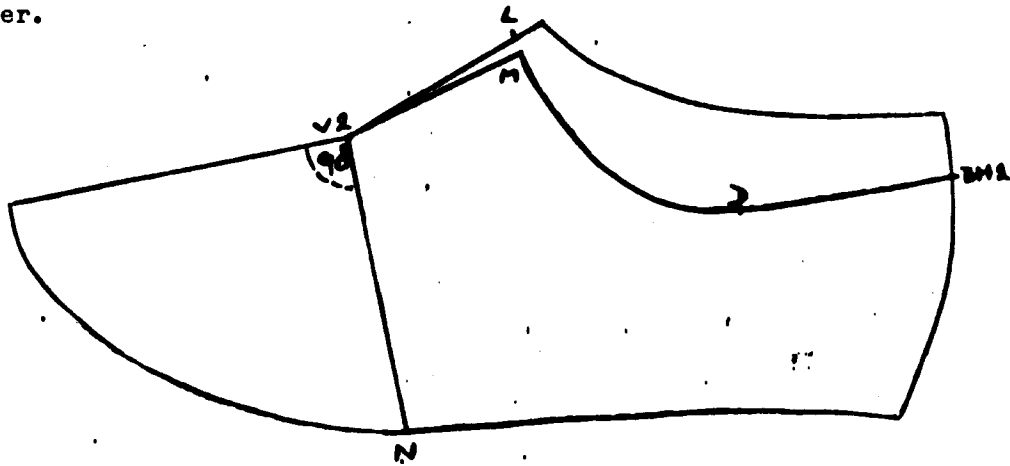


Figure 18

Extend the vertical to line $A-V_2$ to the lasting edge and mark point N ; divide this line into three parts and mark point O at the end of the top third, as shown in figure 19; draw a parallel to line $A-V_2$ starting at O . Now draw in a nicely shaped vamp line, beginning at V_2 and following line V_2-O , touching line $O-P$ and ending with a right angle to the lasting edge.

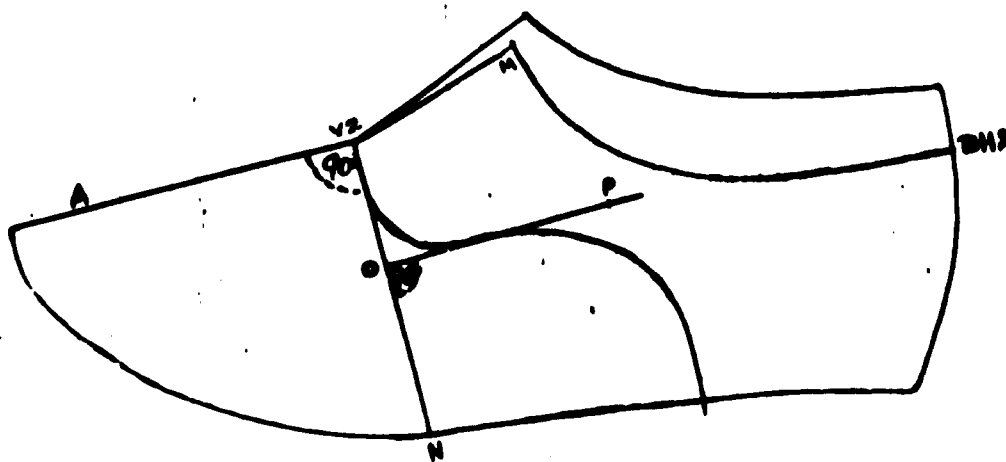


Figure 19

To determine the shape of the cap, proceed as follows: for a straight cap divide line $A-V_2$ into three parts and mark point R at the end of the top third, as shown in figure 20. Prepare a segment of a 16 in. circle, place one edge on the vamp line at point R and draw in the cap line. Make a curve connecting the facing and quarters at point M . To put in the eyelets make a line parallel to and $3/8$ in. from line V_2-M (see figure 20); this is the eyelet line. For a five eyelet style, divide the eyelet line into six parts to obtain the position of the eyelets. The only thing now left to do is to draw in the tongue. Mark in a position $1/4$ in. up from point L on the instep line and draw in the tongue (see figure 20). The tongue must be made wide enough to cover all the eyelets.

Note that the vamp curve at the throat should bear some resemblance with the toe shape of the last.

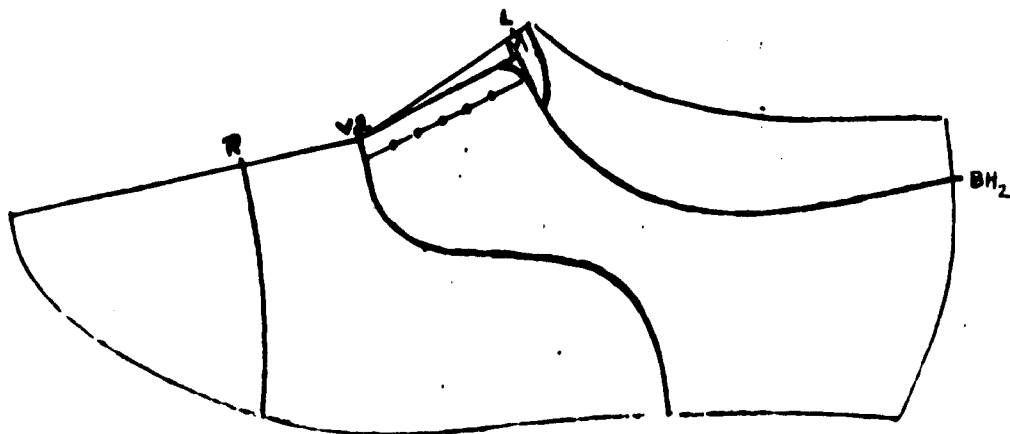


Figure 20

Lining

The back lining depends on the design; the measurements and the trimming allowances are exactly the same as for the court. The trimming allowance to be added to the top of the quarters is $\frac{1}{8}$ in. up to the facing line just past point M and reduces from this position until it is $\frac{1}{16}$ in. at V_2 (see figure 21). From V_2 towards A add a $\frac{1}{16}$ in. allowance for a distance of $\frac{1}{2}$ in. (point T); from point T draw a line parallel to the vamp line and $\frac{1}{2}$ in. away from it. The distance between V_2 and T is a seam allowance for joining the quarter lining. The allowances for laps and seams are the same as for the court. The tongue is cut to fit to the front of the quarter lining; add $\frac{1}{4}$ in. in length at the top of the tongue.

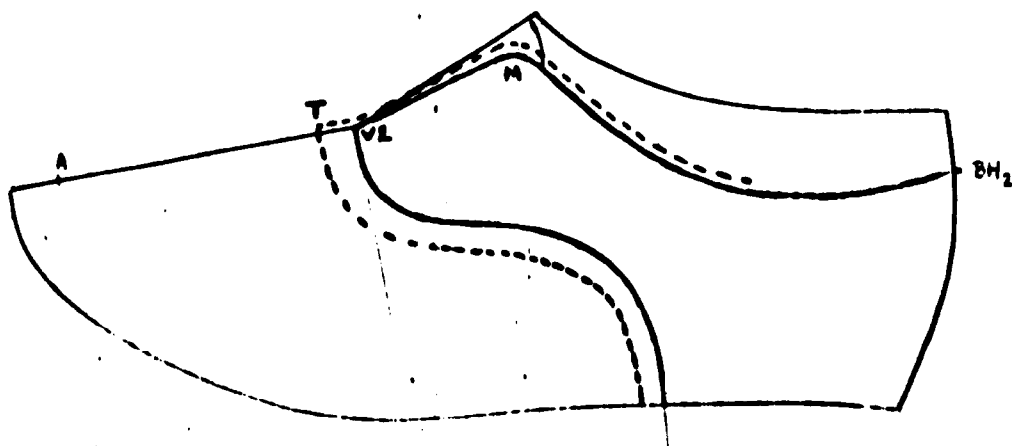


Figure 21

Basic Derby, size 4

Preparation of the standard

To make the standard for the Derby, take the Oxford standard and draw round it. Many of the lines of this standard can be used for the Derby. From point V_2 draw in the guideline for the facing to the instep line (see figure 22). The line of the Oxford quarters can be transferred to the Derby standard. Point M remains the same, but from line V_2-M measure $1/8$ in. down from V_2 and put mark W. To obtain the facing line, join M and W with a straight line (see figure 22).

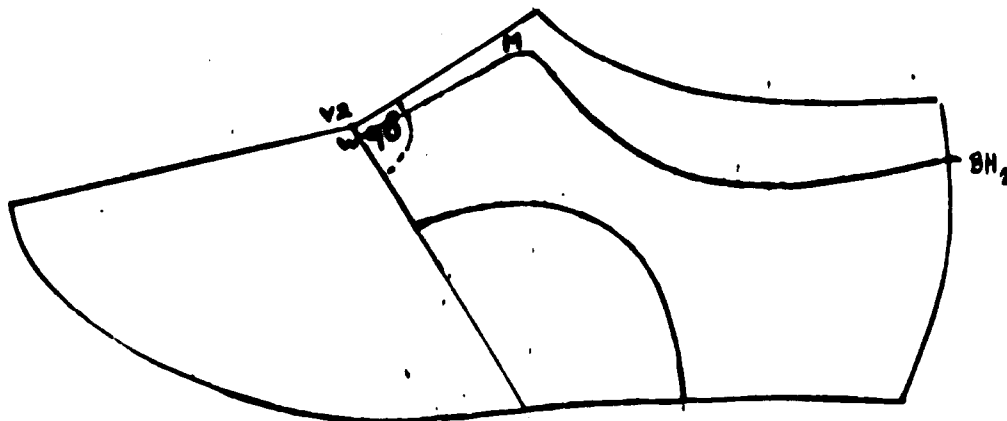


Figure 22

Transfer the vamp line from the Oxford to the Derby standard and make the quarter and facing shape, as shown in figure 22. As this basic style is also having five eyelets, the same method of positioning them is carried out. Finally curve the facing at point W, draw in the tongue position from the Oxford standard and, if required, also transfer the toe cap from that standard. The tongue can be cut in one piece or joined; in the latter case make the join in a position where it will be hidden when the shoe is laced up. For cutting the tongue extend line $A-V_2$, mark the position of the join (Y) if required and pivot down from V_2 until the instep line meets the extended line $A-V_2$ (see figure 23). Now sketch the shape of the tongue, which should always be rounded where the tongue line connects to the vamp. At last mark the fitting point FP half way between the tongue and the vamp and about $1/16$ in. from the vamp. This point is important for cutting the lining.

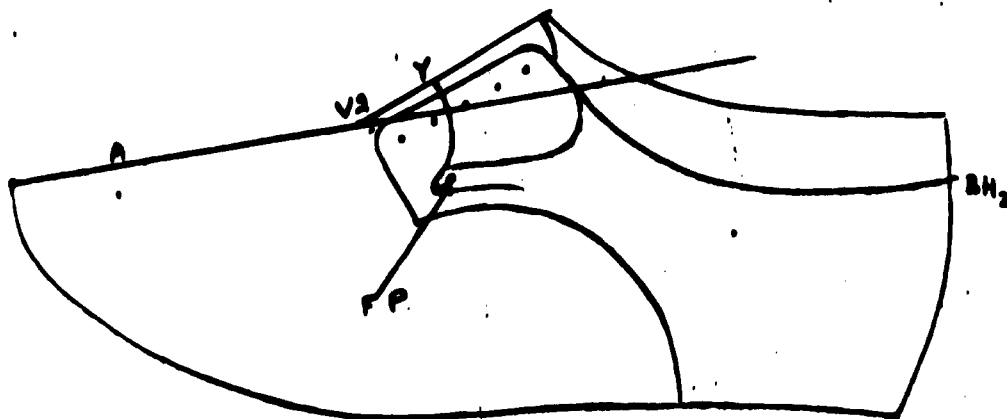


Figure 23

Lining

The method of cutting the lining, the measurements and the trimming allowances are the same as for the court. Find the "stay" position by drawing a straight line below the fitting point as shown in figure 24. The trimming allowance of the lining ($1/8$ in.) is now marked in by a dotted line starting at BH_2 and ending at the line from the fitting point. The trimming allowance on the tongue and, if a joined tongue is used, the allowance on the vamp are put in and brought to meet at point FP (see figure 24). Finally mark the cutting line for the quarter lining, which can be a straight line starting $\frac{1}{4}$ in. away from FP.

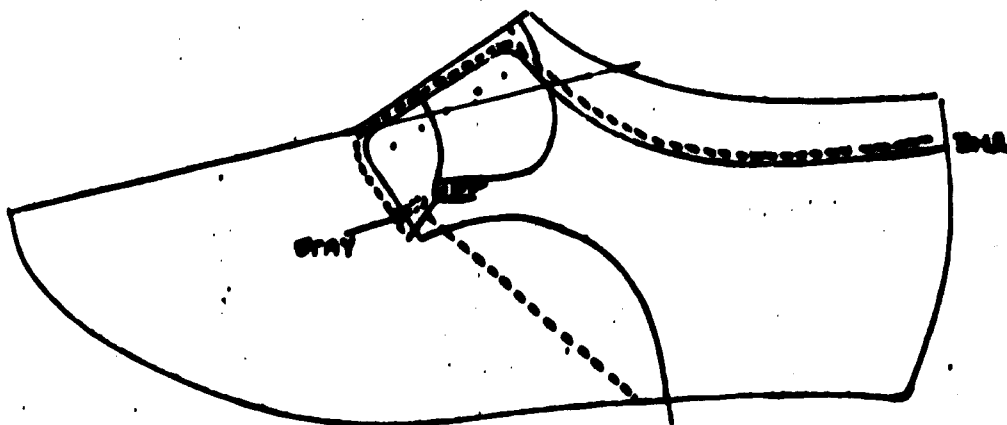


Figure 24

With this method one can also prepare standards for Derbys with one, two or more eyelets, with facings of different shape etc.

Sandal with open toe and heel

Preparation of the standard

The standard for sandals is constructed in the same way as the one for the court or pump, with a few differences: as no toe puff or stiffener are required for sandals, the respective allowances of $1/16$ in. do not have to be made and the back curve template is not needed.

Draw in the top line from V_2 to BH_2 and draw a line through BH_2 perpendicular to the top line. If a buckle is to be used it should be selected now as the strap to which the buckle will be fitted has to be cut $1/16$ in. narrower than the inner width of the buckle. On the perpendicular line to the top line measure down from BH_2 the width of the strap (see figure 25) and drawn in the strap parallel to the top line of the quarters. The size of the opening at the back depends on the design, but it should normally be not smaller than the heel. The opening at the toes also depends on the design; it should be ensured, however, that the small toe is covered and that, if straps are used, the first strap is in such a position that it will keep the small toe in the sandal. If the design has an open waist, the vamp line must come behind the joint.

If a buckle is used at the back, make sure that it is well clear of the ankle. The spacing between the buckle holes should be $5/16$ in. and there should be five holes made. The middle hole should be $1 \frac{3}{4}$ in. from the end of the strap.

Lining

The lining is prepared as for the court, except that at the back it is cut to fit the shape of the sandal pattern. Joins in the lining are usually made at the back strap.

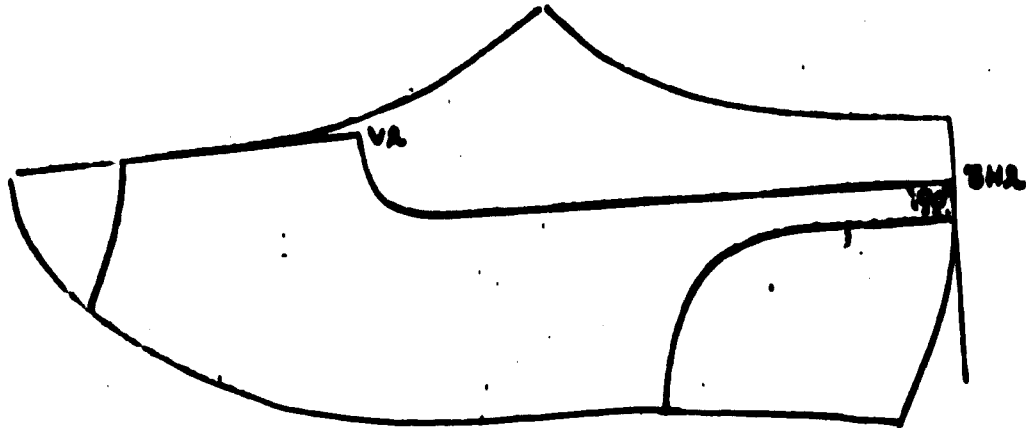


Figure 25

T-strap shoe

Preparation of the standard

A T-strap shoe is basically a court shoe with one strap up and one across the instep. The method for the construction of the standard is therefore the same as for a court, except that the vamp line is kept on the outline of the last mould (point V and not V_1 , as shown in figure 9) and that the instep line is straightened as for Oxford. All other measurements are the same as for the court. Construct the court design.

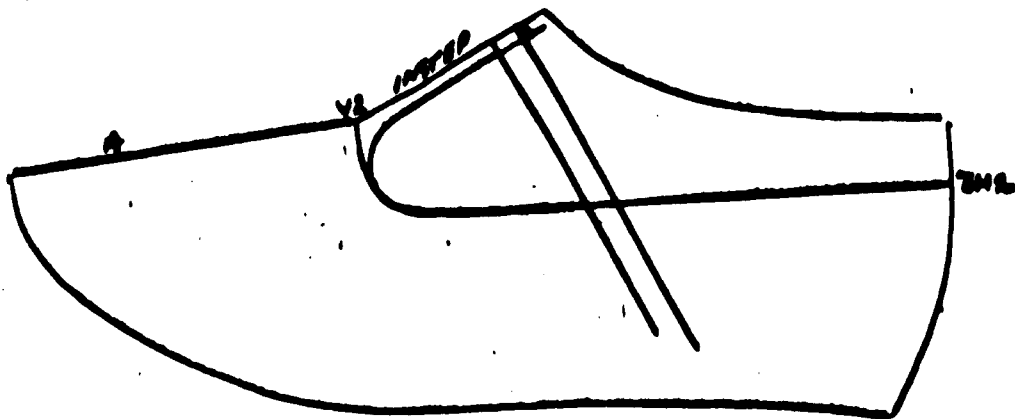


Figure 26

The easiest way to determine the position of the strap is to draw the strap on the last, to measure it and to transfer the measurement onto the last mould or standard. The width of the strap depends on the size of the buckle. At the previously determined position of the strap draw on the standard a line, perpendicular to the instep line, all the way down to the quarter of the court, and make a parallel to it at the distance of the width of the strap (see figure 26). For the front strap, measure half the instep width and draw a parallel to the instep. If required, the front strap can be rounded to merge into the top line of the court as shown in figure 26. The front strap should extend $1/16$ in. over the position of the instep strap (see figure 26).

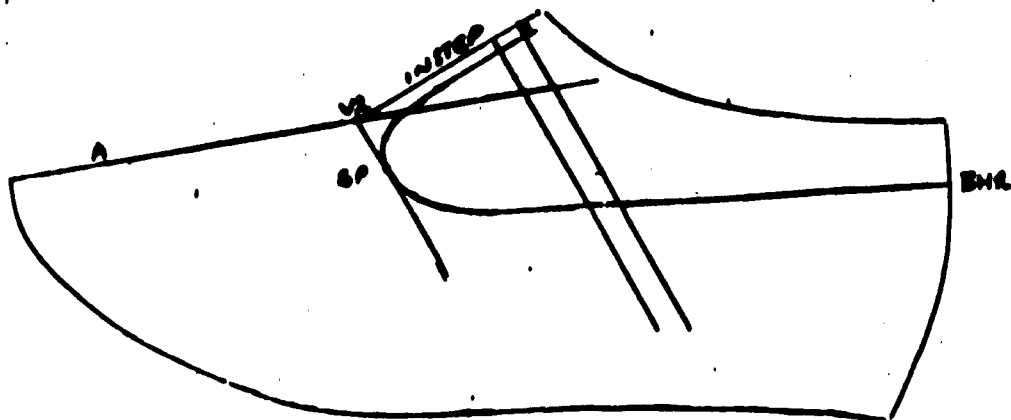


Figure 27

If the front strap is to be cut in one piece with the vamp, extend line $A-V_2$ and draw a line through V_2 perpendicular to the instep line. This is used as a guideline to bring the vamp mouth to it. It is important that this position is opposite V_2 as shown in figure 27. Cut slots in the standard on the front strap and quarters; it is now easy to transfer the lines by drawing in the slots with a finely pointed pencil. About half way in the curve of the vamp opening mark point SP (see figure 27). Place a folded pattern paper on extended line $A-V_2$ and copy round the standard marking in the position of the quarters and as much of the front strap as possible. Holding the paper at point SP, pivot the standard down until the instep line comes on the extended line $A-V_2$ and copy again from the standard the front strap and vamp mouth as shown in figure 28. The new curve has to be smoothed

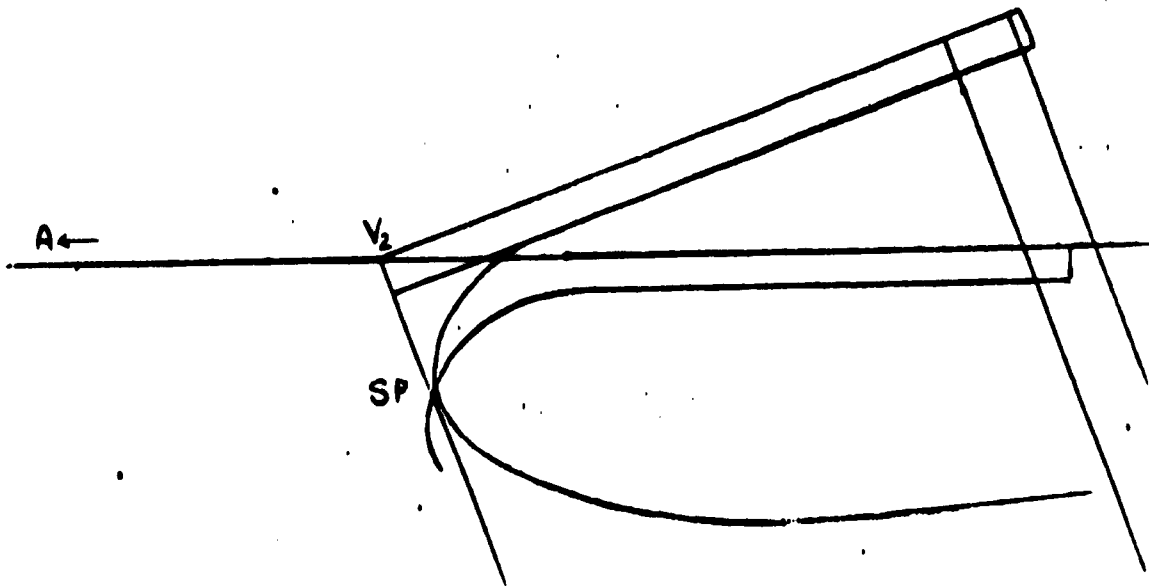


Figure 28

out to make a nice shape. Check again the length of the front strap against the standard and add the necessary amount if it is found to be too short.

The strap is cut to the measurements taken from the standard and the position of the buckle is determined in the same way as for the sandal. The distance between the buckle holes and their distance from the end of the strap is the same as for the sandal.

Lining

The lining is cut exactly the same way as for a court; only the lining for the strap has to be added. The trim allowance for the strap lining is $\frac{1}{8}$ in.

Slip-on shoe with tab and apron

Preparation of the standard

This style again is basically a court shoe. Therefore take the court standard, draw round it and mark in the vamp position. If the vamp position needs altering, this is done as explained previously.

It is possible to use an existing topline of a court shoe as a base to work from. From the vamp position V_2 measure up the instep line the required

height of the tab and mark this point with B. To decide on the height of the tab, sketch the outline on the last, measure the height from the vamp position on the last and transfer it to the standard. Do not make the tab too high.

Lift the tab off the instep line by measuring $\frac{1}{8}$ in. out from point B; this point, C, is then connected to V_2 by a straight line (see figure 29). The tab is lifted off the instep line in order to allow the foot to slip in easily and to give it a better appearance. This design should have a square shape to the vamp mouth as shown in figure 29.

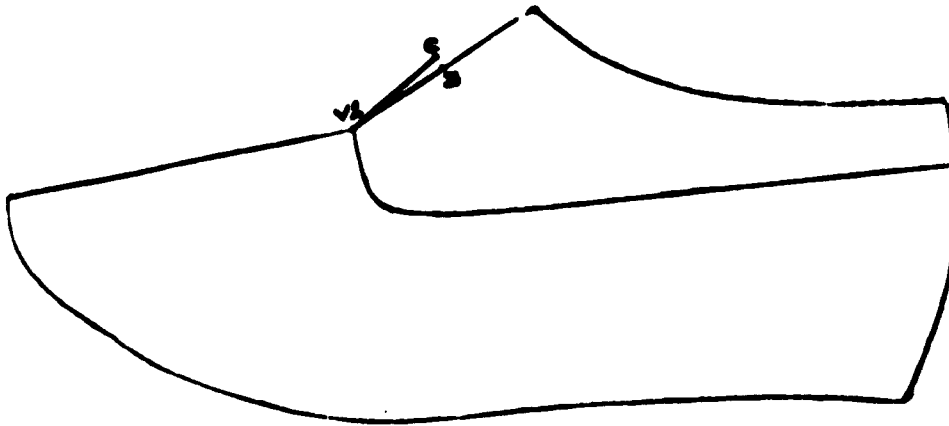


Figure 29

Draw a line through C perpendicular to line V_2-C which will serve as a guideline for designing the shape of the tab. Now draw in the tab and make it come down to the vamp mouth as shown in figure 30. How the tab fits on the standard is similar to how it will later fit on the foot. The tab should not be so wide that it overlaps the quarters.

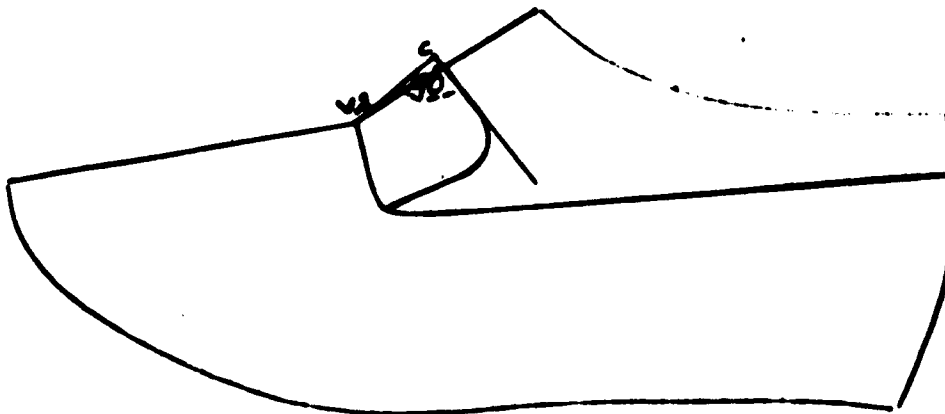


Figure 30

At this stage the apron can be designed and put on the standard. The easiest way to cut an accurately shaped apron is the following: decide on the position of the apron by drawing it on the last. Imagine a hole drilled through the last at the edge of the apron perpendicular to the bottom of the last as shown by the dotted lines A in figure 31.

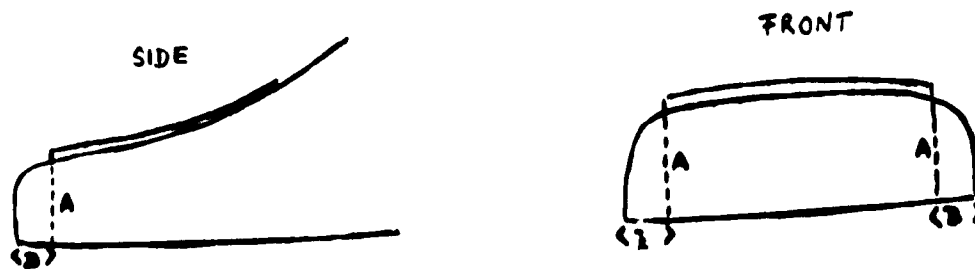


Figure 31

The distance (B) from line A to the edge of the last represents the amount by which the apron is smaller than the last. Take a copy of the last pattern or copy the forepart of the last and transfer the distance onto the last pattern at points C, D and E, as shown in figure 32. Then connect these points with a line parallel to the outside of the last pattern and mark in the centre line.

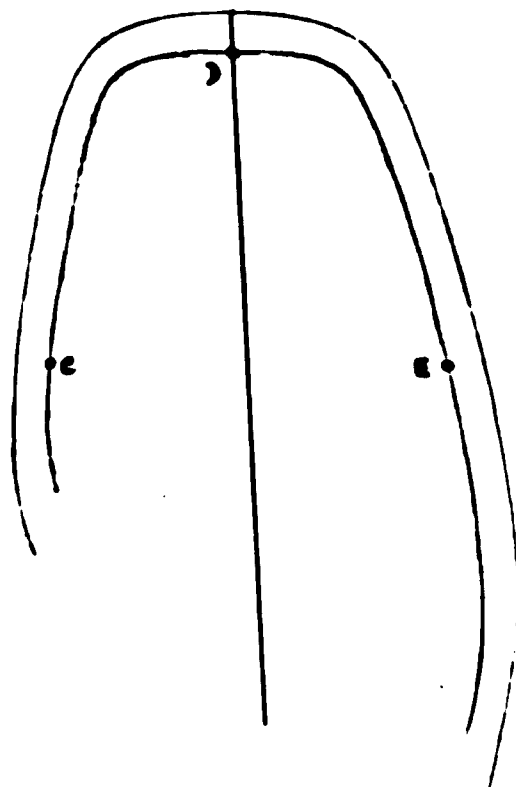


Figure 32

Now the apron pattern can be transferred to the standard. Take the required measurement from the last and transfer it onto the standard. Provide for the lasting allowance by moving point P $1/8$ in. up and marking point P_2 (see figure 33). Place the folded apron pattern on the vamp line of the standard with the front at P_2 and draw in the apron. The outline of the apron can be altered to line up with the quarters.

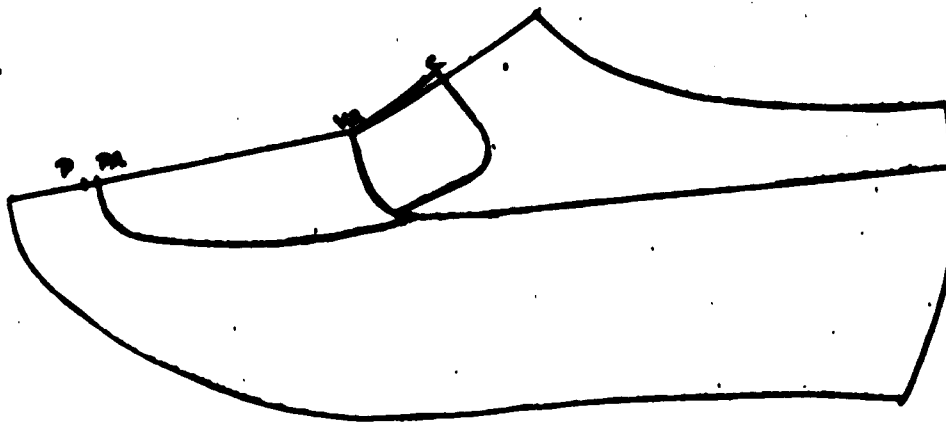


Figure 33

This style usually has a saddle, which should now be put on the standard. The width of the saddle has to be decided on; for a shoe of size 4 the right width is about 1 in. From V_2 , apply half of the width of the saddle (in this case $1/2$ in.) into both directions, i.e. towards P_2 and towards C, connect the two points S and D thus obtained with a straight line and draw perpendicular lines to this line through S and D as shown in figure 34. This is the position of the saddle. The vamp mouth is now too close to the saddle and has to be altered as shown by the dotted line on figure 34. The length of the saddle can now be determined.

Usually this style also has a counter which is designed in the following way: measure about $3/4$ in. from BH_2 on the top line and mark point F, from F measure $3/4$ in. down and draw a line parallel to the quarter topline; continue this line to give the counter the desired shape (see figure 34). Styles which have a counter should not have a backstrap.

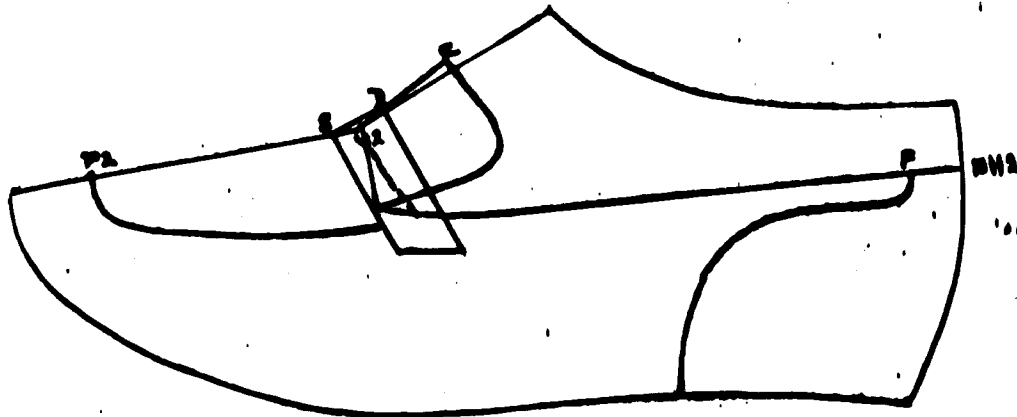


Figure 34

Lining

Cut the lining in the same way as for the court; in addition, prepare the lining for the tab which is attached to the tab and then inserted between the outside and the lining of the shoe.

Tab with elastic gusset

Preparation of the standard

This design is the same as for the slip-on shoe with the addition of an elastic gusset to make the shoe fit better to the foot. Prepare the standard as explained before or, still better, use the standard for the slip-on style if available. Mark in the topline, the tab and any other lines which may be of help. Now make the following alterations to the design which are reflected in figure 35. Mark the top of the gusset, G, on the instep line. Point G should be about $\frac{1}{2}$ in. below the top of the tab. Draw from G a $\frac{3}{8}$ in. long line perpendicular to the instep line and mark the end point with H. From G measure down the instep line the width of the elastic (about $\frac{3}{4}$ or 1 inch) and mark point J; draw a second $\frac{3}{8}$ in. long line perpendicular to the instep line and mark that end point with K. Finally, connect K and H. The elastic is now drawn in.

Extend line K-H by $\frac{1}{16}$ in. on each side (points K_1 and H_1). Through K_1 and H_1 draw lines, perpendicular to line K-H, all the way down to the quarter line (points L and M). These two lines serve as guide-

lines for the new shape of the quarter which can now be drawn in: round up line H_1-L to join the quarter line at O and do the same with line K_1-M to join with point N , the vamp mouth (see figure 35). Lines $N-O$, K_1-M , and H_1-L can now be erased.

One important point to remember is to keep the elastic gusset away from the saddle; if it is too close, this will restrict the amount the elastic is allowed to stretch in wear.

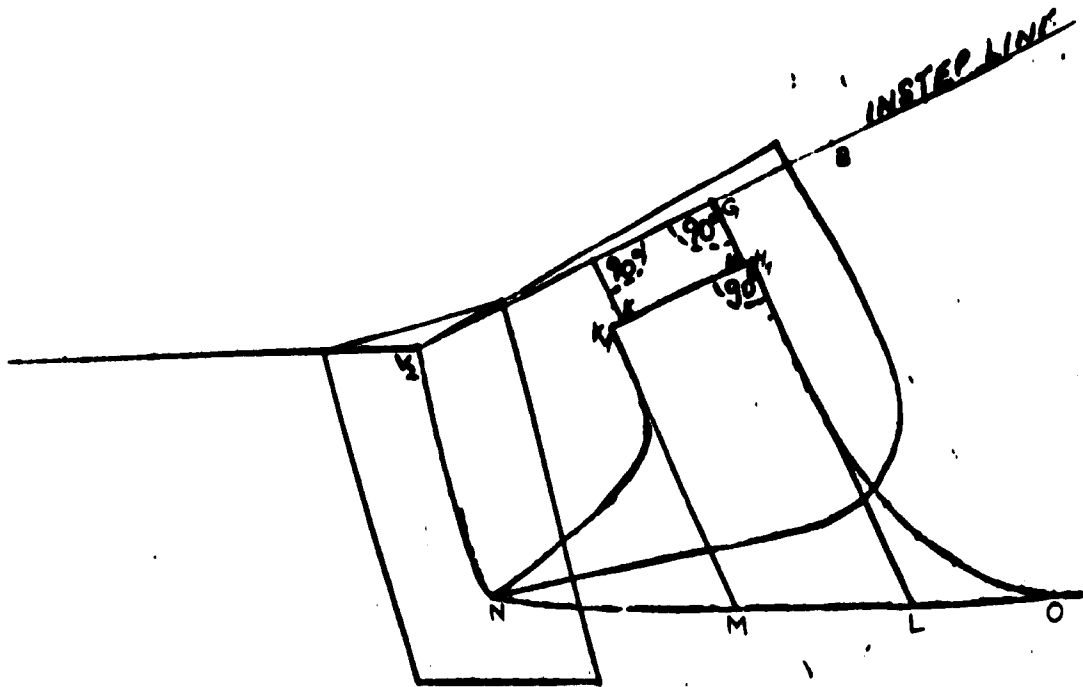


Figure 35

Lining

The lining can be cut in the same way as that for a court; the only difference is that quarters which have to be lined are higher (see dotted lines in figure 36). All allowances are the same as for the court shoe.

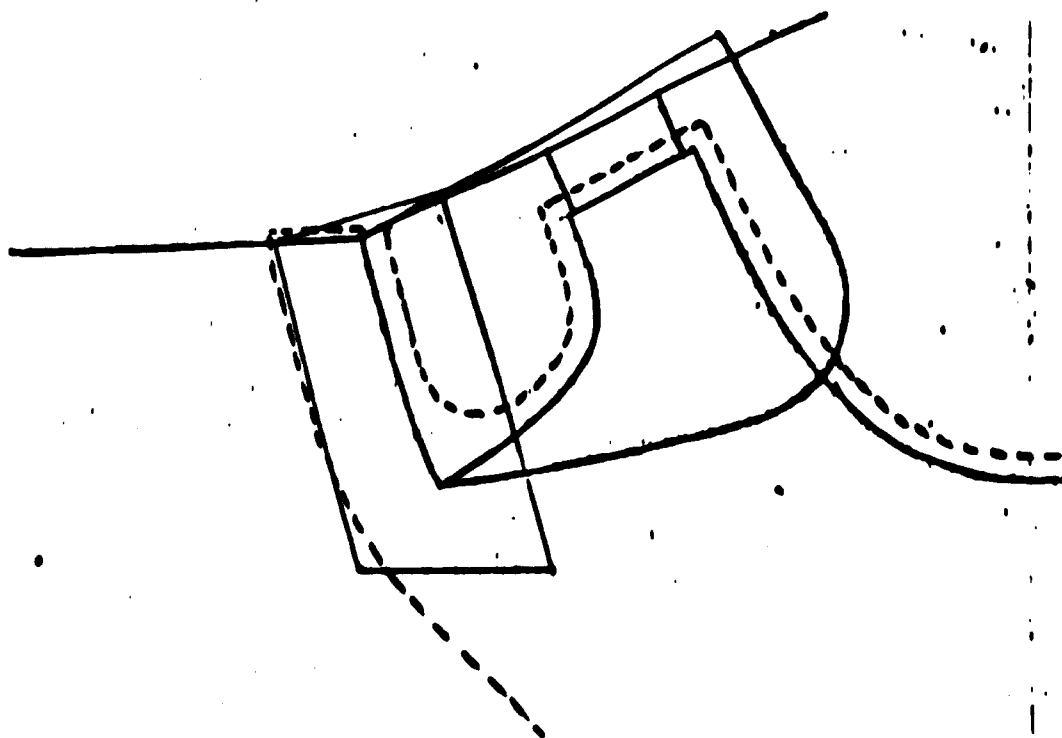


Figure 36

Boot

The boot is the most difficult type of footwear to be dealt with in this paper, mainly because no charts have been laid down for leg measurements. One of the best methods to determine the measurements for the leg of the boot is to take the measurements of the legs of 5 or 6 people of the same foot-size at different heights from the bottom of the heel and to work out the average measurements. The more measurements of the leg are taken, the better will be the shape of the boot.

The standard is prepared as follows: Make a court standard or use an existing one. Draw a straight line A-B (at least the length of the foot) and perpendicular to it line B-C (at least the height of the boot). Place the court standard on the pattern paper so that the lasting edge touches line A-B and the back touches line B-C (see figure 37). The desired heel height is determined by adjusting the distance of the seat from line A-B. From S_3 measure the under ankle position P (3 in. for size 4) and draw a perpendicular line to line A-B through P. Line P-O is the centre line of the leg.

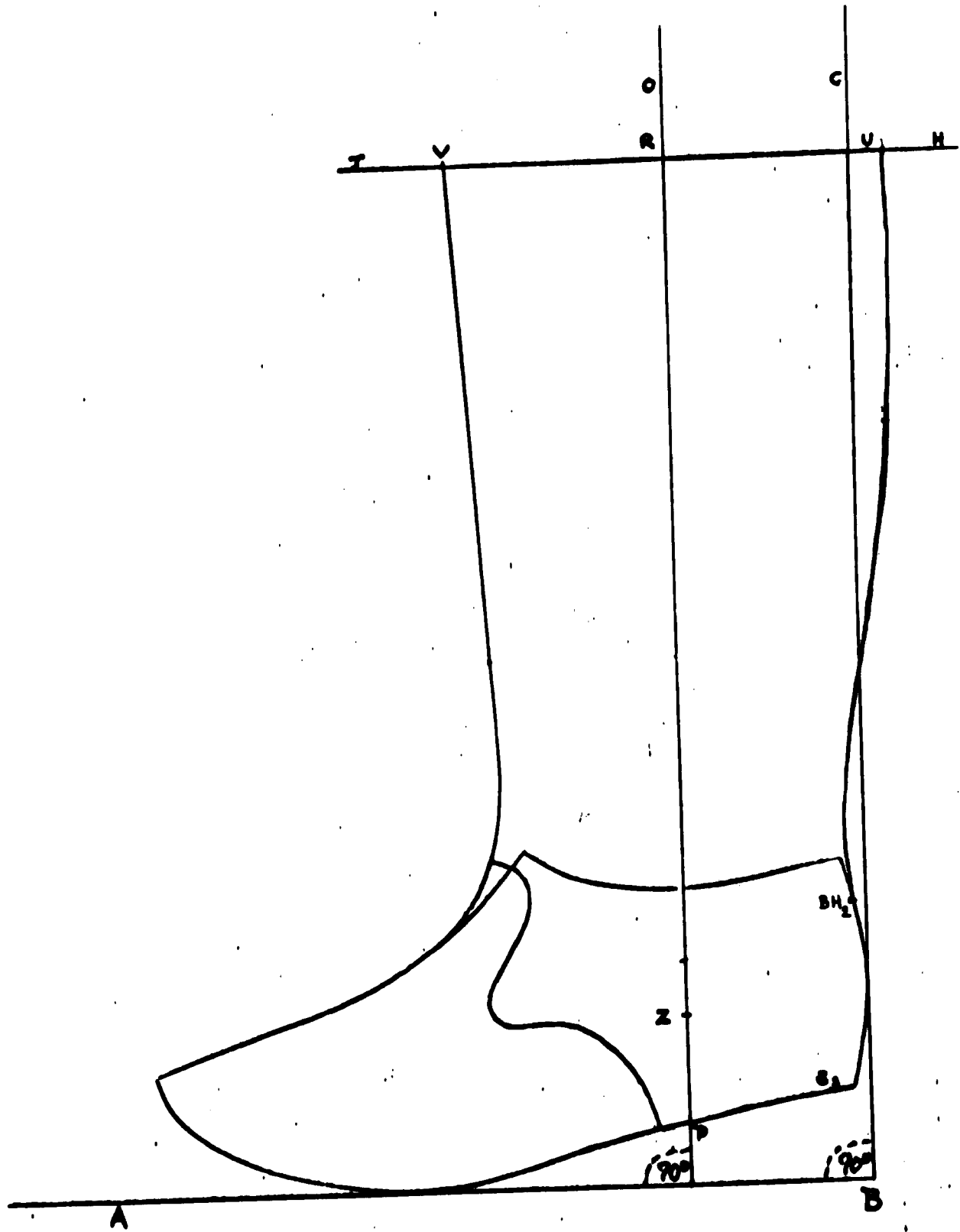


Figure 37

As a next step the topline of the boot has to be drawn. We assume that the boot will have a 12 in. zip. From point P measure up line P-O the lasting margin (about $9/16$ in.) plus the distance from the feather edge to the bottom of the zip (about $1\frac{1}{4}$ in.) making a total of $1\frac{13}{16}$ in. and mark point Z. From Z measure up line P-O the length of the zip (12 in.) plus $1/8$ in. tolerance and mark point R this is the height of the leg. Draw a line T-H through R and perpendicular to line P-O. This is the topline of the boot (see figure 37).

Now the shape of the leg has to be decided. Assuming that according to the leg measurements taken plus an allowance for the lining, the width of the top of the boot should be 14 in., line T-H should be 7 in. long. Therefore measure from point R on the centre line $3\frac{1}{2}$ in. in both directions from R, and mark points U and V. Repeat this procedure at the positions previously measured on the leg. Connect the points thus obtained, in the back by a curved line which should meet the court standard at BH_2 , in the front by a straight line (if all the points in the front are not on a straight line, connect only the point on the top line and the one closest to the instep) which blends in with the instep (see figure 37).

If the design has a high vamp as shown in figure 37, it should be cut in the same way as the T-bar style described in figure 28.

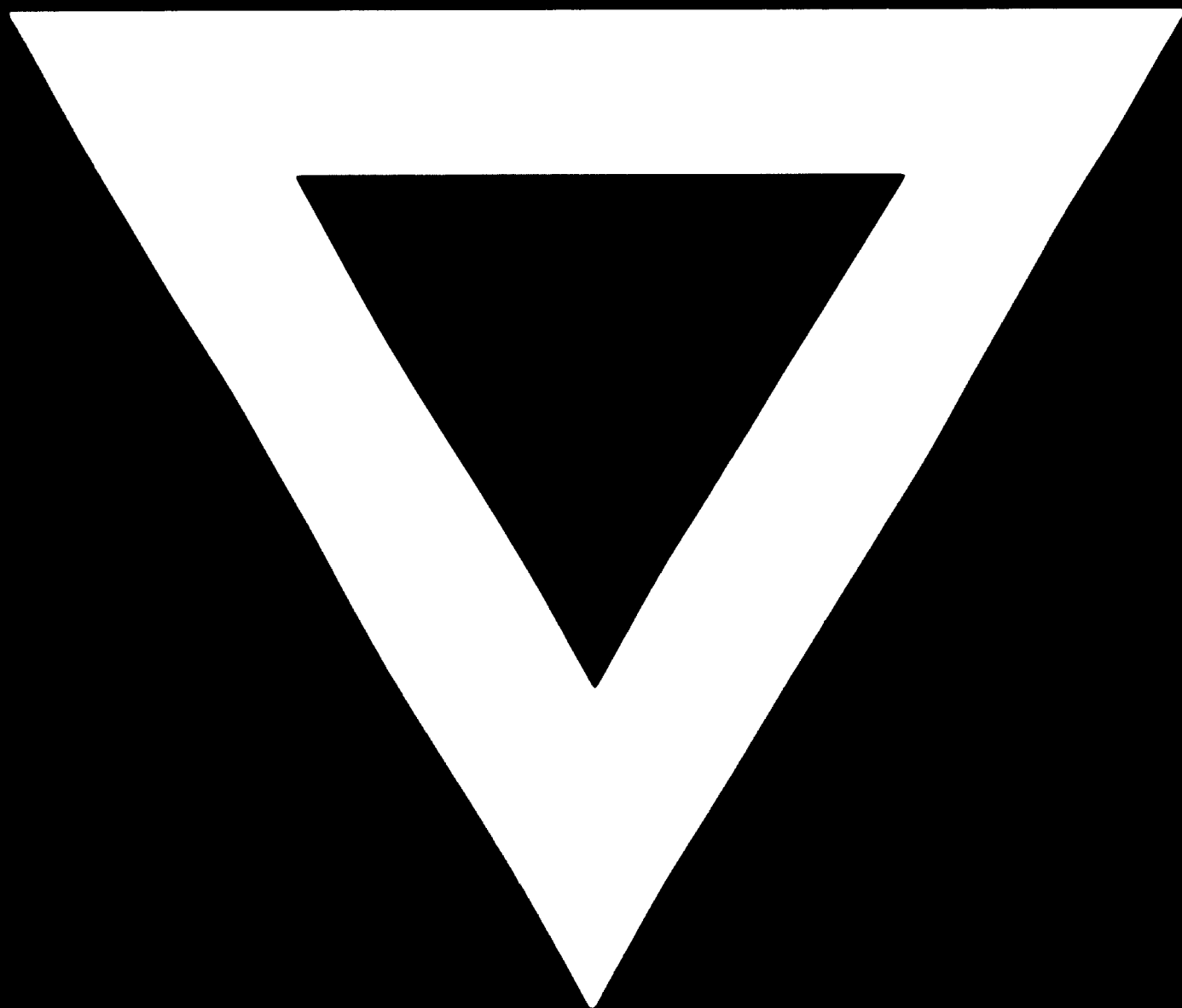
Lining

For the lining see the boot closing technology described in annex II.

Concluding remarks

The descriptions given above are intended to be suggestive rather than exact. If it is found that any dimension given does not work, it should be altered. Mark all lines required for a given design, including the contours of the lining, on the standard. If all standards are kept, a collection of designs and standards will soon be built up which will make it easy to transfer different lines and positions from one last to another. A last mould has to be made for each last and a standard for each design.

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