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FINAL REPORT

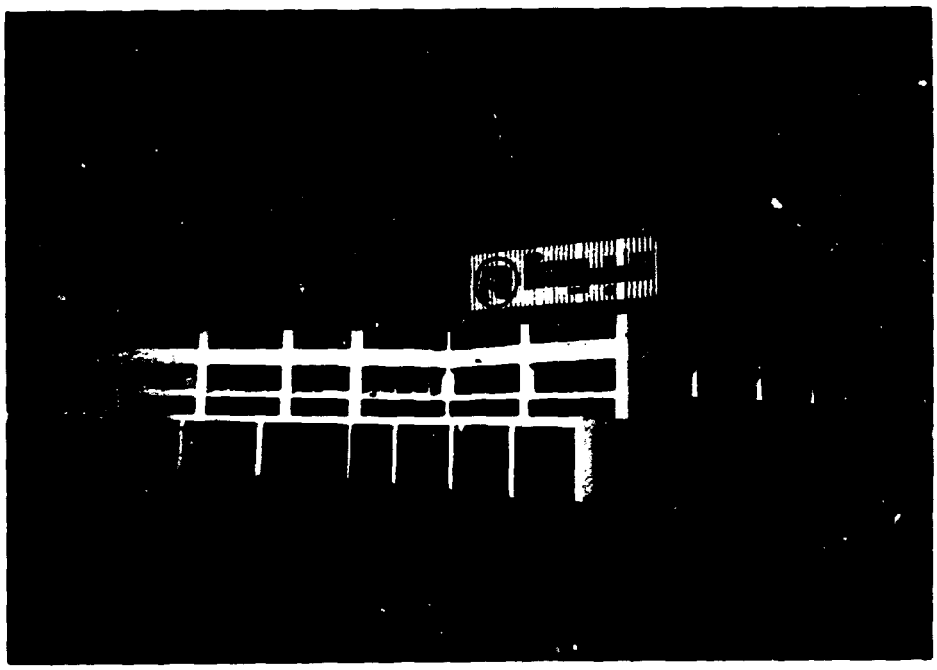
UPGRADING OF TECHNICAL CAPABILITIES OF SELECTED SHOE FACTORIES IN THE ARAB REPUBLIC OF EGYPT

Prepared by Mr. Paul Regli, Ass. Project Manager and Team Leader

Bally International Ltd., Licensing Division

BALLY INTERNATIONAL Ltd.

PROJECT: **UNIDO - EGYPT** **US/EGY/88/044**



BALLY INTERNATIONAL Ltd.

SYNOPSIS

The aim of the project is to upgrade the technical performance and product range of selected Egyptian private sector shoe factories by providing one factory, Abbouda Shoe Co., 10th of Ramadan City, with a compiete technical assistance package and by providing four others with limited services.

This Final Report contains a description of the most significant activities undertaken in accordance with UNIDO Contract No. 88/80 carried out during a six months' period from January 1989 to June 1989. Our team worked in close collaboration with Mr. Juhani Berg and Mr. Odd Birkhaug from UNIDO and the Abbouda Shoe Co. as counterpart.

The first phase was characterized by the folowing activities:

- Style selection and manufacturing of prototypes and flowcharts
- Evaluation of locally available materials and of the technical capabilities
- Training of technical staff from Abbouda Shoe Co. at Bally's Shoe Factories Ltd. in Switzerland
- Study tour of four Egyptian shoe manufacturers at Bally's Shoe Factories Ltd. in Switzerland

The second phase was characterized by:

- The production start in Abbouda Shoe Co. together with a massive transfer of technology and know how as well as the establishing of quality standards and the introduction of a quality control system.
- The seminar in Cairo for the selected Egyptian shoe factories
- Information about Retail Display Systems and Fitting Standards

The project progressed according to plan and schedule. The achieved results are very pleasing. Abbouda Shoe Co. now has a modern layout and suitable machines. Through the introduction of new technology, the quality has been increased to a remarkable level. The reproduced models are suitable for Export.

The main problems are the unsatisfactory quality of upper leather and the absence of high quality components on the local market. These difficulties could be partly overcome by using a suitable cutting method for the upper leather, the application of reinforcements and also the use of modern finishing products. It is however most important that improvements in the tannery sector are forthcoming.

It is still noticeable, that technical knowledge is missing in the Egyptian shoe industry. We were able to remedy this through our activities at Abbouda. Similar problems exist in the areas of quality control and training.

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1. INTRODUCTION

1.1 General remarks

This report is based on the Contract No. 88/80 between "The United Nations Industrial Development Organization" (UNIDO) and Bally International Ltd., Zurich, Switzerland. The aim of the contract is to upgrade the technical performance and product range of the selected Egyptian private-sector shoe factories, by providing one factory, Abbouda Shoe Co., 10th of Ramadan City, with a complete technical assistance package and by providing four others with limited services.

The project was carried out in a six month period from January to June 1989. Our team worked in close collaboration with Mr. Juhani Berg, Chief of Leather and Leather Products Unit and Mr. Odd Birkhaug, Shoe Technologist, from UNIDO on the one hand and the representatives of Abbouda Shoe Co., on the other.

The activities and the results of the first phase of the project are described in our "Interim-Report" from 5th April, 1989.

1.2 Personnel data

In the following we deal with the contractual duties according to annex E of the contract. The expert team provided 10 man/week work in the field. The personnel assigned to the project were as follow:

Mr. Werner Bürgin	Director, Project Manager
Mr. Paul Regli	Head, Technical License Sector, Team leader
Mr. Erhard Gysin	Technician
Mr. Rudi Ingold	Technician
Mr. David Blair	Technician

1.3 Reports

The contractor has submitted to UNIDO, before this Final Report, the reports listed below:

- "Test Report" of locally available materials

- "Quality Manual" containing
  - list of testing machines and apparatus needed
  - work manual for selecting suitable materials for quality shoes, tests recommended and standards applied

- Report of visit of Messrs. P. Regli and E. Gysin to Abbouda Shoe Co., in February 1989

- "Interim Report"

Together with the "Final Report" the following documents will be handed over:

- Report of visit of Messrs. P. Regli and R. Ingold to Abbouda Shoe Co., in April 1989

- Report "Orthopedic Criteria"

- "Technical Manual" part 1
  leather sorting
  clicking room techniques

- "Technical Manual" part 2
  quality control

- Report "Retail system"

2. MATERIAL SELECTION AND TESTING MATERIALS TO BE PURCHASED ABROAD (para 1 and 2, annex E of agreement)

2.1 General remarks

The selection of locally available materials took place from 5th February to 11th February 1989 in Abbouda Shoe Co. Present were also Mr. Odd Birkhaug, UNIDO, and, for one day, Mr. Max May.

The results of these tests, which were carried out in Bally laboratories in Switzerland have been recorded in a special "Material Test Report". We also dealt with this point in our "Interim Report".

2.2 Comments on materials selected

The test results as well as the various inspections and investigations in Cairo, have clearly shown that the materials available on the local market, in many cases do not meet the standards required for a high grade shoe. This applies especially to upper and lining leather. Sole leather however can be found in the quality required. Mr. May dealt in his report with the problems in the Egyptian Tanneries. From the shoe technical point of view the following main points have to be mentioned:

- floating grain (pipy look)
- insufficient finish abrasion and finish adhesion
- coarse grain, especially on kid leather
- hard and dry material, partly heavy coat of finish
- extreme irregularities in colours
- lack of aniline or semi-aniline dyed materials in fashion colours
- lack of soft materials for leisure wear

Many tanneries do not seem to be interested in upgrading. They can sell what they produce. The import and export restrictions have the disadvantage that there is no competition. Shoe manufacturers and tanners who are interested in an upgrading programme should sit together and discuss these problems and the possibilities for improvements.

On the other hand we must point out that also the shoe manufacturers can help to improve the appearance of the material. Generally too much adhesive is applied or wrong adhesives are used for bonding upper and lining pieces. Certain adhesives and their solvents negatively affect the leather, giving it a pipy look. Furthermore the final look of the shoes can be improved by the application of suitable finishing products. The six styles selected which we manufactured at Bally's using Egyptian materials, were treated with special finishing products. The results achieved were very promising.

Various components cannot be found on the local market or only in inadequate quality as e.g.

- insole materials
- steel shanks
- toppiece material
- threads
- reinforcing tapes
- interlining materials (swansdown/backers)

The development of these products on the local market should be forced on.

3. EVALUATION OF TECHNICAL CAPABILITIES OF MACHINERY AND EQUIPMENT FOR THE SELECTED PRODUCTION PROGRAMME (para 3, annex E of agreement)

3.1 General remarks

This evaluation took place from 5th February to 11th February 1989, together with the selection of locally available materials. The report of this visit has been added to the "Interim Report".

The Abbouda Shoe factory presents well. The space in the manufacturing plant is limited and could get very tight with an increased production of 500 to 600 pairs.

3.2 Machinery and equipment

Generally the factory is well equiped with machines. The layout is suitable. Improvements are very difficult due to the limited space and the great number of pillars.

During the visit in February for the evaluation and the visit in April for the implementation of styles, we made suggestions for additional machines and equipment required.

Upper manufacturing

- Splitting machine for processing various sections and for uniforming leather lining (CAMOGA)
- Perforating machine (present machine is worn out)
- Strap folding machine with various guides
- Table ironing machine (WSK ROTARY mod. 460)
- Pfaff sewing machine 493-755 (BIANCHI MARE, Italy) special machine for moccasin style AB 891-6

Lasting, making, premanufacturing

- Preactivating apparatus for thermoplastic stiffeners (Elettrotechnica)
- Moisture conditioning apparatus for uppers (RAPIZZI)
- Scouring machine for flat sole edges with adjustable table for correct angle
- Upper attaching, holder device (offer through Bally)
- Accurate moulds and cushions for
  - insole moulding machine
  - stiffener moulding machine (cement lasted and Moccasin)
- Correct teflon bands and wiper plates for forepart lasting machine MOLINA-BIANCHI
- Correct wiper plates and pressure band for seat and side lasting machine MOLINA-BIANCHI
- Spray gun for shadow finish, nozzle 0,3 mm

During the SIMAC Fair in Bologna in May 1989 the Team Leader assisted Mr. Maher Abbouda in selecting suitable machines and additional equipment.

During our last visit to Abbouda Shoe Co. one week before the seminar, we noticed with pleasure that most of the machines suggested have been ordered, and some of the additional equipment has already arrived in the factory.

4. STYLE SELECTION
(para 4, annex E of agreement)

The style selection took place at Bally's Shoe Factories Ltd. in Schönenwerd, Switzerland, from 9th January to 11th January, 1989. (see also point 3 of Interim Report).

In presence of Mr. Medhat Abbouda, Abbouda Shoe Co., and Mr. Odd Birkhaug, UNIDO, the following styles and shoe lasts were selected:

- 4 men's shoes, size 8E, cement lasted
- 2 men's shoes, size 8E, moccasin
- 2 different lasts for cement lasted shoes
- 2 different lasts for moccasins (one additional last offered without any extra charge)

Mr. Max May joined the group for one day. We took the opportunity to acquaint the participants with the quality standards of high grade shoes. Special attention was paid to the quality of upper leather, laboratory tests and sorting. In order to familiarize the group with our manufacturing methods, quality standards and quality control, we arranged visits to various factories.

5. MANUFACTURING OF PROTOTYPES IN EGYPTIAN RAW MATERIALS (para 5, annex E of agreement)

From each of the six styles which were selected as the basic product programme we manufactured in Egyptian raw materials one pair of shoes; a complete upper and a partly finished upper. We paid special attention to the correct cutting and matching and to the application of reinforcing tapes and interlinings. On the partly finished uppers these inner values are well visible and serve as guidelines for the counterpart. The finished shoes presented well, especially due to the application of adequate finishing products. The final product showed clearly that with the correct shoe technical basic rules, careful handling and an appropriate finish, the quality level can be much improved.

The flowcharts which we established for each of the 6 styles contained technical specifications for skiving and stitching, as well as the sequence of operations and the time minutes. Various items such as patterns, lasts and samples of soles and insoles were also handed over to the counterpart (for the complete list see point 7 of the Interim Report).

All items were handed over to Mr. Medhat Abbouda during his stay at Bally's in Switzerland in March 1989. During the implementation of styles in April 1989, the two Bally technicians used shoes and uppers and various components as samples, to explain the shoe technical aspects in detail to the counterpart's staff and operators.

6. TRAINING OF TECHNICAL STAFF FROM THE ABBOUDA SHOE CO. AT BALLY'S SHOE FACTORIES LTD, SWITZERLAND (para 6, annex E of agreement)

We have dealt with this point in detail in the Interim Report (point 10).

According to the contract the training was detailed as follows:

1 person for style implementation	2 weeks
1 person for closing room	1 week
1 person for making room	1 week
1 person for sole preparation	1 week
1 person for material testing	2 weeks

On request of Mr. Medhat Abbouda the following training took place:

1 person for style implementation (Mr. Abbouda)		2 weeks
2 persons for closing room	each	1 week
2 persons for making room	each	1 week
1 person for sole preparation		1 week

The training of 1 person for material testing has not been carried out. Instead an additional person for the closing room and the making room was selected.

The training took place in two groups. The first group arrived on 5th March and left on 11th March. The second group arrived on 12th March and left on 18th March.

One week was of course too short for an in-depth training. Furthermore it was a great handicap that the trainees did not speak English.

Mr. Abbouda and one of the trainees had the opportunity to visit the Bally moccasin factory. During the training period various technical documents were handed over to Mr. Abbouda and he also ordered some special guides developed by Bally.

7. IMPLEMENTATION OF SIX SELECTED PROTOTYPES AT COUNTERPART'S FACTORY, PRODUCTION START (para 7, annex E of agreement)

7.1 General remarks

The implementation of the six selected styles took place from 17th April to 30th April 1989 by Messrs. P. Regli and R. Ingold. After the visit a "Technical Report" was worked out dealing in detail with the most important technical and quality points of each style and in general with shoe technical questions.

7.2 Style implementation

From styles AB 891-1 to AB 891-5 we manufactured a total of 22 pairs. Style AB 891-6, moccasin type, has a complicated joint seam which requires a special machine. This machine has been ordered but has not yet been delivered, therefore we could not finish any shoes.

The manufacturing of these styles went very slowly. The reasons were that we had to explain everything very carefully, the partly new technology (cutting, reinforcings etc.) and certain language problems. However the shoes produced were of a very good standard and presented well.

A final meeting was held with Messrs. Maher Abbouda and G. Pfanner (pattern making) during which all technical problems were discussed.

7.3 Technology

7.3.1 General remarks

We have dealt in details with all technical points in our two special reports after the visits to Abbouda Shoe Co., in February and April 1989. The following documents have been handed over to Messrs. Abbouda:

- Flowcharts of each of the six selected styles with specification for skiving and stitching; the sequence of operations and the standard time minutes for cutting, stitching, making and finishing (details see point 7 of Interim Report)

- Report of visit of Messrs. P. Regli and E. Gysin to Abbouda Shoe Co. in February 1989

- Report of visit of Messrs. P. Regli and R. Ingold to Abbouda Shoe Co. in April 1989

- Quality Manual, securing of quality, guide book for major material tests

- Technical Manual, part 1 leather sorting, clicking room techniques

- Technical Manual, part 2 quality control

- Technical Manual, part 3 closing room techniques

- Technical Manual, part 4 making room techniques

These documents are of great value and include considerable special Bally "know how" and specifications. We have dealt with each operation and made suggestions for improvements. During the style implementation we introduced the Bally technology and exercised with the operators in various fields.

7.3.2 Main technical and quality points to be improved in Abbouda Shoe Co.

The main points were:

- quality of upper, lining and sole material
- lack of reinforcing tapes and reinforcing materials
- cutting system
- skiving
- application of reinforcings
- application of correct needles, threads, stitch lengths
- generally too much application of adhesives
- premanufactured soles not fitting properly, incorrect edge angle
- incorrect heel stand (heel cupping and inclination)
- insole moulding inaccurate

- because of the new lasts, the moulds and cushions have to be replaced and new teflon bands for pulling over are required
- length and quality of insole steel shank
- sole pressing
- finishing
- cleanliness and careful handling

7.3.3 Achieved improvements

During the visits of Bally and UNIDO experts special improvements were achieved in the following fields:

Leather sorting, upper leather cutting

We trained the clicking room foreman the technique of sorting upper leathers according to colour, substance, stretch, grain, defects, articles etc.

Furthermore we have started in the clicking room with the introduction of important basic cutting rules. Special attention has been paid to the direction of stretch and tension, cutting in pairs with the correct shading and matching up and economy. In order to avoid that pieces, uppers or shoes become mixed up again during the manufacturing process, we introduced consecutive numbering. Various layout diagrams, indicating how varying types of skins combined with various shapes of patterns can be effectively cut, have been handed over to Abbouda Shoe Co. (see also annex 7 of Technical Manual, part 1).

Closing room

For joint and backseams wrong needle points have been used. We introduced the correct application of needles and threads and the stitch lengths required.

Reinforcing tapes and interlinings are practically not in use. We selected some adequate materials for interlinings and explained the importance and the correct use of reinforcing tapes. As there are no suitable reinforcing tapes available on the local market, they must be imported. We dealt specially with this point in our Technical Manual, part 3.

A very weak point is still the skiving operation. In spite of an intensive training at Bally's in Switzerland this operation needs more attention.

Generally too much adhesive is applied which affects the leather. During the style implementation we paid special attention to this point.

Premanufacturing of soles

We explained and discussed all points which can influence the correct fit of a sole and which must be taken in consideration when making the templets.

Several sample soles in Egyptian material have been manufactured at Bally's. We achieved very satisfactory results with cow leather, which has a better structure than the Buffalo leather in use. Sole leather in an acceptable quality is available on the local market. Further improvements have been made with smoother emery paper (280 or 320) and the application of suitable edge, heel and bottom inks.

In order to improve the heel stand, we handed over to the contractor technical instructions concerning heel cupping and inclination.

Making room

We suggested new moulds for insole moulding and cushions and moulds for the thermoplastic counter moulding, because they did not correspond to the new lasts. Furthermore we proposed the purchasing of a pre-activating device for the thermoplastic counter. The actual moulding will be improved and crooked backseams should disappear. Together with the new teflon bands for pulling over, all these items have been ordered and will shortly be installed.

Special attention has been paid to pounding, roughing and application of adhesives. The accuracy and the cleanliness can still be improved.

The sole pressing was not very carefully executed. The timing between activating the soles and sole pressing was not synchronous, which could have led to various bonding problems. With an in-depth training, the operation is now carried out properly.

During the implementation period we demonstrated various finishing methods such as solvent or wax based finishes and different shadow finishes. We also exercised the basic finishing operations such as cleaning and ironing. The results were very promising. The finished shoes looked clean and fresh, and due to the correct application of shadow finishes, some rather poor looking materials presented quite well. We recorded all these technical points, the correct application of the various products and the sequence of operations in our Technical Report.

General remarks

During our three visits to the counterpart's factory we always insisted on accuracy, cleanliness and careful handling. These are basic points for a high quality shoe and must be regularly controlled.

7.3.4 Further assistance by Bally

It has been clearly shown that some weak points are in the closing room, especially operations such as skiving, folding and some stitching operations. On request of Mr. M. Abbouda we are prepared to send a girl to his factory for a two weeks stay. She has had three years training on all closing room operations and is now on an additional training as a shoe technologist. She should spend her time on training the operators (execution, quality, adjustment of machines, performance etc.). The visit will take place in the first half of August. All costs to be borne by Abbouda Shoe Co.

8. SUPPLY OF LABORATORY EQUIPMENT FOR MATERIAL TESTING (para 8, annex E of agreement)

In order to cover the entire subject of this part of the agreement, we worked out a special folder called "Quality Manual" which has been handed over to UNIDO and the contractor.

The "Quality Manual" deals with the following subjects:

- List of machinery and equipment for testing leather and non-leather materials
- List of machinery and equipment recommended for destruction tests
- Bally standards applied and tests recommended. Work manual for selecting suitable materials
- Leaflets of most important testing machines and the corresponding offers

So far no machines or equipment have been ordered by the counterpart. During the seminar in Cairo the question was brought up whether it would be possible to install control laboratories in Cairo and Alexandria (see also point 12.4).

According to the contract (para 6.5 and 8.4 of annex E) one person from the counterpart's factory should be trained in the Bally laboratories for a period of two weeks. For various reasons this training has not yet taken place (see also point 6.4 of Interim Report).

Mr. Abbouda requested these two weeks training for two additional trainees from the closing and the making room. With a total of 7 training weeks the contract has been fulfilled on our part.

9. INTRODUCTION OF A QUALITY AND PROCESS CONTROL SYSTEM (para 9, annex E of agreement)

9.1 Material selection, material testing

We dealt with this point during the visit of our experts to the counterpart's factory in February 1989. Furthermore the two documents "Quality Manual" and "Technical Manual", part 1 contain additional information.

9.2 Check points, criteria for inspection, training of inspectors

The quality control system has been introduced in the counterpart's factory by two Bally technicians, one week before the seminar. The "Technical Manual" part 2 (Quality control) contains all the important information of the various inspection points as well as checklists for the inspectors.

The situation in the counterpart's factory is not yet satisfactory. The inspection after cutting and in the closing room, concentrates more on the completeness of the lots and not on quality. The inspectors do not have a thorough knowledge of the department. Inspection of cutting requires an experienced clicker and the same refers to the closing room inspection. More attention must therefore be paid to quality control and to experienced examiners.

During the seminar from 12th June to 14th June 1989 various lectures by Bally experts underlined the importance of quality and quality control for a higher grade and for export shoes.

10. RETAIL SYSTEM
(para 10, annex E of agreement)

10.1 Report retail system

This report which is added in annex I deals with the following two main points:

- Modern criteria for ordering, selling shoes and accessories of fashion quality merchandise

- Criteria used for selling quality shoes and accessories

Due to the changed buying habits of the consumers, the retailers have introduced the "rolling buy". The first part of the report explains the term "rolling buy" and deals with the consequences for the shoe and tanning industry.

The second part contains tips and suggestions for window and interior display, as well as for advertising.

10.2 Additional activities

During the various visits to Bally International, Mr. Medhat Abbouda had the possibility to visit several Bally stores in Zurich and Basel. He was made familiar with modern display and had the opportunity to discuss problems with our retail experts.

11. ORTHOPEDIC CRITERIA
(para 11, annex E of agreement)

We dealt with this subject as follows:

- Practical exercising during the style selection and the training period in Switzerland
- Various discussions with the contractor's pattern maker during the visits of Bally technicians in Egypt
- Report "Orthopedic Criteria" with basic information of the human foot, last construction, last grading and fitting requirements (see annex II).

12. SEMINAR IN CAIRO
(para 12, annex E of agreement)

12.1 Aim of seminar

The aim of the seminar was to inform the participants about:

- the activities of the project
- the quality standards required for high grade shoes
- new and future technology in modern shoemaking
- the progress made during the project period with recommendations

12.2 Programme (see annex III)

The seminar took place at the Sheraton Heliopolis Hotel in Cairo from 12th June to 14th June 1989

On Monday 12th June and Tuesday 13th June, various lectures were held by Bally experts with discussion after each subject.

On 14th June the participants had the possibility to visit the Abbouda Shoe Co., in 10th of Ramadan City. The groups met again at the Sheraton Heliopolis Hotel for a final discussion and conclusion of the seminar.

On 15th and 16th June the three Bally delegates and Mr. O. Birkhaug, UNIDO, visited the following shoe factories:

- Ramadan Shoe Co.
- 2M Co., for shoes and leather products
- Zalat Co., for shoes

This visit took place on request of the other selected Egyptian shoe factories.

A visit to 28 shoe factory was not possible because it was closed.

12.3 Lectures

A summary of the various lectures can be found in annex IV.

In order to make the content of the lectures easier to understand for the participants, several OHP foils and slides were used. Additionally the following video films, which we prepared specially for the seminar, were shown:

- rink systems
- computer stitching
- two machine lasting
- automatic roughing
- audio visual training programmes about stitching and machine folding
- testing machinery for leather and non leather materials

For some of the lectures samples and materials were on display:

- laser and water jet cutting
- sample skins showing grain and colour variation within 1 batch (leather sorting)
- sample uppers showing correct application of various finishing products
- examples of sewing sheets and training materials from the audio-visual training programmes

12.4 Conclusion of seminar

Participants

The opening of the seminar and the first day was well attended.

The attendance on the second day was, with 15 to 20 persons, not satisfactory. We are of the opinion that quite a few participants did not have enough knowledge of the English language and could not follow the lectures. As a conclusion we suggest to introduce for future similar seminars a simultaneous translation.

35 persons visited the Abbouda Shoe Co.

Final discussion and propositions

The audience took advantage of the final discussion and expressed their views and demands for an upgrading of the Egyptian shoe industry. The focal points of the discussion were the following:

- In spite of certain improvements on the upper leather sector there is still a lack of high grade raw materials and components. The tanning industry urgently needs an upgrading. Some materials such as reinforcings (tapes and interlinings), heels, insole boards, lasts, etc., are practically not available on the local market or only in rather poor quality. On the other hand imports increase the prices and finally the price of the shoes would not be competitive. In our opinion a closer contact between tanneries and shoe manufacturers is essential, and an integrated development programme for the entire sector is needed.

- With regard to a general upgrading of the Egyptian shoe industry, the question of quality control and quality securing was also discussed. The audience brought up the request, to establish through UNIDO/BALLY, two quality control laboratories; one in Cairo and one in Alexandria, for the leather and footwear sector. The laboratories should be equipped with physical/chemical testing facilities. Special attention should also be paid to the training of staff. After the implementation phase the laboratories should be self-financing.

- There was also a big demand for a footwear training centre in Cairo. Mr. J. Berg, UNIDO, informed of the activities of the Federal Republic of Germany to establish such a training centre. In order to avoid overlapping, Mr. Berg is prepared to co-ordinate the activities of all partners interested in this project.

12.5 Visit to other shoe factories

After the seminar we spent 2 days visiting the following factories:

Ramadan Shoe Co
2M Co., for shoes and leather products
Zalat Co., for shoes

2M Co. was on a very good quality level. The quality in the other two factories was very low. The visits were much appreciated by the owners as we could give them many on-the-spot tips for improving the quality.

These visits have also proved that the selection of Abbouda Shoe. Co. as the counterpart factory was correct.

13. STUDY TOUR VISIT OF REPRESENTATIVES FROM SELECTED EGYPTIAN SHOE FACTORIES TO BALLY'S SHOE FACTORIES LTD, SWITZERLAND (para 13, annex E of agreement)

13.1 Participants

The following factories participated:

2M CO.	Amin M. Mahmoud, Chairman Sherine A Mahmoud, Manager Atef El Zorkany, Plant Manager
EGYPTIAN ITALIEN CO	Samir K. Ramadan, Man. Director
ZALAT CO	Ismail Zalat, Partner Manager
28 SHOE FACTORY	Machmoud Daoud El Masri, Chairman
ABBOUDA SHOE CO.	Medhat Abbouda, Gen. Manager

13.2 Visit and programme

The visit took place from 28th February to 4th March, 1989. (see also Interim Report, point 9).

Crucial points of the programme were:

- Modern manufacturing methods and new technologies

  We arranged visits to our men's and ladies' factories, the last and heel factory and the premanufacturing plant for soles.

- Training methods efficiency

  The "Audio-Visual Training Method" was presented and discussed with the visitors. Training of operators and their efficiency was also studied during the factory visits.

- Quality, quality control

  During the factory visits special attention was paid to quality and quality control. With the visit to the material testing laboratories we underlined the importance of quality securing.

- Workflow, production planning

In a short seminar we made the participants familiar with our planning system and handed over a documentation to them.

13.3 Conclusion from the visit

The visitors were enthusiastic about the visit but considered it as too short. They expressed their wish that Bally experts should also visit their factories in Cairo during the seminar, and asked whether part of their staff could be trained over a longer period at Bally's Shoe Factories.

14. FINAL CONCLUSION OF PROJECT

14.1 Aim of the project

The aim of the contract was to upgrade the technical performance and product range of selected Egyptian private sector shoe factories, by providing one factory, Abbouda Shoe Co., 10th of Ramadan City, with a complete technical assistance package and by providing four others with limited services.

We believe that the objectives of the project have been achieved and that we have fulfilled our assignment.

14.2 Layout, machinery, equipment

The plant of the Abbouda Shoe Co. presents well. The layout is suitable and the machines and equipment are adequate for quality and export worthy shoes. Some additional machines and tools, which are required, have been ordered or are already installed. We have also drawn attention to the importance of regular cleaning and maintenance of all installations.

14.3 Materials

As has already been stated several times, some raw materials are still a weak point in this upgrading programme. Further activities are necessary, especially on the upper leather and component side (see also point 12.4 Conclusions of seminar).

We assisted Abbouda Shoe Co. in finding suitable materials. The "Test Report" of locally available materials has clearly shown which materials are of the quality required and where improvements are necessary. The request from the seminar audience to establish 2 quality control laboratories in Egypt would definitely be of great value.

However with the application of the correct shoe technology such as cutting-methods, reinforcings and especially finishes, we achieved very satisfactory results. The shoes manufactured during the implementation phase at Bally's in Switzerland and in Abbouda Shoe Co, present well and are of a very good standard. Reactions from various customers also confirm this.

14.4 Shoe technology

We supplied Abbouda Shoe Co with extensive documents about shoe technical basic knowledge and Bally specific "knowhow". For the six styles selected we gave detailed instructions of the manufacturing process (samples, flowcharts, technical reports etc.) and exercised these techniques in the factory. It is obvious that not all these points could be realised in a rather short time, but we can state with pleasure that considerable progress has been achieved. The technical reports serve as guidelines and checklists for further activities.

14.5 Quality

Abbouda Shoe Co. has achieved a remarkable quality standard and can be considered as the best in the men's shoe sector on the Egyptian market. From our part special attention has been paid to increase the awareness of quality.

We also started to introduce a quality control system. The Technical Manual "Quality Control" contains advice for the various examination points and corresponding checklists. The training of the inspectors still needs more attention.

14.6 Training of technical staff at Bally's Shoe Factories

The trainees showed great interest and were very eager to learn new things. Thanks to the great help of Mr. Medhat Abbouda we could overcome language problems and achieve optimum results.

However we have to point out that one week training was not enough to close the lack of "knowhow" and experience. For further similar projects we suggest to extend the training period to three or four weeks.

14.7 Performance

Generally the performance level in the Egyptian shoe industry is rather low. We supplied Abbouda Shoe Co. with standard time minutes, based on 100% performance for practically all operations. Incentive systems were discussed in Switzerland and during the Seminar in Cairo. With this information it was possible to introduce a similar system in the closing room. So far the results achieved are very positive.

14.8 Follow up

It is obvious that not all the "knowhow" and information could have been realised in this short period of six months. In the first instance all the major points and problems were attacked and the results are very promising. The follow up of the upgrading will be facilated by all the technical documents which we handed over during our activity. All these documents would actually be part of this Final Report. We considered it as more efficient to deliver them during the various phases.

It will be of great help for Abbouda Shoe Co. and the product, that Mr. Odd Birkhaug can spend another six weeks in the factory and supervise the follow up.

14.9 Effect for the other selected shoe factories

It is very difficult to judge the positive effect of this project on the other selected shoe factories, which have not directly participated. We tried to give them as much information as possible during the visit to Bally's Shoe Factories, the seminar and also whilst visiting their factories. The result depends on the activity of the management of these companies. We are convinced that with the successful upgrading of the Abbouda Shoe Co., a solid base has been established for export worthy shoe manufacturing in Egypt. A healthy competition has always been a good basis for further efforts.

14.10 Final remarks

We are of the opinion that this project has been successfully concluded, partly due to the good cooperation from the representatives of UNIDO, Messrs. J. Berg and O. Birkhaug, and from our direct partner Abbouda Shoe Co., all of whom we would like to thank most sincerely.

Schönenwerd, June 30, 1989

BALLY INTERNATIONAL LTD

Licensing Division

W. Bürgin P. Regli

PROJECT: UNIDO - EGYPT US/EGY/88/044

English June 1989

UNIDO PROJECT NO. US/EGY/88/044

Activity Code: J 13104

RETAIL SYSTEM

UPGRADING OF TECHNICAL CAPABILITIES

OF SELECTED SHOE FACTORIES

IN THE ARAB REPUBLIC OF EGYPT

ACCORDING TO THE AGREEMENT, ANNEX E, PARA 10

BALLY INTERNATIONAL Ltd.

UNIDO PROJECT NO. US/EGY/88/044

para 10 RETAIL SYSTEM

10.1 Modern criteria for ordering, selling shoes and accessories of fashion quality merchandise

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10.1.2	Future trends for the leather and shoe industry	1
10.1.3	Consequences (Rolling buy) for the shoe industry	2
10.1.4	Guidelines for buying merchandise	3
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10.2 Criteria used for selling quality shoes and accessories

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10.1 Modern criteria for ordering, selling shoes and accessories of fashion quality merchandise

10.1.1 Introduction

Buying of fashion merchandise, such as shoes, accessories, dresses etc. has become due to consumers demand and the ever changing fashion picture more and more difficult.

An up to date knowledge of the fashion scenery and upcoming trends is essential to offer the consumers the merchandise they desire and to convince them to enter into a Retail store.

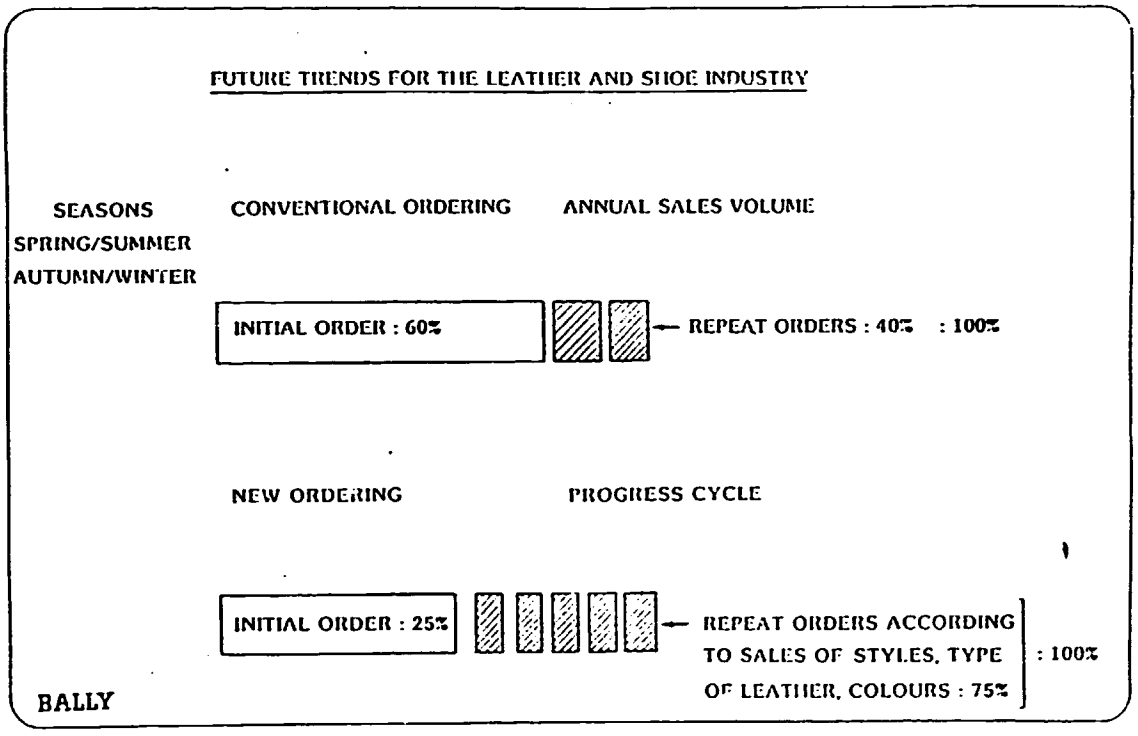
As a result, the timing of buying must be as closed as possible to the sale on the floor and should be done in several intervals. This sounds very easy but in practice it is a big challenge and has consequences for the shoe industry.

10.1.2 Future trends for the leather and shoe industry

In the old days, shoe manufacturers presented to Shoe Retailers two collections (spring/summer, autumn/winter) and the buyers placed an initial order of 60 to 70 %, leaving the balance for repeat orders.

Due to the changed buying habits of the consumers, the shoe retailers are no longer prepared to place large initial orders and carrying the risk of slow or not moving merchandise.

Consequently, the **ROLLING BUY** has been widely introduced to Retailers. The **ROLLING BUY** is nothing else than splitting up the total **OPEN TO BUY** into several buys. Instead of placing large initial orders, the merchandise is bought according to the sales performance and as closed as possible to appearing trends. The **ROLLING BUY** has the advantage of being flexible and less risky. The stock turn is much faster and less capital is tied up (interest rates).



10.1.3 Consequences for the Shoe and tanning industry

The **ROLLING BUY** effects both sides, the manufacturers as well as the Retailers.

Tanning

- Faster finishing processes to meet demand of shoe industry
- Higher stocks of raw materials
- Demand for advanced tanning technology
- Computerized colour codes
- Knowledge of latest leather trends

Shoe factory

- General demand for greater flexibility
- Development of a basic collection plus realizing of upcoming trends
- Less time to order raw materials, shoe components etc.
- Great dependency on material suppliers, esp. tanners, but also ornaments
- Shorter "work in progress" time
- Simple but effective administrative organization

Retailer

- Thorough information on fashion scenery
- Flexible and reliable suppliers
- Accurate daily information of in-stock situation
- Recognizing of possible bestsellers
- Efficient repeat order system
- Inter-change of merchandise (Retail chains)
- Good customer information system

10.1.4 Guidelines to buy merchandise

A Retailer must know his customers and their demands. Before leaving for a buying trip the following **INFORMATION** should be available:

- Fashion trends, style colours etc.
- Latest developments
- Sales performance of preceding season
- Accurate figures about own seasonal stock situation.

A very important fact is the **location of the store.** Questions which arise in this connection are:

- business area
- visited by tourists
- percentage of local customers
- traffic-price ranges

The **style selection** is for every Retailer the key for success. It needs a thorough knowledge of the product, its manufacturing methods and standards of materials used.

During **STYLE SELECTION**, attention should be given to the following:

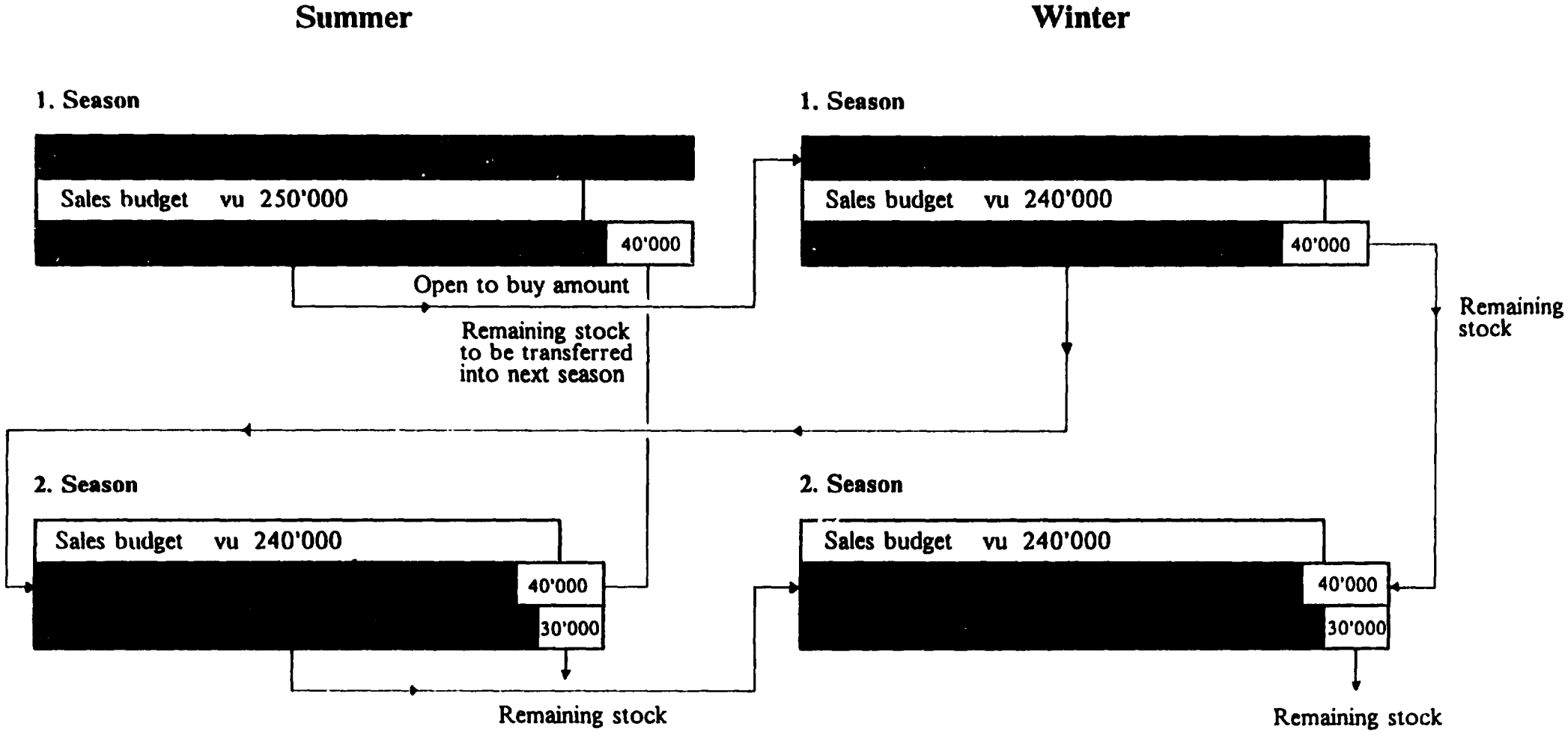
- own taste does not always coincide with consumers demand
- selection must be made in categories (classic, casual sport etc.)
- a group of shoes (3 - 4) have a better impact than items
- if possible, a selection should be discussed with partner or associate
- if time is permitting, one or two weeks should elapse between selection and final order
- size-run and widths depend very much on the market. In general there is a tendency to wider and broader fits.

10.1.5 Open to buy

It is of utmost importance, that the "Open to buy" (OTB) mechanism is handled correctly. The base to work out the OTB is the capital available and the sales budget.

OPEN TO BUY - MECHANISM

Available capital Value units (VU) 300'000 per year



etc.
It's important that total purchases and stock do not exceed the available capital.

The **OTB-amount** is the capital available to purchase the merchandise for a Retail store. It should be split up into the most important merchandise categories which a store is offering.

Shoes	Accessories	Ready to wear
Men's	Handbags	Dresses
Ladies'	Small leather goods	Suits
Children	Attache cases	Shirts
	etc.	Trousers
		etc.

10.1.6 Stock-turn

The objective of the stock-turn is, to tell the Retailers how fast and how often the stock of a store is turned in a year. Any stock ties up capital and has to be financed. Interest rates of course are a dominant factor.

Example

Stock **VU 300'000**

Sales **VU 600'000**

Stock-turn 2.0

Stock **VU 300'000**

Sales **VU 400'000**

Stock-turn 1.33

A healthy stock turn is anything between 1.7 to 2.0.

10.2 Criteria used for selling quality shoes and accessories

10.2.1 Window display

It is very important that any display of merchandise is done in a distinguished and sophisticated way. It represents the stores image and customers will make their judgements.

The window display should be representative of all the merchandise which is available inside the store. An attractive window is the key for success.

The windows should not be overloaded with merchandise but invite the consumers to enter into the store. The decision whether a consumer is entering into the store depends very much on the merchandise presentation. The display must be changed as often as possible at least every fortnight.

It is already sufficient if the merchandise is arranged differenty so that consumers get the impression of seeing a new display.

The total lay-out of a window including the artwork should be changed twice during a selling season. Prices must be marked clearly and correct.

It is a confirmed fact that a shop window is the best and most economical advertising.

10.2.2 Interior display

The interior display must be arranged in such a way that the consumer can make a **PRE-SELECTION.** It should be a follow up of what is displayed in the window. In other words, colour stories, merchandise groups displayed in the window must be repeated inside the store.

This means also, that any goods should be displayed in categories:

- Men's shoes (classical casual sport)
- Ladies shoes " " "
- Packages of co-ordinated fashion handbags
- Accessories
- Shoe care products

Contradictory to the window display, the interior presentations should contain all the articles which a store carries in stock. A customer who enters into a store is prepared to buy, provided the merchandise is available.

10.2.3 Advertising

The objective of advertising is to support the product and increase sales, turnover and profit.

The effectiveness of an advertising campaign cannot be measured but it is an essential tool to introduce the product to the consumer.

An advertising program can consist of the following:

- Image adv.
- Product adv.
- Posters
- Fashion adv.
- Brochures
- TV-spots
- Fashion presentations
- Editorials
- press information
- store activities
- give aways

Before launching a campaign, the following must be considered:

Budget — How much capital is available? It can be a percentage of the turnover or a lumbsum.

Target group — With whom do we want to communicate?
- Low-medium-high income
- Business man or worker
- Local population or tourist

Message — What kind of a message should be given to the consumers
- Image
- Live-style
- Technical expertise

The message should be conducted in such a way that it stimulates and desires. The quality of a campaign is more important than quantity.

Media-selection — The selection of the medias depends very often on the advertising budget. The decision made on the target groups must be considered.

Media-plan — After the medias have been selected a media plan must be established which is important for both the manufacturer as well as the retailer. (see Bally's media plan 1989, annex I). It is of utmost importance that the products are in store before an ad appears in a media. Advertised products should be displayed in the windows.

The advertising schedule must always be coordinated with the displays in the windows.

10.2.4 Customer information

Each store has his regular and permanent customers. Addresses of such clientels should be recorded and assembled in a customer file. The requested information can be obtained from credit-cards, invoices, telephone books etc.

Customers should be informed about:

- New collection, together with trends
- New arrivals within a season
- Seasonal sales
- Special offers

10.2.5 Fashion information for sales personnel

The sales personnel must be informed and instructed about forthcoming fashion trends. Very often a seasonal fashion scenery is grouped into themes and the shoes and accessories are bought accordingly.

For example	City look
(see Bally's fashion info. Annex II)	Hunting etc.

A consumer, especially for high priced products, wants to get the advice of a consult. The subscription of a fashion magazine can help a great deal to keep the sales personnel up to date.

Bally-Mode
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SECTION 1

Country Club

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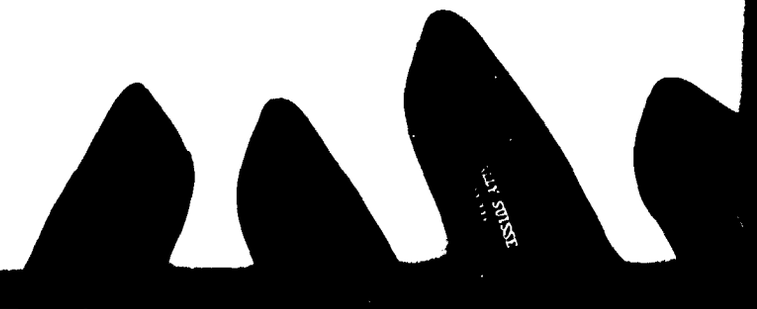
SECTION .2

Down Town



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SECTION 3

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SECTION 4

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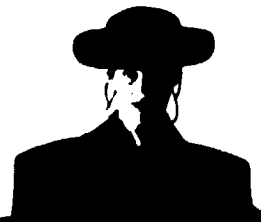

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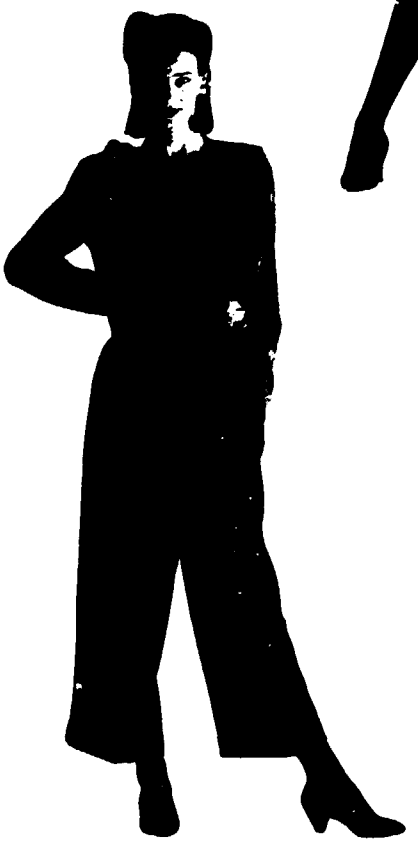
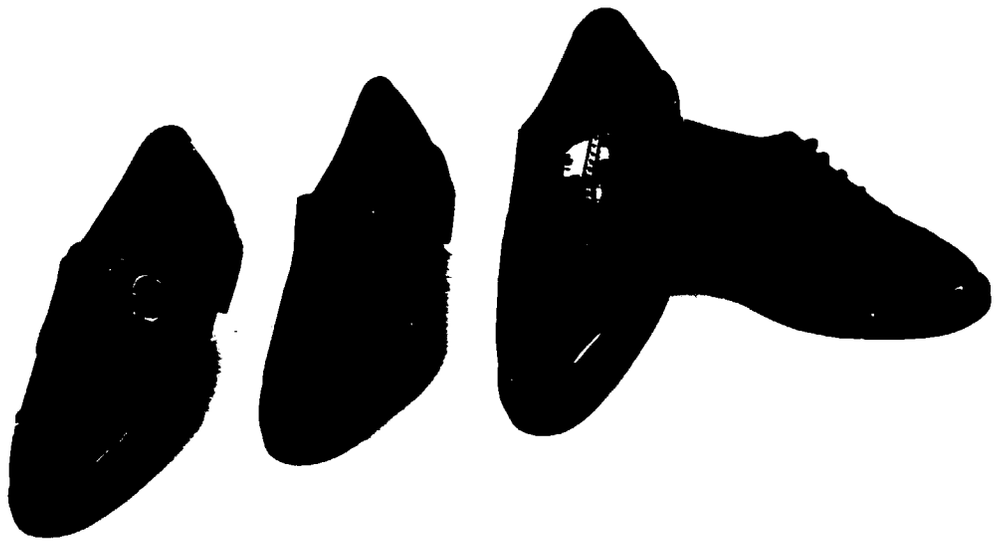


Down Town



SECTION 8

cognacbraun/brun cognac

Country Club

SECTION 9

Kleinkinder
petits enfants

SECTION 10

Schüler
écoliers

Modefarben Damen
Couleurs mode dames

cognacbraun/brun cognac

Kleinkinder
petits enfants

SECTION 11

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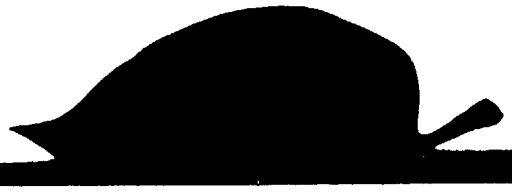
cognacbraun/brun cognac



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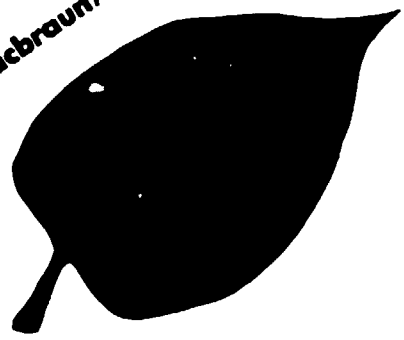

Modefarben Herren
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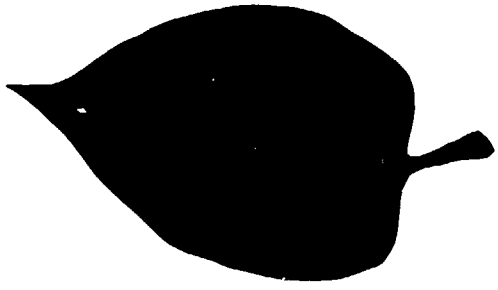

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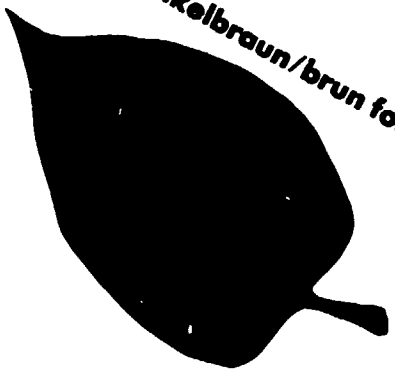
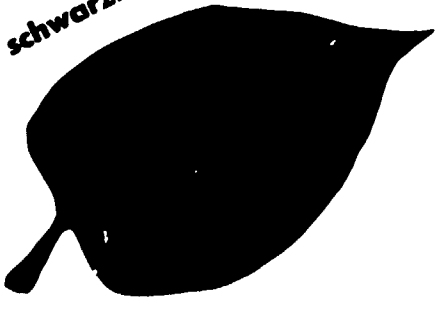


SECTION 12

schwarz/noir



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SECTION 13

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Couleurs mode dames

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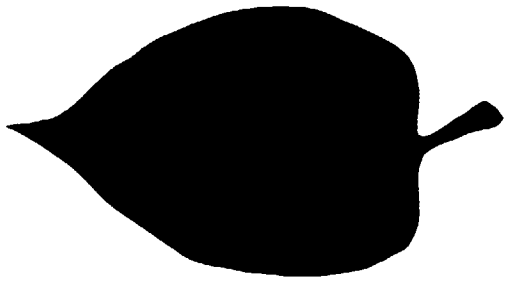

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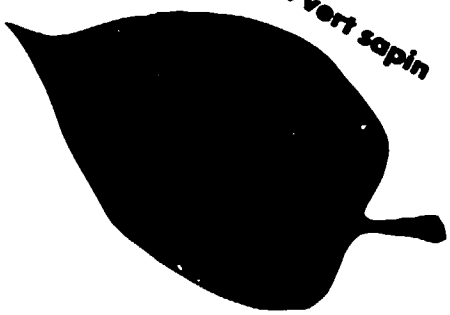

SECTION 14

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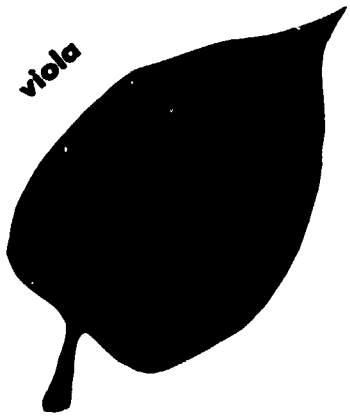

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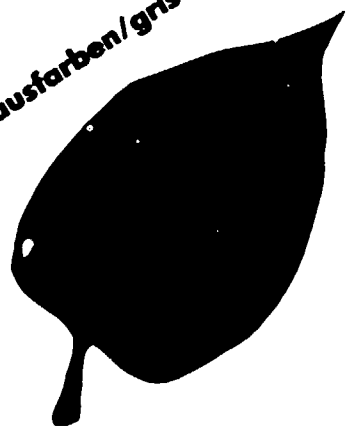

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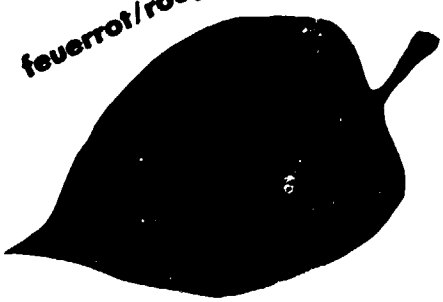

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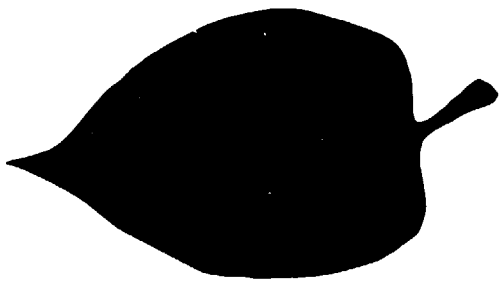

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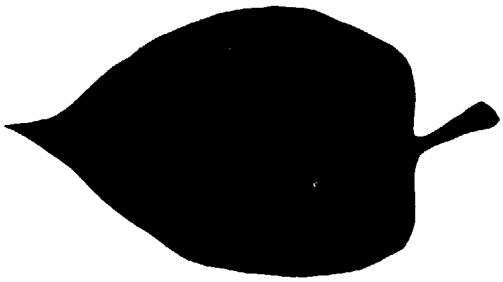

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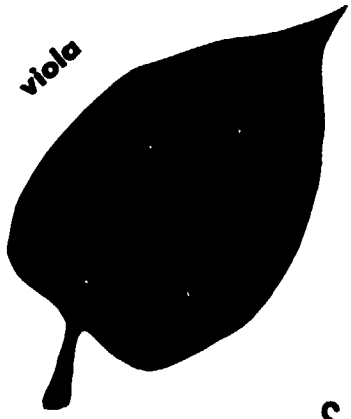

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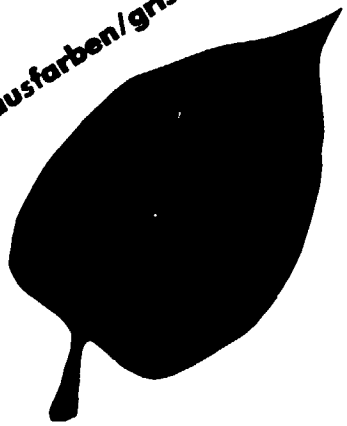

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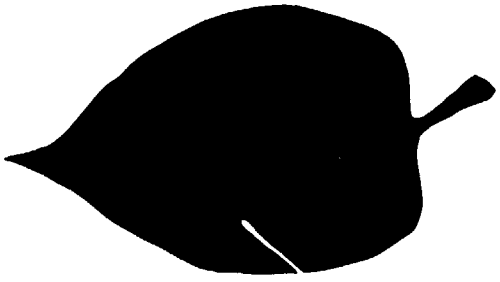
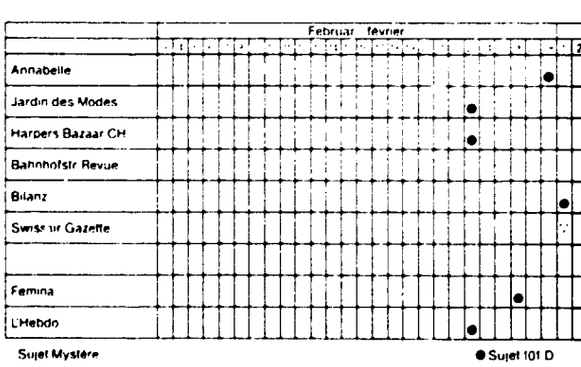


Die Bally Werbu
La publicité Bally

Basis-Inseratekampagne (Internationale Kollektion). Campagne d'annonces de base (collection internationale).

SECTION 1

Erscheinungsplan Basis-Inserate. Plan de parution des annonces d



Promotions-Inserate. Annonces de promotion.

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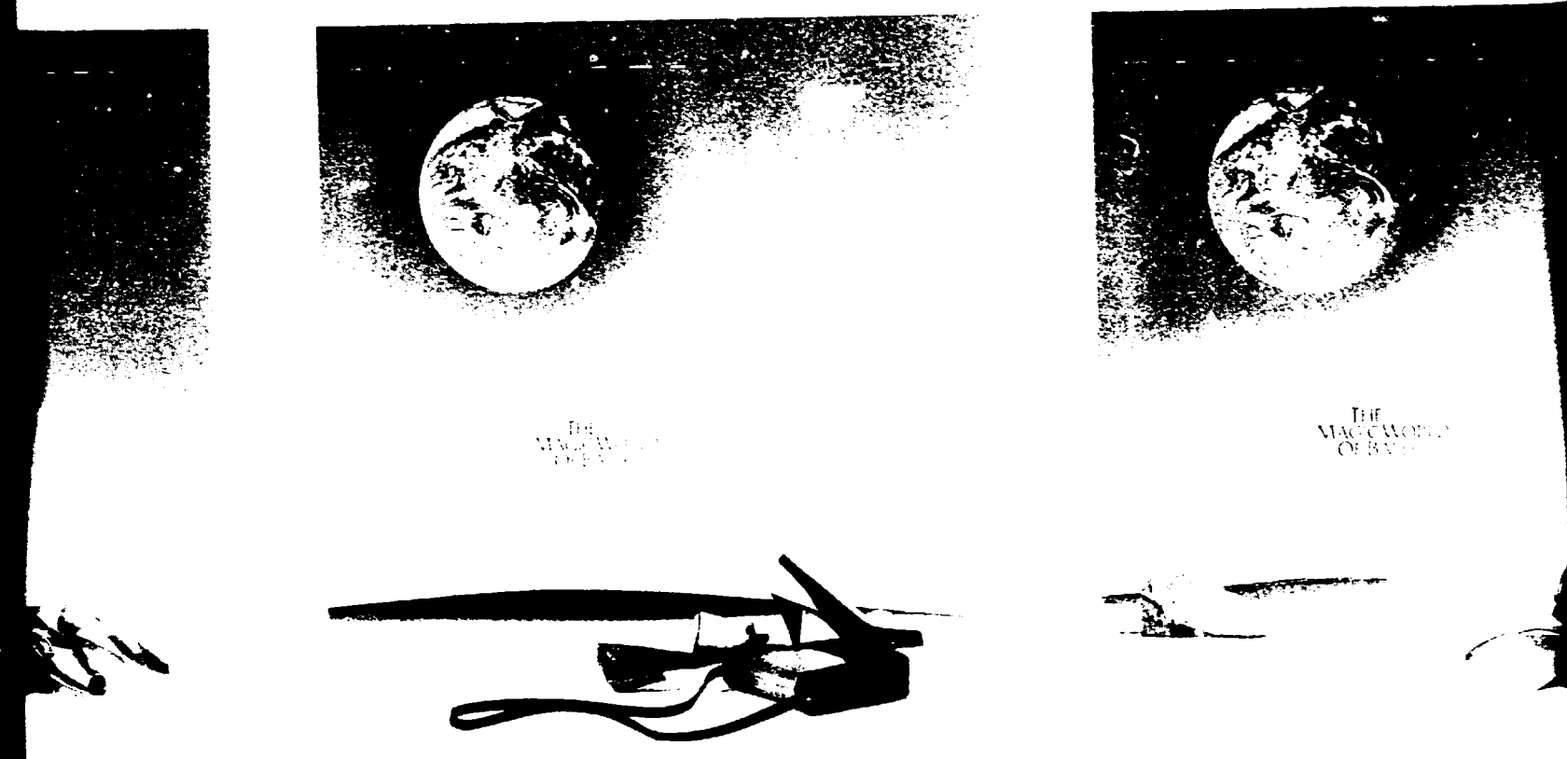

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SECTION 3

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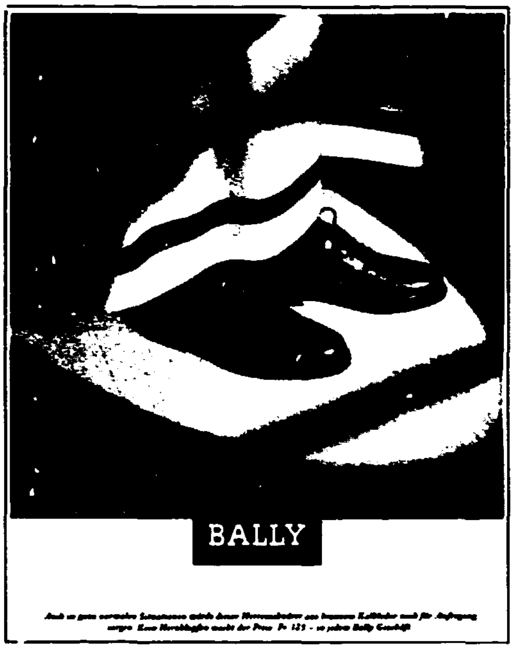
Promotions-Inserate. Annonces de promotion.



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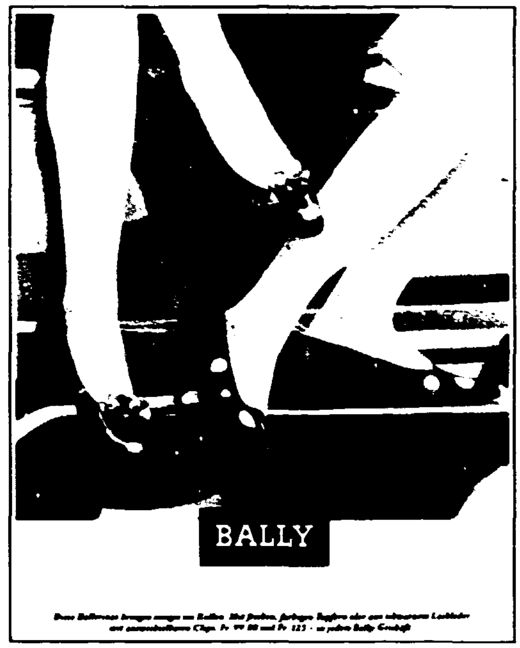

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SECTION 4

Erscheinungsplan Promotions-Inserate. Plan de parution des annonces de promotion.

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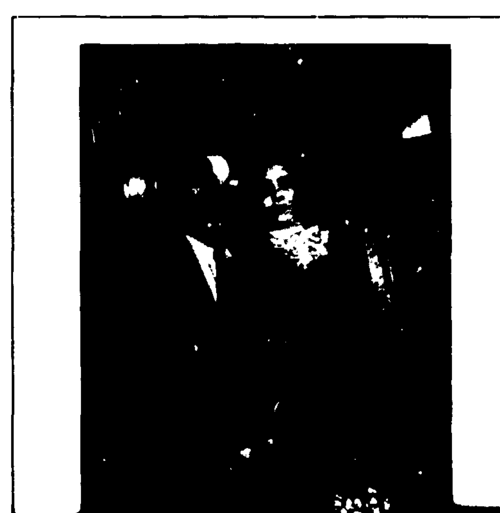
Plakat Internationale Kollektion. Affiche collection internationale.

Modeinserate. Annonces de mode.



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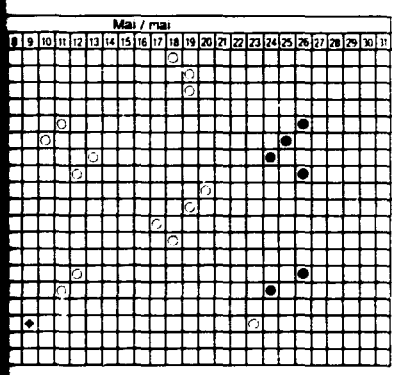

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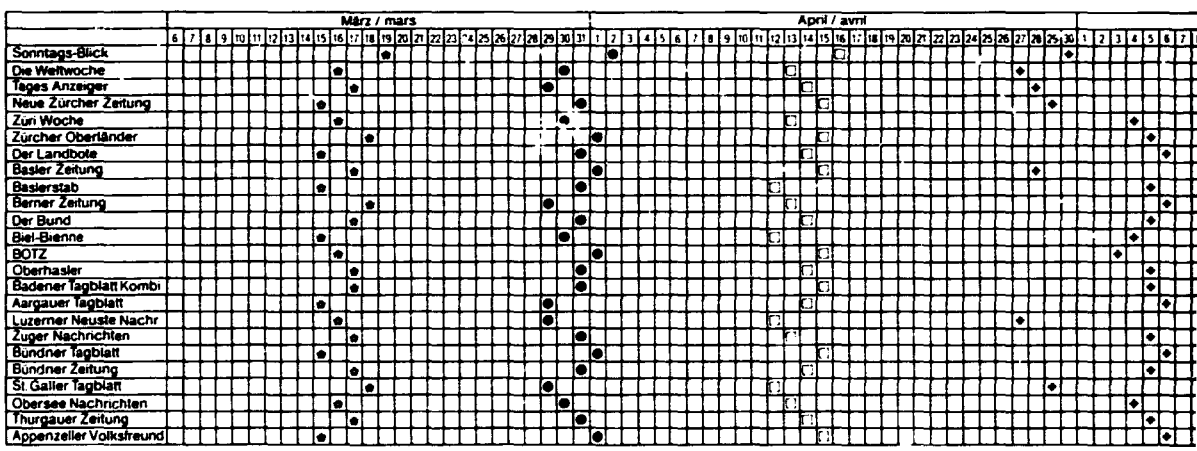

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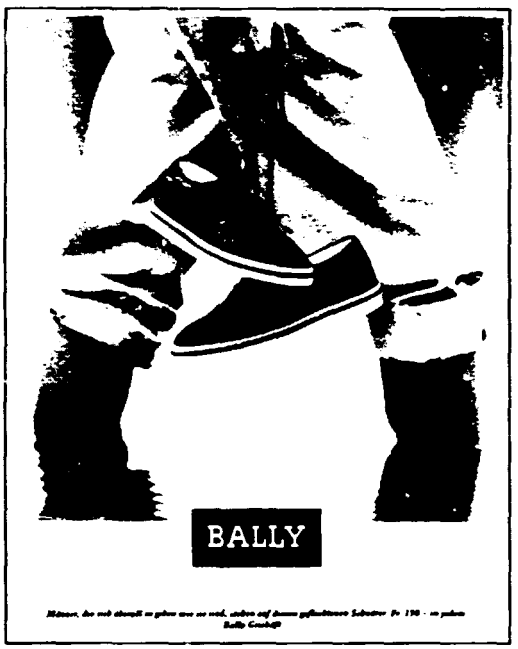
Gelegenheits-Inserat. Annonce occasionnelle. Saisoner



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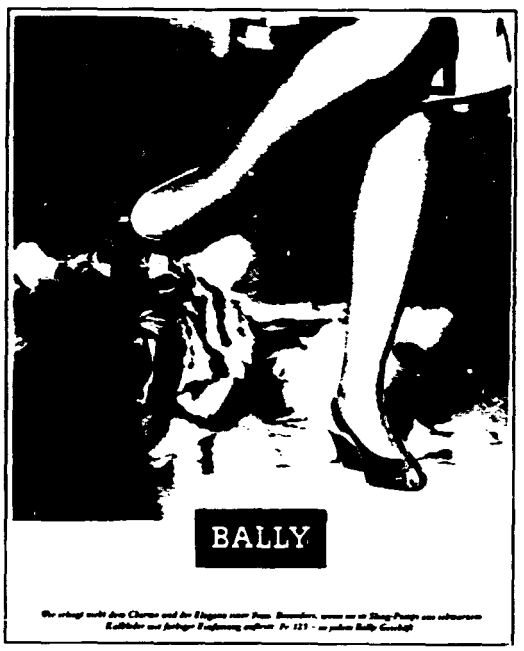

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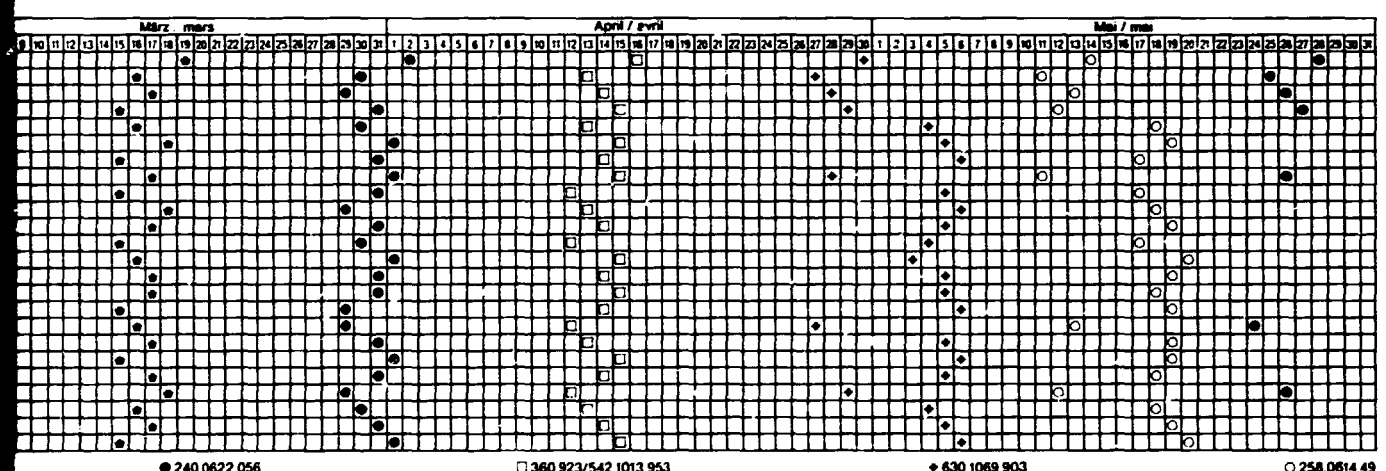

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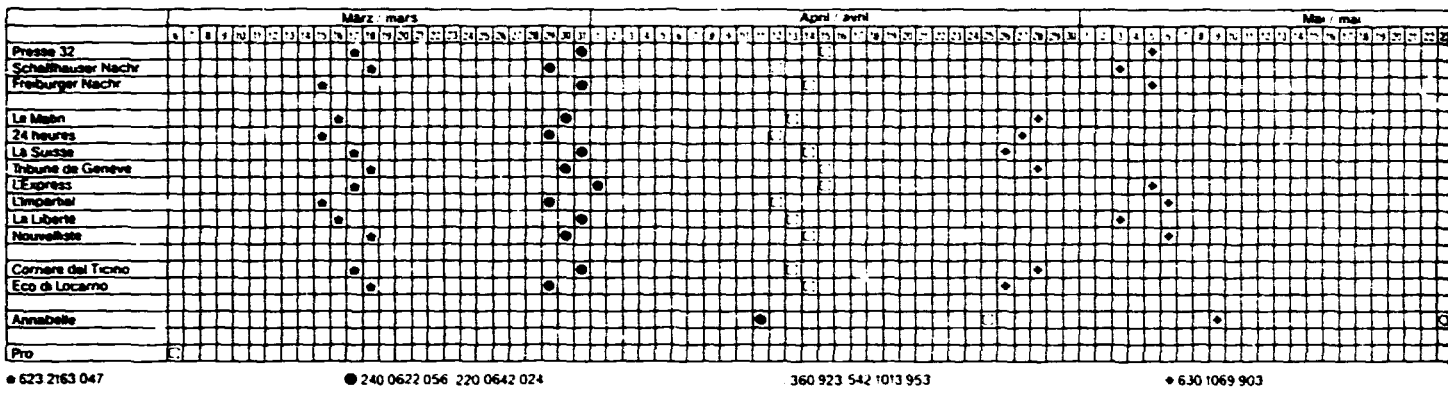
Saisoneröffnungskarte. Carte de début de saison.

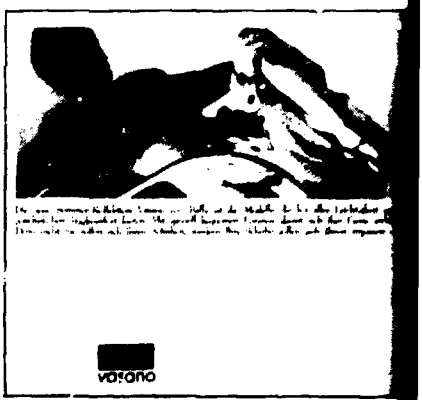
Erscheinungsplan Promotions-Inserate. Plan de parution des annonces de promotion.



Plakat Internationale Kollektion. Affiche collection internationale.

Modeinserate. Annonces de mode.

Vasano-Prospekt. Prospectus Vasano.



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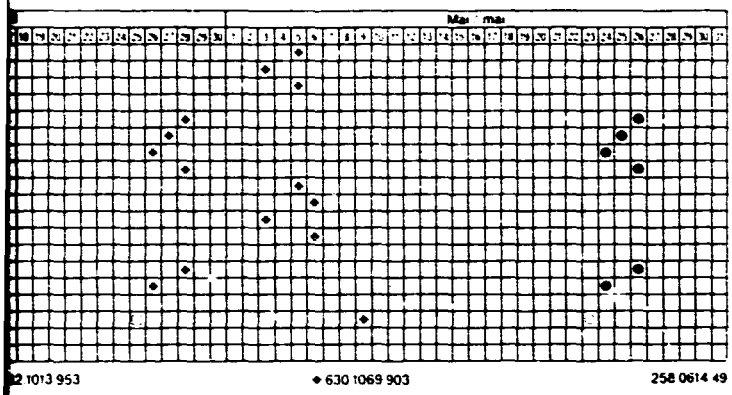

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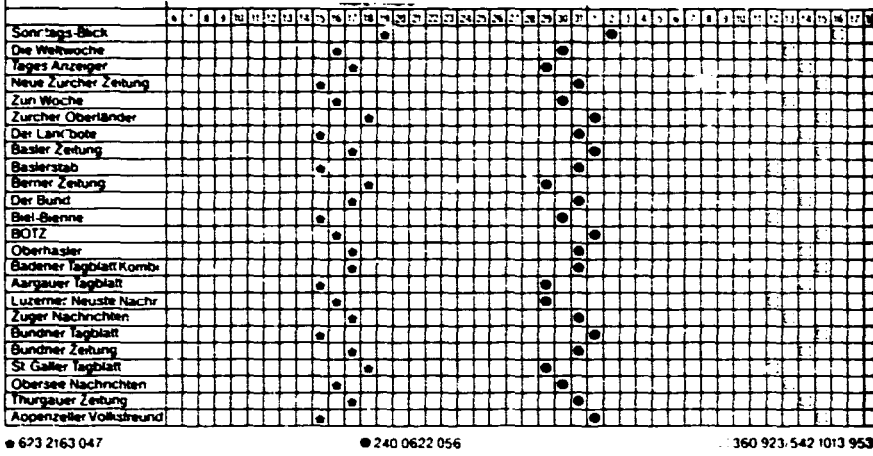

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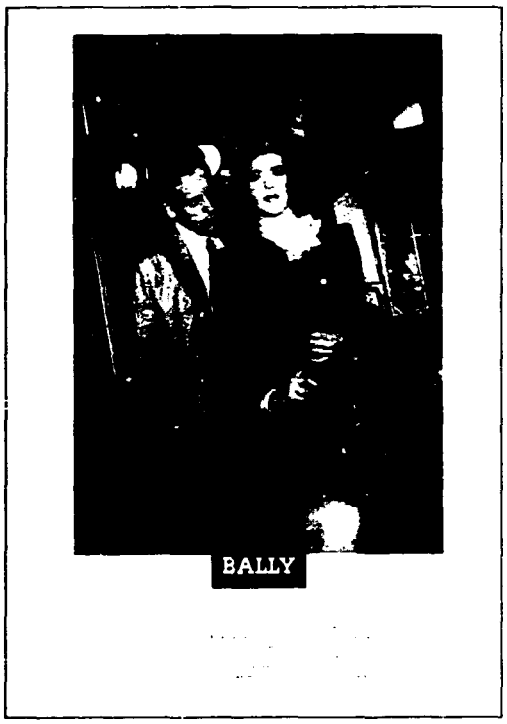

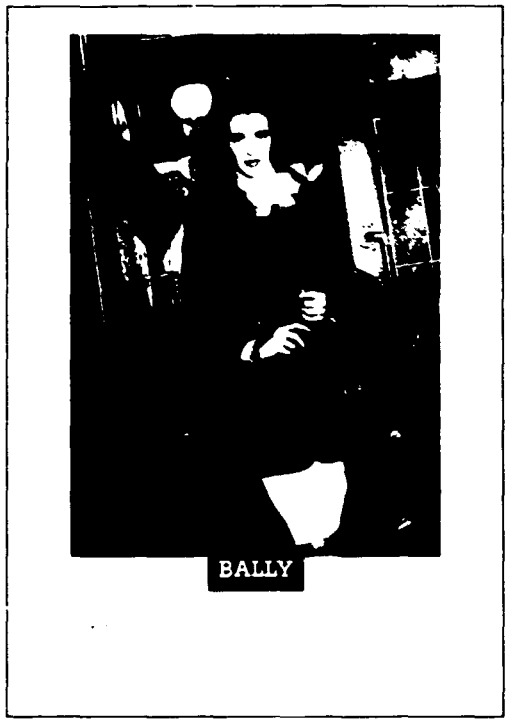

Gelegenheits-Inserat. Annonce occasionnelle.

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Vasano-Prospekt. Prospectus Vasano.

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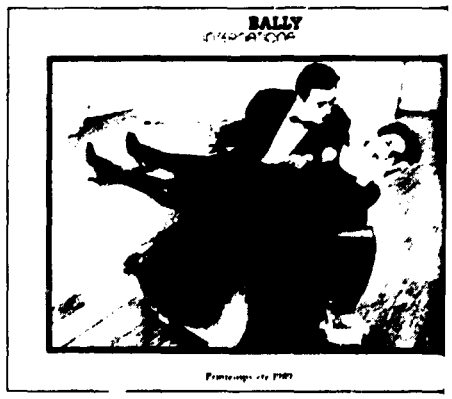
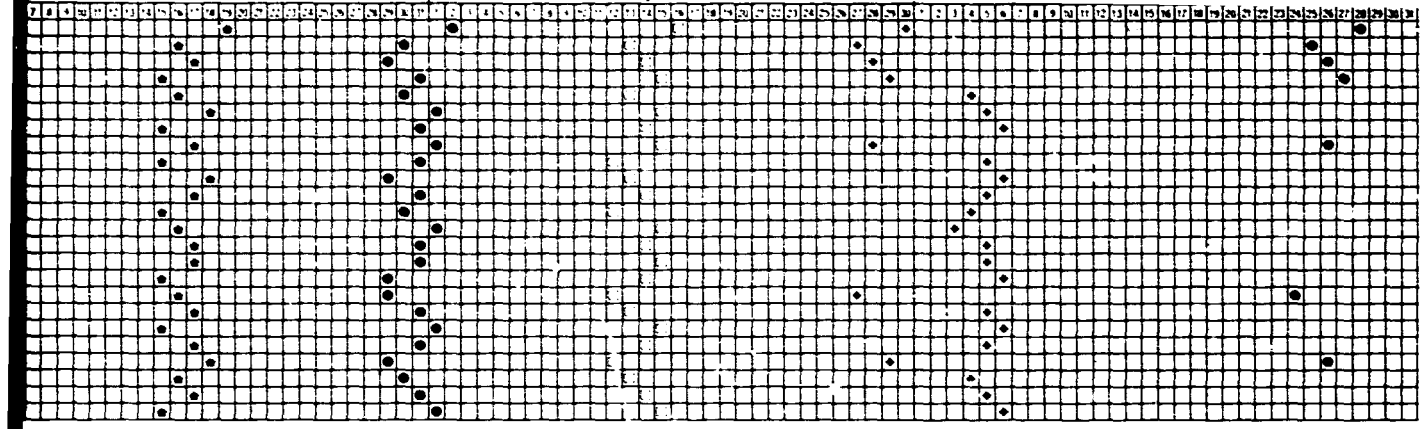
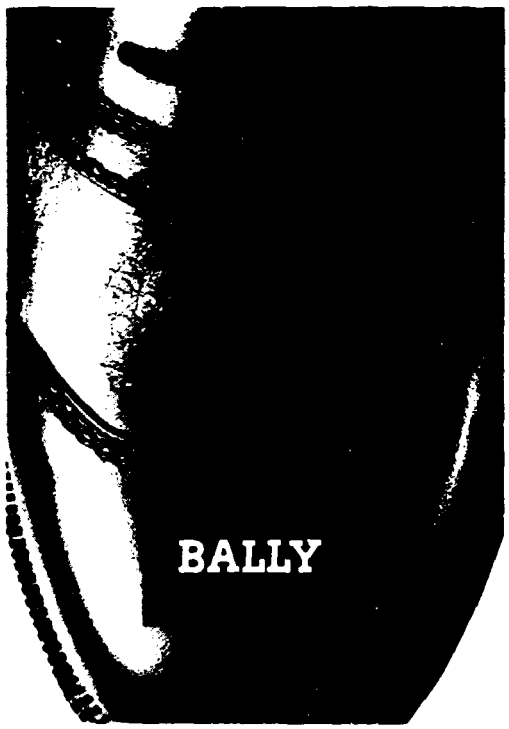




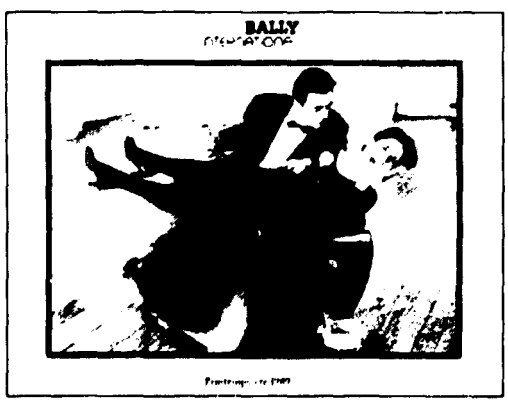
Gelegenheits-Inserat. Annonce occasionnelle.



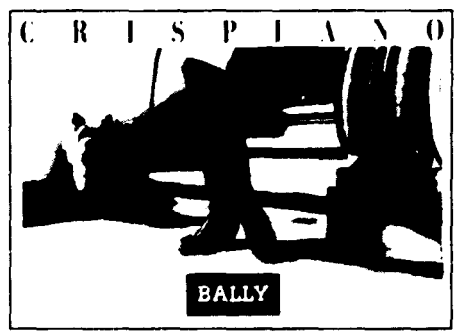
Saisoneröffnungskarte. Carte de début de saison.

SECTION 9

Prospekt Internationale Kollektion. Prospectus collection internationale.



Crispiano-Karte. Carte Crispiano.



English May 1989

UNIDO PROJECT NO. US/EGY/88/044

Activity Code: J 13104

ORTHOPEDIC CRITERIA

UPGRADING OF TECHNICAL CAPABILITIES

OF SELECTED SHOE FACTORIES

IN THE ARAB REPUBLIC OF EGYPT

ACCORDING TO THE AGREEMENT, ANNEX E, PARA 11

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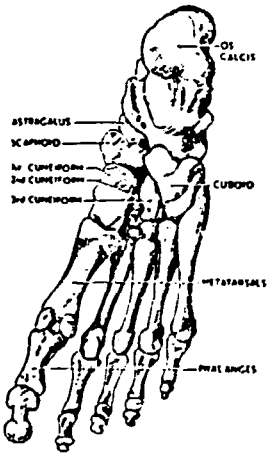
ANNEX

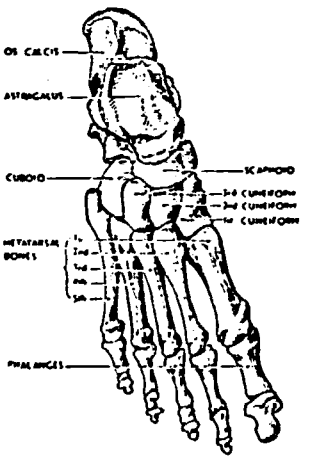
INTRODUCTION TO ORTHOPEDIC CRITERIA

1. GENERAL REMARKS

A last is not a true copy of the foot. In order to work out the standards for lasts, a method is to be used to convert foot measurements to last measurements.

The relationship between foot, last and footwear depends on the type and style of footwear, material and method of construction. The human foot itself is an amazing construction, composed of 26 bones which are connected with muscles in such a wonderful way, to give the foot enough flexibility and strength to carry out all the complicated movements which enable us to walk, run and jump.





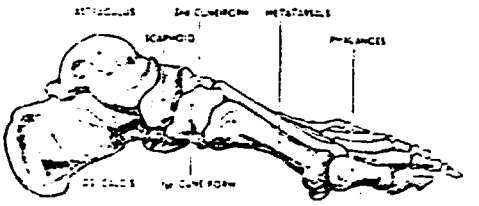
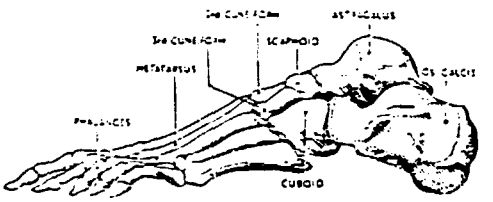


Fig. 4 The Bones of the Foot Viewed from the Inner Side



In the early days feet were wrapped up in a piece of hide. Later on, wet leather was placed around the foot and, with cut-outs, this type of footwear already looked similar to a shoe.

Today shoes are lasted, that means that the last is the actual base for the shoe. The last is responsible for the correct fit as well as for the comfort of the foot, for the particular shoe constructed over this last.

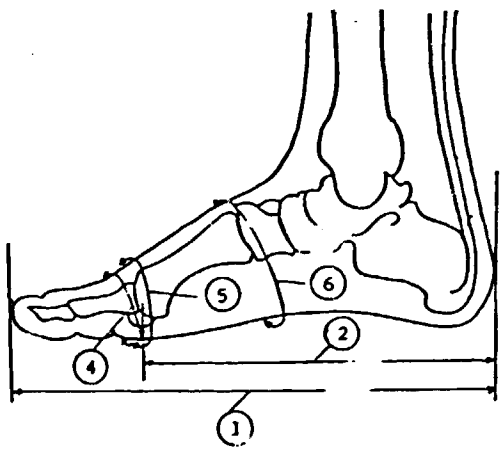
2. FOOT MEASUREMENTS

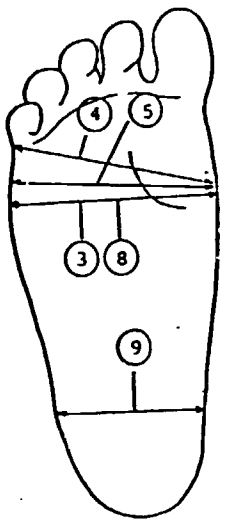
Converting the foot measurements into last measurements is a process which is based very much on the know-how of the last designer. He converts the foot parameters into the last parameters. A basic last which could serve as a standard starting point (as for example the metric system) does not exist.

The basic meter deposited at Paris was produced in a special material and served the whole world as the base for all metric measurements, until a new even more accurate method was found to guarantee this universal base for the metric system.

In order to find out the orthopedic criteria for the construction of a last, which is always the base for the shoe, we have to look into the various parameters of the foot measurements:

2.1 Parameters of foot measurements





a) Length: ① This is the distance from the back of the heel to the tip of the longest toe. This measurement is obtained by using the foot measuring device.

b) Shank length: ② The shank length is the distance from the back of the heel to the joint of the metatarsal and the phalange bones, connecting the toes. This distance is measured with the foot measuring device.

c) Width: ③ This is the distance between the metatarso phalangeal joint of the big toe and the metatarso phalangeal joint of the little toe. The width of the foot is also measured with the foot measuring device. In order to have a realistic measurement, a light pressure should be applied on the foot from the side while taking this measurement. In the Bally foot measuring device this pressure is established with the help of a 200 g calibrated spring. Later on, this distance is important for the comfort of the foot in the shoe.

d) Joint girth: ④ This is the circumference of the foot taken around the metatarso phalangeal joint of the big toe and the metatarso phalangeal joint of the little toe.

e) Instep girth: ⑥ This is the circumference of the foot taken about the tuberosity of the navicular and the tuberosity of the 5th metarsal head.

The joint girth and the instep girth are measured with a millimeter tape measurement. Again here Bally has developed a special device with a calibrated spring, giving a pull of 200 g on the tape while taking these measurements. Also this detail has an influence on the construction of the last and the later comfort of the foot in the shoe.

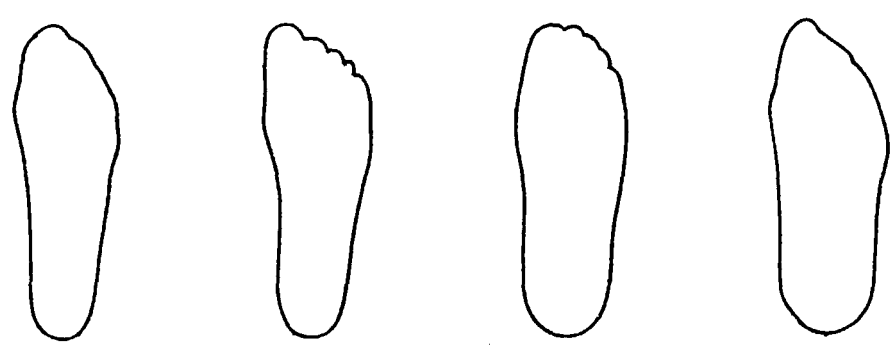
f) Foot impression: ⑧ ⑨ The foot impression delivers us the general impression of the shape of the foot, the measurement of the ball width at front, as well as the heel width.

3. INFLUENCE OF FOOT SHAPES ON LAST MAKING

The sketches below show us a selection of feet, long, short, wide and narrow ones, healthy and distorted feet. A last maker has to deal with all of these variations.

small large short long diseased healthy

The shape of the foot changes with the characteristics of the race, the various countries, and also with the environment. Anglo Saxon feet are mostly narrow and bony, the German feet rather wide in front and sickle-shaped, the Latin group have straight and soft feet and the people of East Europe have wide heel parts.



Anglo-Saxon Germanic Romanic Baltic

All these measurements and facts are only an aid for the last maker. They influence the shape and the width of the last. But, as already stated at the beginning, the last is never a copy of the foot.

4. LAST CONSTRUCTION

When a last is constructed 4 main points must be taken into consideration:

Aestetic properties: Look according to purpose (elegant, young, walking, etc.)

Fitting: The last should be constructed in such a way that a largest possible variety of feet can be accomodated.

Production: The last must be made to suit the production of the particular shoe type that will be produced on it.

Health: It should meet the anatomic requirements.

Each last type can only serve a certain fitting category. Therefore one has to look at each country or customer group separately in order to choose or to construct a suitable last for a particular market.

4.1 Basics for last construction

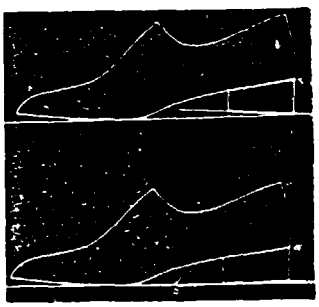
The last maker must think in terms of "VOLUME". A solid block of given weight and volume can have thousands of different shapes simply by a different distribution of the volume.

A comfortably fitting and good looking last has a certain volume, which cannot be changed, it can only be moved to an other place. Let's take for example a balloon. If you push in on one side it will push out on the other side. It changes its shape but the volume stays the same. This explains in very simple terms the difficult work a skilled last-maker must be able to do.

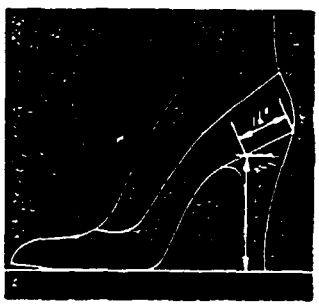
Beside the six basic measurements (see point 4.2) a last requires as many as 20 additional dimensional checks. Here enters the use of templates, gauges and other sensitive instruments that work at a tolerance of 0,04 mm.

The model maker views the last in two parts, ball to toe and backpart, ball to heel. In each of these areas is a group of important measurements. For example, shank curve to assure a hugging fit under the arch; back curve to conform to the counter of the back of the heel; the heel seat length and width so that the heel of the lasts "sits" properly inside the shoe; the heel wedge angle adjusted to each heel height.

The ball and heel tread must sit on proper planes so that the foot and the shoe rest securely on the ground during walking. The toe spring, the raised portion under the toe tip, is a built in allowance to permit the foot and shoe to move easily forward with each step.

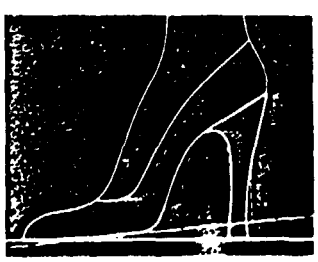


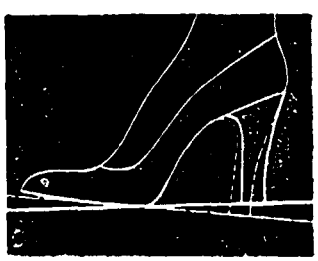
Heel thread, which affects shoe fit and shoe wear, must be on the exact plane called for on the last. The example at the top is wrong, on the bottom is right.



The proper way to measure heel height. The point of measurement is made 1½ inches forward front the back of the heel seat on a woman's model 48 shoe. (Note if the measurement is made through the center or at the back of the heel, this would give a "false" height measurement).

The last must be precisely designed so that the foot and shoe are balanced to receive the body weight falling through the center of the leg and dispersing at heel and ball for proper fit and tread.





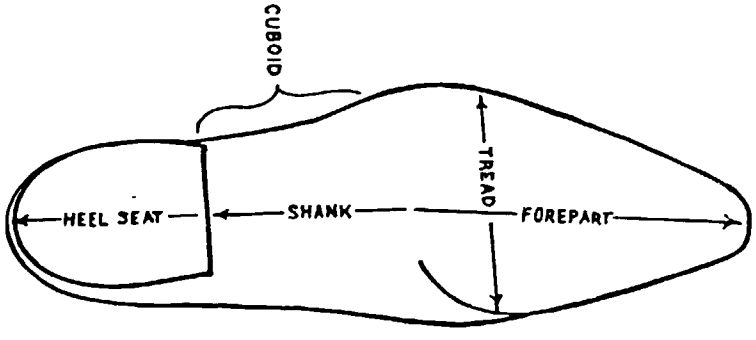
The height and position of the heel must be exactly right for each particular last. When a wrong height heel is applied to a last, the heel and ball tread (plus fit and comfort) of the shoe is seriously affected. Above shows the faulty tread effect on a too-low heel, and below shows the effect with a too-high heel.

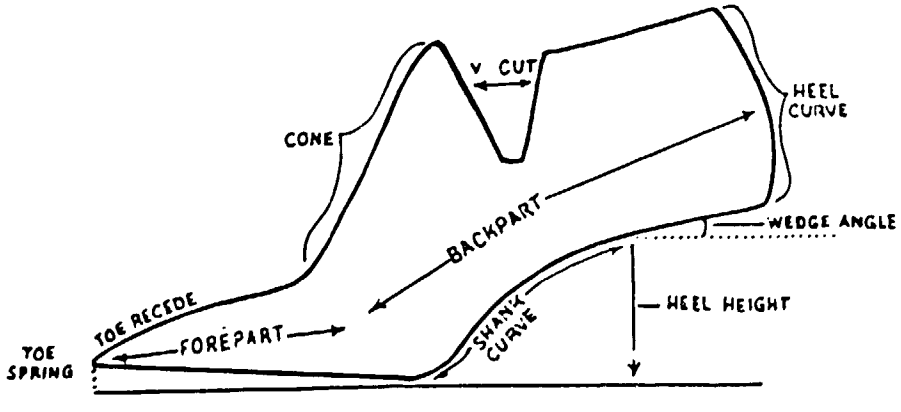
4.2 Last measurements

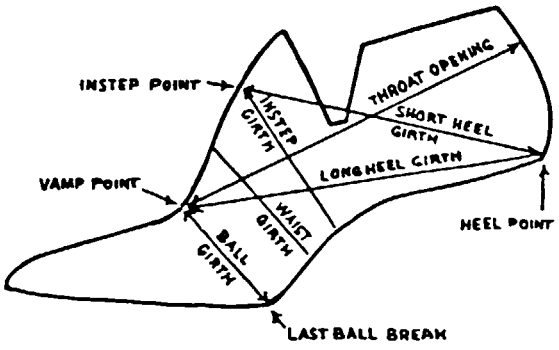
There is no such thing as a straight line on a last. A last is a continuous flow of countours and configurations. Yet these contours - every style with its own variations to meet fashion requirements - must abide by precise standards of measurements and dimensions, more than 20 different ones. This requires not only delicate templates and gauges with minute tolerances, but the meticulos skill of the model-last maker.

There are six basic measurements:

- overall length
- ball girth (for ball width)
- waist girth
- instep girth (to grip the foot and prevent forward sliding)
- short heel and
- long heel, both for accurate fit and grip of the shoe backpart







These measurements not only determine the size and fit of the shoe, but also influence the fashion shape, plus the comfort, balance or tread, and general wear performance of the shoe. They further set the stage for the fitting of many of the shoes component parts and hence influence the shoemaking process itself.

5. LAST GRADING

5.1 Actual last grading

Today we know 3 grading systems

- the arithmetic regular grade
- the arithmetic grade with same heel height
- the geometric grade (also called proportional grade)

All of the three grading systems bear some distortions if one would grade the lasts for the total size run only over one turning model. With several turning models it is possible to correct the mistakes that are produced by the grading machine, because of three dimensional grading. What counts is the actual length of the foot, plus the allowance in various millimeters for foot comfort in the shoe that is made over this last. For these millimeter allowances no international standards exist. Each last maker or last manufacturer works with his own measurements which are based on experience gained from fitting trials.

5.1.1 Arithmetic regular grade

For the length grading the machine does not give us any problems. For the girth we have two measurements. One in relation to the size and the other to the fitting, which will be the same throughout the whole range.

There is a certain distortion which supplements the width in the bigger sizes and reduces the width in the smaller izes. If the size run is held in a limit of not more than 6 full sizes, as e.g. 3 - 8 one can accept this distortion for a middle price shoe. That means it is possible to produce over one middle size turning model the above mentioned size run.

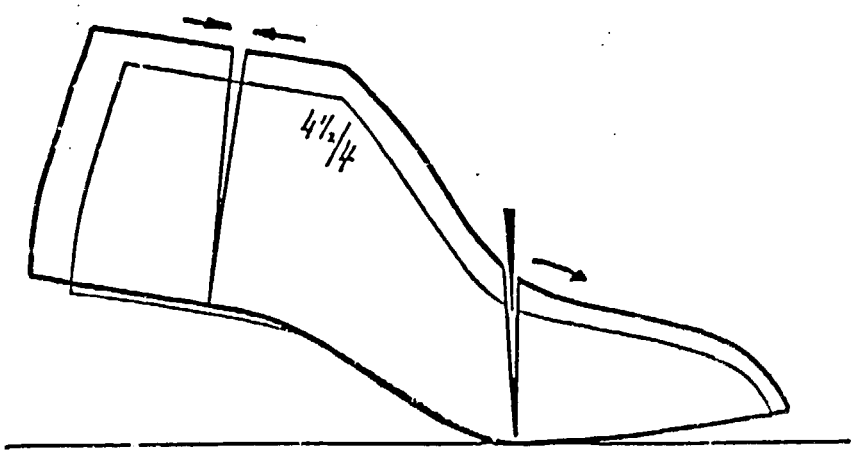
5.1.2 Arithmetic grading with same heel height

The main reason for using this system is to work with only four heel sizes for the total size run.

2 - 3 - / 4 - 5 - / 6 - 7 - / 8 - 9 - size run

5 7 9 11 heel sizes

However this asks for a breakdown of the turning models with the exception of the turning model in the middle size.



For this type of grading we usually require the following turning models.

ladies 2 - 3 - / 4 - 5 / - 6 - / 7 - 8 / 9 - 10 - size run

X X X X X X= grading model

Here we need five turning models in order to eliminate grading mistakes.

mens 4 - 5 - 6 - / - 7 - 8 - 9 - 10 / - 11 - 12 - 13 - 14 - 15

X X X

As we have in most cases low heel heights for men's lasts, it is in generally possible to only work with three turning models

Children and girls

19 20 21 22 / 23 24 25 / 26 27 28 29 / 30 31 32 33 34 /

X X X X X

35 36 37 38 / 39 40 41 / 42 43 44

X X X

The smaller the last is, the more the graded last deviates from the constructed last. The children foot grows in length much more than in width, this is the reason why we cannot take only one turning model as a base. If we have small lasts practically each turning model is basically a total different last, as already the insole has to be corrected by hand.

5.1.3 Geometric grade

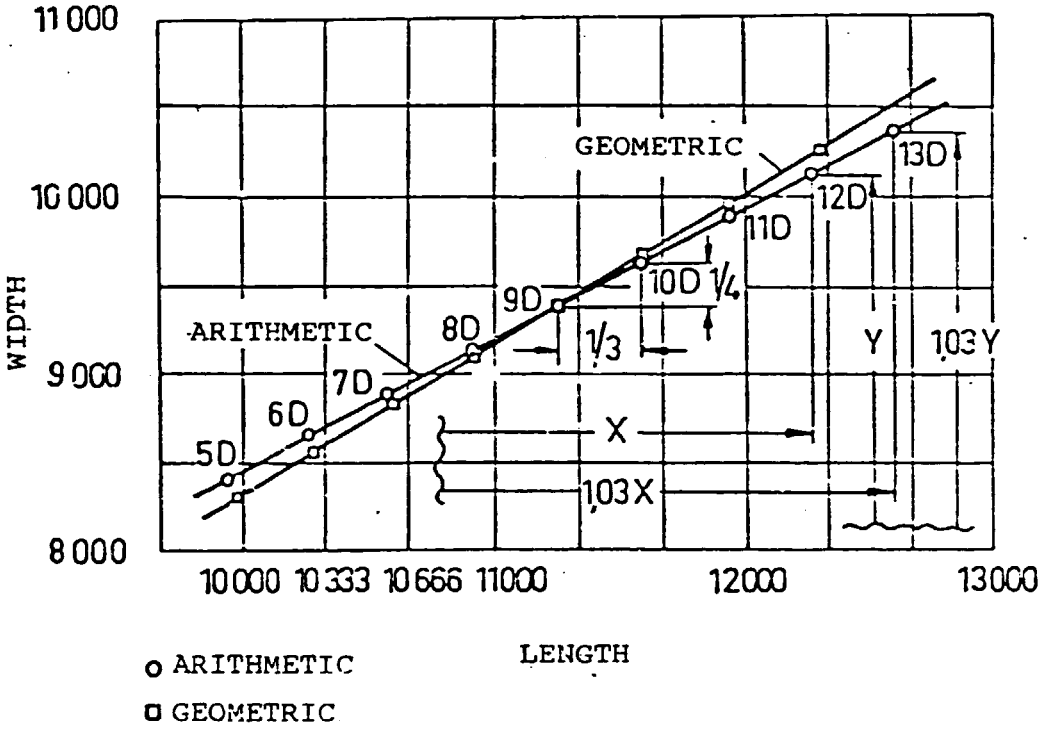
In the early 70's the geometric grading system was announced to be THE solution for modern shoe making, especially in view of constructing new modern shoe machinery. In the meantime progress in constructing electronic guiding systems was so enormous that many problems in the machine industry could be solved without first introducing the geometric last grading. This is certainly one of the main reasons why there was no worldwide break-through for this method.

What are the main points of the geometric grading:

- The comb surface is always held parallel to the heel plate
- The standard thimble is located at a right angle to the comb surface
- The distance of the standard thimble from the last point is in a fixed relationship to the back curve
- The location of the standard thimble is graded in a proportion to the last, therefore it is possible to define from this position the length of the last
- The last back height is in a definite relationship to the last length and is reduced or increased with the growing last size
- Standardised last backs

The scale on the next page shows us a comparison between geometric and arithmetic grading. The Geometric grading was developed in a way, that it harmonizes as far as possible with the arithmetic grading, in order to keep the same size run identifications as they are used for the arithmetic grading system.

In spite of all the advantages this new system had, it was not accepted; the shoe industry and the shoe retailers are very resistant to the introduction of new grading or sizing systems. We also experienced the same with the introduction of mondopoint.



5.2 Last size grading systems

The various grading systems, English, French and Metric (Mondopoint) have nothing to do with the basic last shape. They just fix the grading steps of the last which was created by the last maker in a certain middle size. What counts is the actual length of the foot, plus the allowance in various millimeters for foot comfort in the shoe that is made over this last. For these millimeter allowances no international standards exist. Each last maker or last manufacturer works with his own measurements which are based on experiences gained from fitting trials.

The grading method can however strongly influence the fitting properties of the large and small shoe sizes.

5.2.1 French grading

This grading system works with Paris Points. 1 point = 0,66 mm, 3 points = 2 cm (1,98). One stitch = 2/3 of a centimeter. The size run goes from 16⅔ to 48.

Grading details

No 16 - 33 length from one size to next size = 6,66 mm
ball width " " " " " " = 3 mm
" " " " width to next width= 5 mm

No 34 - 37 length from one size to next size = 6,66 mm
ball width " " " " " " = 5 mm
" " " " width to next width= 5 mm

There is a method of defining the French size for a certain foot by multiplying the foot length in cm 3 times, and dividing this result by 2.

E.g. foot length, including millimeter allowance for foot comfort, 26 cm x 3 = 78 : 2 = French size 39

5.2.2 English grading

This grading system is based on the English foot (12 inches) = 30,6 cm - 1 inch = 2,54 cm.
1 inch = 3 full sizes at 0,846 cm or 6 half sizes at 0,423 cm. The size run goes from 1 - 13½ and continues again with 1 - 12½ (see comparison table).

In the French grading system the difference from one size to the other is 0,66 cm, in the English grading system from one half size to the other size only 0,423 cm. Therefore it is possible to have a better average fit by using the English system.

Grading details

No 1½ - 2 length from ½ size to next size = 4,23 mm
ball width " ½ " " " " = 2 mm
" " " 1 width to next width = 5 mm

No 2½ - 12½ length from ½ size to next size = 4,23 mm
ball width " ½ " " " " = 2½ mm
" " " 1 width to next width = 5 mm

5.2.3 Centimeter grading (Mondopoint)

This grading system is based on the centimeter, 1 full size = 1 cm, 1 half size = 0,5 cm. Size run from 11 to 32 cm. This system has a scale which lays between the French and English size grading. For fitting purposes it is closer to the English than to the French shoe sizing system. Unfortunately the International Bureau of Standards ISO was not able to introduce this Mondopoint system worldwide, which should have replaced the English and French systems. However many countries such as the USSR and some other East-European centrally planned economy coun- countries have changed to the Mondopoint system.

Length grading comparison table of the 3 grading systems

English	French	centimeter	English	French	centimeter
1	16½	11 cm	1	33	22 cm
1½	17⅓	11,5 cm	1½	33⅔	22,4 cm
2	17⅔	11,7 cm	2	34⅓	22,7 cm
2½	18⅓	12,4 cm	2½	35	23 cm
3	19	12,8 cm	3	35½	23,6 cm
3½	19⅔	13,1 cm	3½	36⅓	24,2 cm
4	20⅓	13,5 cm	4	36¾	24,5 cm
4½	21	14 cm	4½	37½	25 cm
5	21⅔	14,4 cm	5	38	25,3 cm
5½	22⅔	14,8 cm	5½	38⅔	25,7 cm
6	23	15,3 cm	6	39⅓	26,2 cm
6½	23⅔	15,7 cm	6½	40	26,6 cm
7	24	16 cm	7	40⅔	27,1 cm
7½	24¾	16,5 cm	7½	41⅓	27,5 cm
8	25½	17 cm	8	42	28 cm
8½	26	17,3 cm	8½	42⅔	28,4 cm
9	26⅔	17,7 cm	9	43⅓	28,8 cm
9½	27⅓	18,2 cm	9½	44	29,1 cm
10	28	18,6 cm	10	44½	29,6 cm
10½	28½	19,1 cm	10½	45	30 cm
11	29⅓	19,4 cm	11	45⅔	30,6 cm
11½	29¾	19,8 cm	11½	46½	31 cm
12	30½	20,1 cm	12	47⅓	31,3 cm
12½	31	20,6 cm	12½	48	32 cm
13	31⅔	21,1 cm			
13½	32⅓	21,5 cm			

Bally has constructed a size converting instrument which is handed out to selected customers to facilitate the size comparisons in the various markets (see annex).

6. FITTING REQUIREMENTS

It is rather difficult to explain what is needed to ensure that a shoe fits. The shoe should touch the foot at every point, without giving too heavy pressure anywhere that might cause discomfort to the foot after a period of wear, and should leave the toes enough space for comfort. It takes great experience to produce a last, which has all these features. The foot measurements, the individual experience and the established grading charts of each last maker are of a big help. However only several samples, tested on sample feet will give the proof that the new last is ready to be graded and produced in bulk. For a good fit a last should meet the 5 following requirements:

- The toes must have enoug space to feel comfortable
- Over the ball and girth the foot should not be exposed to pressure which could produce pain after a certain period of wear
- The topline should not open too much on the foot when the shoe is flexed
- On the heelseat one should not feel any painful pressure
- The heelstand should be perfect in order to guarantee secure walking without twisting the foot or feeling uncomfortable in the balance of the foot.

6.1 Further points influencing fitting properties

- Patterns, vamp length too short or too long
- Pattern construction, front line in wrong position
- Materials, hard or soft
- Soles, hard or soft soles, platform soles
- Upper construction, lined or unlined
- Shoe construction, california, cemented, welted

7. CONCLUSIONS

All these orthopedic criteria and technical points have a big influence on the sale of the product produced over a particular last. If a shoe meets all the points mentioned in part 4 "Last constructions" and follows the fashion trend, then it certainly will compete successfully on the market. If however the orthopedic criteria are neglected, then the product produced over this last has little chance of being succesful.

UNIDO / SWISS PROJECT

UPGRADING SHOE INDUSTRY OF EGYPT

IMPLEMENTATION OF PROJECT	-	UNIDO / VIENNA
CONTRACTED EXECUTOR OF PROJECT	-	BALLY INTERNATIONAL LTD, SWITZERLAND
COUNTERPART - EGYPTIAN PILOT FACTORY	-	ABBOUDA SHOE CO.
SPONSOR OF PROJECT	-	SWISS FEDERAL OFFICE FOR FOREIGN ECONOMIC AFFAIRS "BAWI" .

SEMINAR

UNIDO - SWISS / EGYPT JOINT SHOE INDUSTRY PROJECT

Cairo June 12 - June 16, 1989

Hotel: Sheraton Heliopolis

Program	First day			
June 12 Monday	09.00	Welcome address	UNDP Cairo Resident Repr.	Mr. S. Kassum
			UNIDO/Vienna	Mr. J. Berg
			UNDP Cairo	Mr. Th. Sabri
			Ambassador of Switzerland to Egypt	Mr. Claudio Caratsch
		Opening of seminar	Minister of Industry	Dr. Mohammed Abdel Wahal
	09.20 - 09.40	Presentation and aim of project	Director Bally Intl. Switzerland	Mr. W. Burgin
	09.40 - 10.00	Introduction of Bally's Shoe Factories Ltd. (contracted Co. for execution of project)		"
		Coffee/Tea break		
	10.30 - 11.00	Future trends for leather- & shoe industry - consequences for shoe- and leather industry		Mr. W. Burgin
	11.00 - 11.45	New technology in modern shoe making - cad - cam - computer stitching - 2 machine lasting - waterbased soling adhesives etc.		Mr. P. Regli
	11.45 - 12.15	Discussion		
	12.30 - 14.00	Lunch		

Program

First day

14.00 - 14.45	Securing of quality Upper leather - part 1 - delivery control; stock keeping - climatic conditions for storing leather - leather quality classification system - colour classification system - leather grading with regard to size of skin, substance, grain structure, colour etc.	Mr. D. Blair
14.45 - 15.00	Discussion	
15.00 - 15.30	Coffee/Tea break	
15.30 - 16.15	Upper leather - part 2 - cutting - qualities required for a clicker - methods of cutting - organization of workplace - cutting layouts for various leathers - size run, vertical-horizontal	Mr. D. Blair
16.15 - 16.45	Discussion	
16.45 - 17.00	Incentive system for clicking room - calculation of pattern area and interlocking waste - calculation of allowed area - coefficient for leather qualities - bonus system - suggestion for improvements	Mr. D. Blair
17.00 - 17.15	Discussion	
	End of first day sessions	
17.15 - 18.00	Answering of questions from participants by technical experts	Technical experts

Program
June 13
Tuesday

Second day

09.00 - 10.00	Testing machinery and equipment for leather- and non-leather material	Mr. D. Blair
10.00 - 10.30	Discussion	
10.30 - 11.00	Coffee/Tea break	
11.00 - 11.45	General quality control systems, - cutting room - stitching room - making room	Mr. D. Blair
11.45 - 12.15	Discussion	
12.15 - 12.45	Piece work system	Mr. P. Regli
12.45 - 13.00	Discussion	
13.00 - 14.30	Lunch	
14.30 - 15.15	Modern training method, audio visual training programs for closing room	Mr. D. Blair
15.15 - 15.30	Discussion	
15.30 - 15.45	Leather finishing effects on finished shoes	Mr. P. Regli
15.45 - 16.00	Discussion	
16.00 - 16.30	Coffee/Tea break	
16.30 - 16.45	Orthopedic basics	Mr. W. Burgin

June 13 Tuesday	16.45 - 17.00	Conclusion of sessions	Messrs. J. Berg W. Burgin
	17.00 - 17.15	Discussion	
	17.15 - 17.45	Answering of individual questions from participants	Technical experts
		Handing out of time schedule for visit to Abbouda shoe factory in Ramadan City on June 14th	
		End of second day sessions	

June 14 Wednesday	Third day	Visit to Abbouda shoe factory in Ramadan City		Messrs. M. + M. Abbouda
	09.00	Departure of first group (A) from Hotel Sheraton Heliopolis		
	12.00	Return to Sheraton Heliopolis Hotel/Cairo		
	10.00	Departure of second group (B) from Hotel Sheraton Heliopolis		
	13.00	Return to Sheraton Heliopolis Hotel/Cairo		
	13.15	Reunion of group (A) and (B) for lunch at Hotel Sheraton Heliopolis/Cairo		
	13.30 - 14.30	Lunch		
	14.45	Closing of seminar	UNIDO Bally Intl.	Mr. J. Berg Mr. w. Burgin

June 15 Thursday	Fourth day	Factory visits by technical experts	
	09.30	Visit to Ramadan Shoe Co. Nasser City	Mr. M. Ramadan
	11.00	Visit to 2 M factory / Cairo	Mr. A. Mahmoud Mrs. S. Mahmoud
	14.00	Lunch	
	16.00	Visit to 28 shoe factory / Cairo	Mr. M. Dawoud

June 16 Friday — Fifth day

10.00	Visit to Zalat shoe factory Cairo / Alessandria - Desert Road	Mr. H. Zalat
13.00	Lunch	

Official visitors & participants

- Minister of Industry/Egypt	Mr. Mohammed Abdel Wahab
- Ambassador of Switzerland to Egypt	Mr. Claudio Caratsch
- Federal office for foreign economic affairs "BAWI" Bern/Switzerland	official delegate
- UNIDO/Vienna, head of leather- and shoe division	Mr. J. Berg
- UNIDO/Vienna shoe technologist	Mr. O. Birkhaug
- UNDP - Cairo	Mr. Th. Sabri
- BALLY INTERNATIONAL LTD, Switzerland head licensing division	Mr. W. Burgin
- Senior technical expert head of technical license section	Mr. P. Regli
- Technical instructor	Mr. D. Blair
- Egyptian tanners & shoe manufacturers	

Vienna /

Schönenwerd, March 21, 1989

Monday 12th June 1989

OPENING SESSION

OFFICIAL VISITORS AND PARTICIPANTS

H.E. Dr. Mohammed Abdel Wahat	Minister of Industry
H.E. Mr. Claudio Caratsch *)	Ambassador of Switzerland
Mr. Kamal Hafez Ramadan	Chairman of Leather Industry Chamber
H.E. Mr. Salim Kassoum	Resident Representative, UNDP
Mr. J. Berg	UNIDO Vienna
Mr. O. Birkhaug	UNIDO Vienna
Mr. Tharwat Sabry	UNDP Cairo
Mr. W. Burgin	Director, Bally Intl. Switzerland
Mr. P. Regli	Head Technical License Dept. Bally Intl.
Mr. D. Blair	Technical Instructor, Bally Intl.

*) 2 accompanying representatives from Swiss Embassy

ATTENDANCE/PARTICIPANTS

ABBOUDA SHOE COMPANY

Mr. Maher Saleh Abbouda
Mr. Medhat Saleh Abbouda
Mr. Shant Yergatian (Seminar co-ordinator)
Mr. Mohsen Youssef

CONDOR SHOE CO.

Mr. Salama Moustafa Hamza, Vice President

28 FACTORY CAIRO

Mr. Mahmoud Ahmed Dawoud

HAFEZ AND OUDA CO.

Mr. Ouda Salah Ouda
Mr. Hafez Salah El Din Ouda

2 M

Mr. Hani Gamal Mahmoud
Mr. Kamel Matta
Mme. Cherine Mahmoud

RAMADAN SHOE FACTORY

Mr. Mohamed Samir Ramadan

ALEXANDRIA NASR LEATHER TANNING CO.

Mr. Yehia El Mokadem
Mr. El Sayed
Mr. El Kawanki

EGYPTIAN LEATHER CO. / MODEL TANNERISTS

Mr. Mohamed Refaat Mourad
Mr. Abdel Hadi Ibrahim
Mr. Abdell Gelil Hagag

TANNERIES CAIRO

Mr. Mamdouh Sabet
Moustafa Eid
Mr. Abdel Nabi Ahmed
Mr. Bilal Ammar
Ahmed Eid

TANNERY EL RADIO

Mr. Moustafa Eid
Mr. A. Youssef
Miss Iman Ahmed Eid

NEFRETITI CO. FOR LEATHERS

Mr. Ali H. Mohamed Ali

CHAMBER OF LEATHER INDUSTRIES

Mr. Ezz El Din Ibrahim

DEVELOPMENT AND INDUSTRIAL BANK

Mr. Ahmed Abu Dunia
Eng. Yehia El Fiky

G.T.Z.

Mr. Jan Pivecka

MISR BANK

Mr. Abdel Aziz Hussein Moharram
Mr. Youssef Hassan Younes

PAN TRADE

Mr. Mamdouh Ismail
Mr. Mohamed Said

EXPORT PROMOTION CENTRE

Mr. Hahag Shawkir

AL AHRAM NEWSPAPER

Mr. Abdel Rahman Akl

UNIDO/BALLY/EGYPT PROJECT

Future trends for the leather and shoe industry

Seminar in Cairo

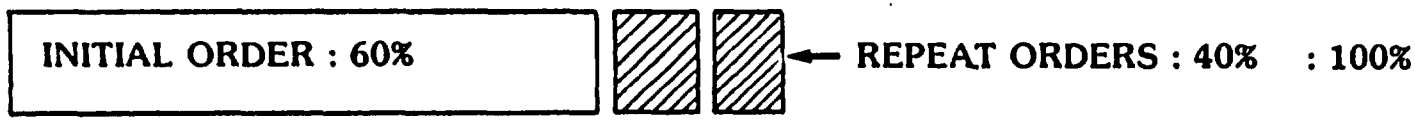
- June 1989 -

Bally International Ltd., Switzerland

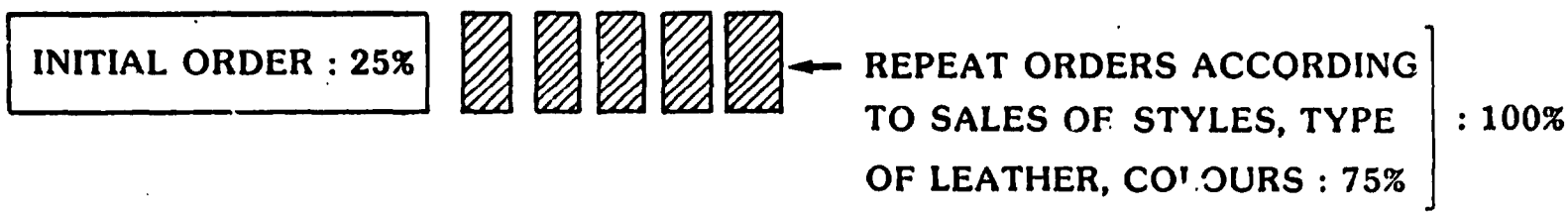
FUTURE TRENDS FOR THE LEATHER AND SHOE INDUSTRY

SEASONS | CONVENTIONAL ORDERING | ANNUAL SALES VOLUME

SPRING/SUMMER
AUTUMN/WINTER



NEW ORDERING | PROGRESS CYCLE



BALLY

BALLY

FUTURE TRENDS FOR THE SHOE- AND LEATHER INDUSTRY

- Change from 2 seasonal ordering schedules (autumn/winter and spring/summer) to a continuous flow of orders.
- Shoe-retail demands from shoe manufacturer also continuous presentation of new styles and propositions. (Away from 2 seasonal range presentation!)
- Shoe retail can only purchase on actual sales budgeting! No or insufficent sales = no or small purchasing budget
- Shoe retailer is no longer prepared to place large initial orders and carrying the risk of slow or not moving merchandise.
- Faster stock turn - less tied up capital (interest rates)
- Shoe retailer requests to re-order good selling styles within 2 - 3 weeks (styles, lasts, material, colours)

CONSEQUENCES FOR SHOE INDUSTRY

- Shorter "work in progress" time
- Less time to order raw materials leather, colours, components etc. to meet customer demands.
- Great dependency on material suppliers esp. tanners but also ornaments.
- Demand for greater flexibility of shoe manufacturer.

Facing the above problems several shoe manufacturers have started

- to add leather finishing plants in order to assure speedy leather/ colour supply
- they buy crust from tanners and finish according to incoming orders

(Brasilian example
French leather research institute)

./2

CONSEQUENCES FOR TANNING INDUSTRY

Advanced tanning technology computerized colour codes
Fast finishing processes to meet demand of shoe industry
(Problems transportation, hide resources)

Leather trends: Softness, Cervo/Elk
Finishes
Colours
etc.

Schönenwerd, June 9, 1989

UNIDO/BALLY/EGYPT PROJECT

New technology in modern shoemaking

Seminar in Cairo

- June 1989 -

Bally International Ltd., Switzerland

Before I begin in detail to talk about major new points and trends in footwear technology and manufacturing, I would like to define the main criteria which will, in the future, confront both shoe machine manufacturers and shoe factories.

What does the market want?

- more models, meaning a wider range of fashion
- quick decisions about fashion trends allowing for a shorter reaction time for model changes
- quick availability of new shoe models
- quick reaction to a change in requirements
- shorter production through-put time
- stable, or even increased demands on quality
- higher demands on the flexibility at the workplace and from the use of machines and equipment
- improvements in relation to humanizing the workplace
- competitive prices, lower manufacturing costs
- environmental protection / waste disposal

How must the shoe industry react?

- Quicker pattern preparation and manufacturing of sample shoes
- Quicker tooling-up for the production of new models
- Less tools, components and lasts for each model
- Smaller work batches and bigger turnover rates
- Quicker and more precise changes in machine adjustments when switching from one shoe model to another
- Reduced through-put time from receipt of order to delivery of shoes, by having less work in progress
- Increased flexibility at the workplace

1. Rink system in the lasting and making room

The demands for "just in time" manufacturing can largely be met by the RINK SYSTEM, which has received much publication in recent times. In this system, the machines for lasting and making, that means from insole attaching to last slipping, are arranged in a group and connected to each other by a transport system. Incorporated in the transport system are operations such as steaming, stabilizing (heat setter) adhesive drying and/or cooling of the shoe and last.

This represents a turn away from traditional lasting and making systems, where racks or transport bands (conveyors) with corresponding buffer quantities of work in progress and intermediate stores, can be found. The lasting and making room of the future will no longer be based on traditional methods. Instead, this department will become an assembly plant where pre-manufactured elements such as uppers, insoles and soles will be put together in a rational way. Optimal utilization of the maximum machine output is no longer the single main objective, but more the performance of the operators of modern machines and equipment will count.

The objective of a rink system is:

to produce with the least possible personnel, lasts and work in progress, a maximum possible quanitity of shoes with a minimum throughput time and, at the same time, with improved quality.

The following criteria are important in order to successfully introduce such a system:

a) Elimination of every unnecessary handling

Handling times are reduced to a minimum or completely eliminated. The product, in this case the shoe, is only handled when carrying out an operation directly connected with the final product. It is therefore always a matter of an increase in value.

The machines must be flexible, with a minimum change-over time. Additionally the machines must be placed close together and should, whenever possible, be connected by handling devices or short conveyors.

b) Reduction of work in progress and last turn-round time

- the waiting time between the individual operations must be reduced to a minimum

- unnecessary and time consuming buffer and intermediate storage zones must be avoided. Orders must only be given into work when all components are available.

c) Flexibility of workforce and machines

- Because team work is the key point for success of this system, great demands are placed on the flexibility of the workforce. As well as a regular operation, each operator must be capable of carrying out several or all of the operations in the rink system.

- The machines can be arranged in a number of ways, but this is dependant on the number of operations which an operator can or must carry out. However, in all rink systems insole attaching and last slipping are located close to each other in order to facilitate the circulation of the lasts. I would like to show you some sketches of the organization and function of the rink system.

ADVANTAGES OF THE RINK SYSTEM

The main advantages of the rink system are:

- lower manufacturing costs
- faster through-put time
- better quality

The success or improvement of these criteria is of course dependant on how efficient the previous system was. In principle it is possible to expect improvements in the following areas:

Increased productivity

Through the reduction of handling times, the use of modern machines and the creation of a well trained team, increases in the production from 10 - 25 % are possible. A production figure of 800 - 900 pairs per day, in 8 hours with 5 operators, has already been achieved. Of course these figures depend on shoe type, construction type, order/batch size and quality requirements. Workplace ergonomics play an important roll.

Team work

Communication between the operators is improved because of the proximity of the machines and operators to each other, the reduction of work in progress and the group payment system. Personnel fluctuation and variations in production and quality are easier to control. Motivation is generally higher.

Less work in progress

Trials have shown a dramatic reduction of 30 - 90 % in work in progress. This of course leads to significant cost savings.

Faster through-put time

It is quite obvious that this system will give significant reductions in through-put time.

Reduced last stocks

As the through-put time is reduced, the last requirement is also reduced, meaning significant savings. Theoretical through-put times of 20 - 30 minutes are possible, but from the quality point of view I cannot recommend such short times.

Improvements in quality

Handling is reduced to a minimum and this reduces the risk of damage. However I strongly recommend the introduction of a quality control inspection after lasting.

Reduced space requirement

Savings of up to 50 % are possible. The average area required for a rink system is around 60 - 90 m2.

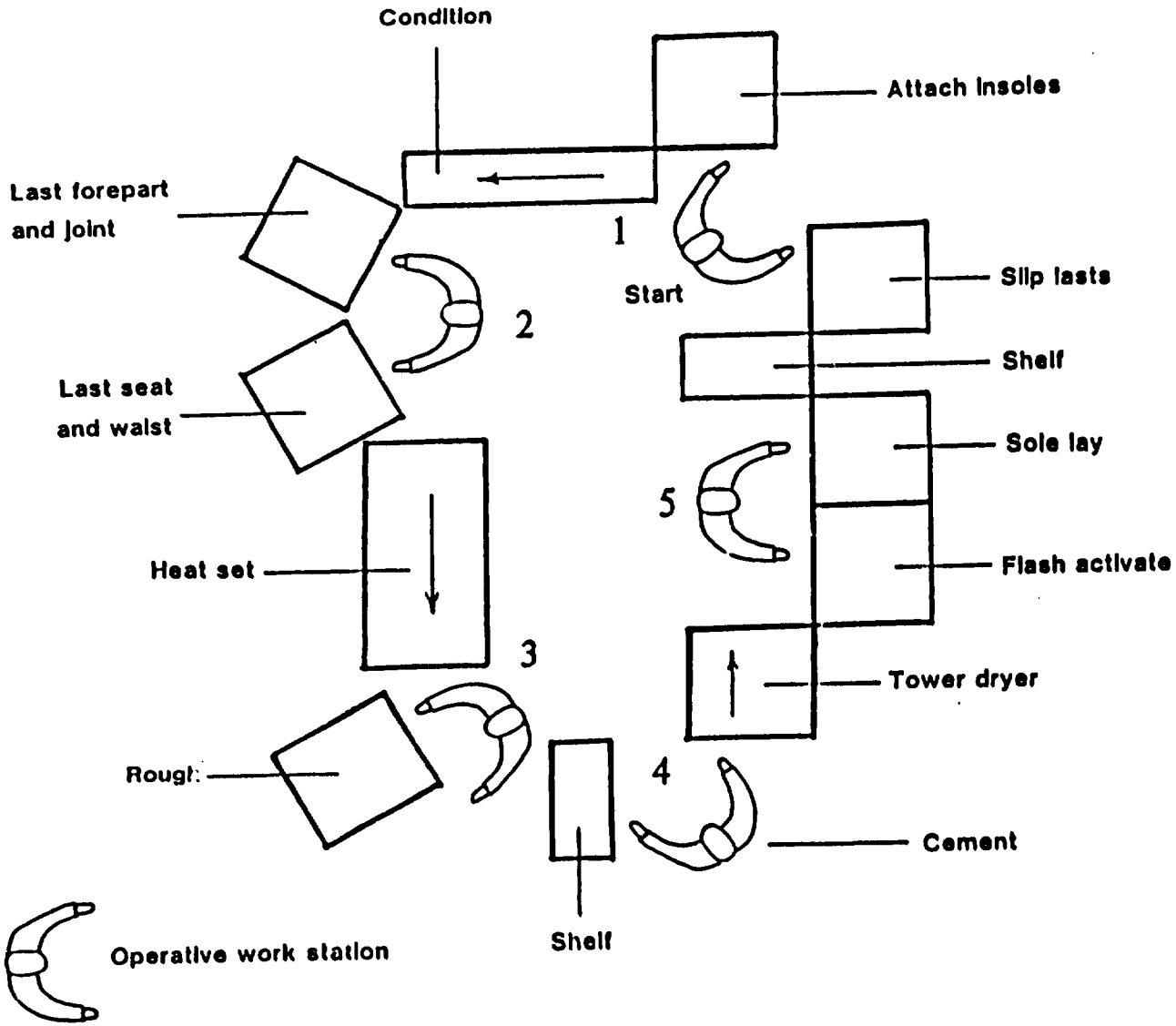
Flexibility

It is possible to quickly exchange machines when the shoe construction or sequence has to be altered. New machines and techniques can be integrated into the rink system without great difficulty.

Conclusion

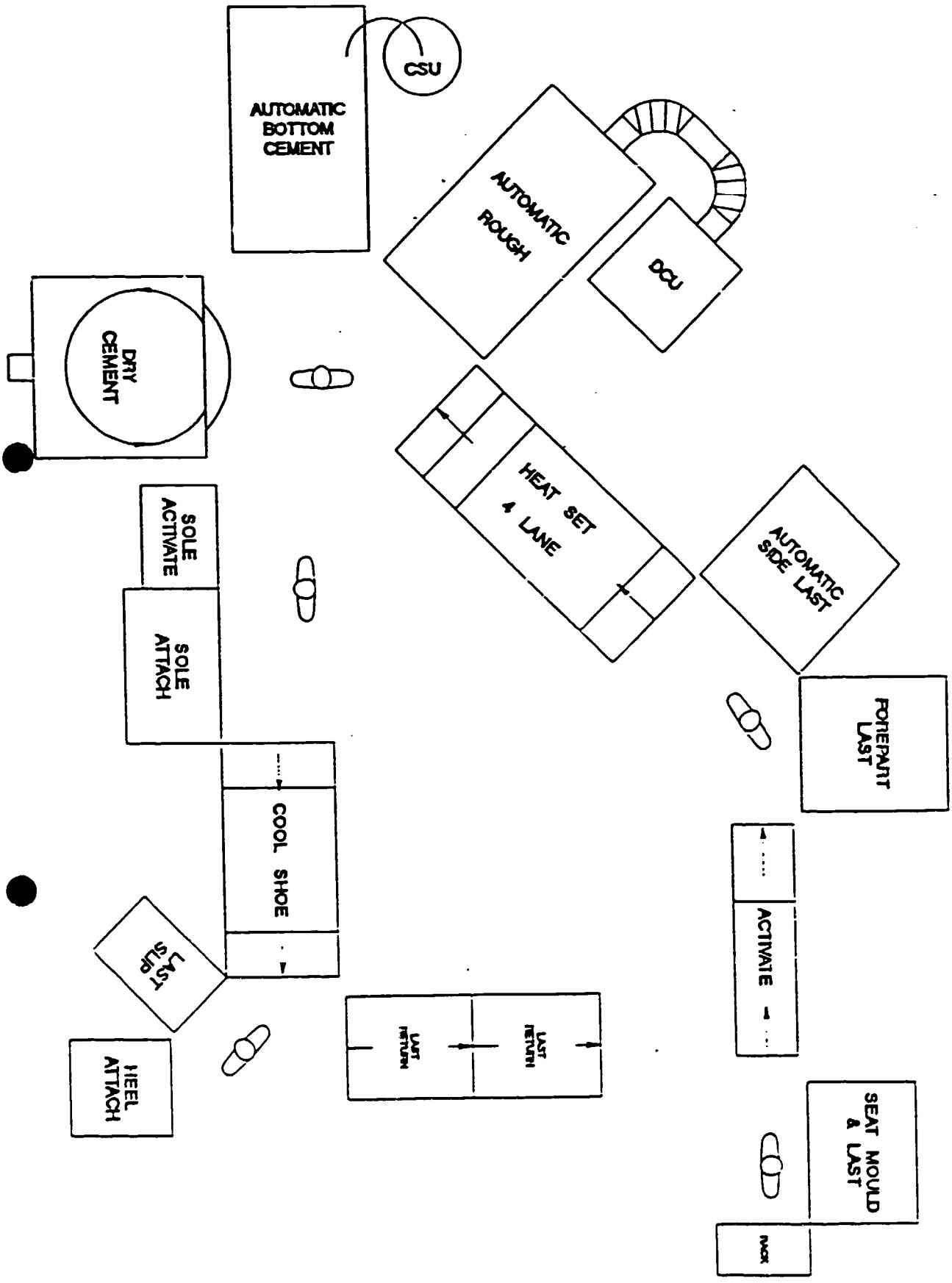
As a final word on this subject I would like to stress that the facilities, shoe components and materials must be suitable for this kind of production method, in order to avoid failures. waiting times, and quality reductions. I would also again like to stress the need for operator training on several or all of the operations in the rink system. This will ensure maximum flexibility. Moreover, high quality demands are placed on the machines with regard to reliability, ease of operation, and flexibility in adapting to the various styles and materials.

MODULAR OR RINK LASTING ROOM



BALLY

1200 PAIRS PER DAY WITH 5 OPERATIVES



OCTOBER 1988

CAD/CAM/CIM.

The footwear industry is facing an explosion in the development and use of computer aided design (CAD) systems, and there is little doubt that CAD will play a major role in automated footwear production in the future.

A footwear CAD system is used to construct and modify patterns, to grade patterns and provide data in a form suitable for making press knives, cutting systems, milling or various other machines. Data in a CAD system can be manipulated in either two dimensions (2D) as with a flat pattern, or in three dimensions (3D) relating to the shape of the last. Manipulation in 3D requires greater computer power.

In a conventional 2D CAD system the pattern maker flattens the 3D shell of the last surface in the traditional manual way, ending up with a 2D forme on which the style lines are drawn. This information is digitised into the 2D CAD system, which then enables the pattern maker to construct pattern pieces, change the design if necessary, grade the patterns and cut them out all in 2D. This type of system copies more or less what the pattern maker has traditionally done manually.

In a true 3D CAD system, the last itself is digitised into the computer. The de. gn lines are drawn and pattern pieces defined in 3D, and grading carried out in 3D. Only after grading are the patterns flattened ready for cutting. However no system is truly 3D as some manipulation of the patterns in

2D is necessary.

Advantages of CAD

The advantages of CAD are in the areas of

Construction and Grading

Construction

Basically CAD construction is not significantly faster than the conventional hand method. It is however possible for a systems expert to construct and grade a simple court shoe on the screen, within 15 minutes. The main advantage of CAD is that not every line must be newly constructed, but stored standards can be quickly called up. The economics of the system are realised through the possibility of being able to build standard sizes and norm units, such as toe-puffs, stiffeners, non-slips, tongues and certain interlinings, at any time into the construction. Of course it takes time to establish these standards. A good pattern cutter always asks himself how the pattern can be simplified, and new knowledge of constructions can be memorised. Significant savings in time arise when a base model must be altered, as such alterations are automatically taken into account in the construction and grading.

Grading

The convention method of producing cutting patterns includes:

- making the metal patterns by hand
- preparing a grading concept
- cutting by hand on the pantograph
- finishing and correcting the patterns by hand

Significant savings in time and money are achieved by grading and cutting with CAD. Manufacturing of metal patterns, the preparation of the grading concept and the correction of the cut patterns are no longer required. Cutting out the patterns with water jet or laser is also significantly faster. There is an improvement in quality and a finishing operation is not necessary. Admittedly, the rationalising effect of the previous system must be considered, and also if simple or complicated model are to be produced. Good technical knowledge is also necessary for CAD grading.

Computer Aided Manufacturing (CAM)

The shoe industry has always had to struggle with difficulties caused by various shoe sizes, continually changing forms, models and materials, as well as the demands for faster deliveries. There is no longer a place for

traditional tools and hand operated mechanical machines in the modern shoe factory. Even automatic machines require operators to set the adjustments for varying sizes, forms and materials. Through the introduction of micro processors and computer technology, the shoe industry now has the possibility of carrying out machine adjustments automatically. This is termed computer aided manufacturing.

Computer Integrated Manufacturing (CIM)

A further step is CIM. CIM uses data and information from a comprehensive data bank, to control and direct the manufacturing process. This data bank contains all the model information from the CAD system, so that manufacturing can be planned and controlled with this information. The term CIM is widely used by system suppliers and the impression is given, that these systems can be purchased ready for use. This is not the case, because CIM systems have to be designed to suit the requirements of each particular factory.

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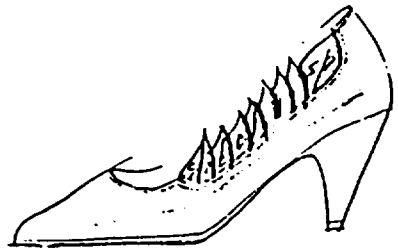
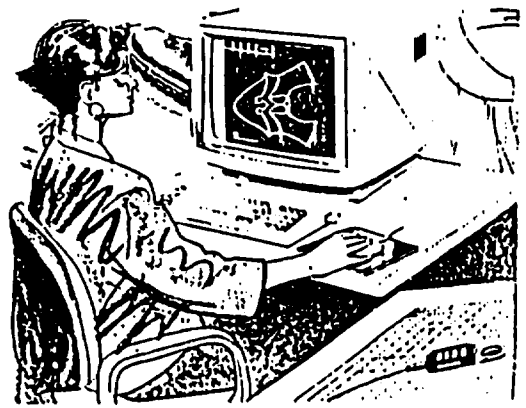
CAD

COMPUTER AIDED DESIGN



DESIGN
PATTERN CONSTRUCTION
GRADING
COSTING



CIM

COMPUTER INTEGRATED MANUFACTURING

MANAGEMENT INFORMATION DATA

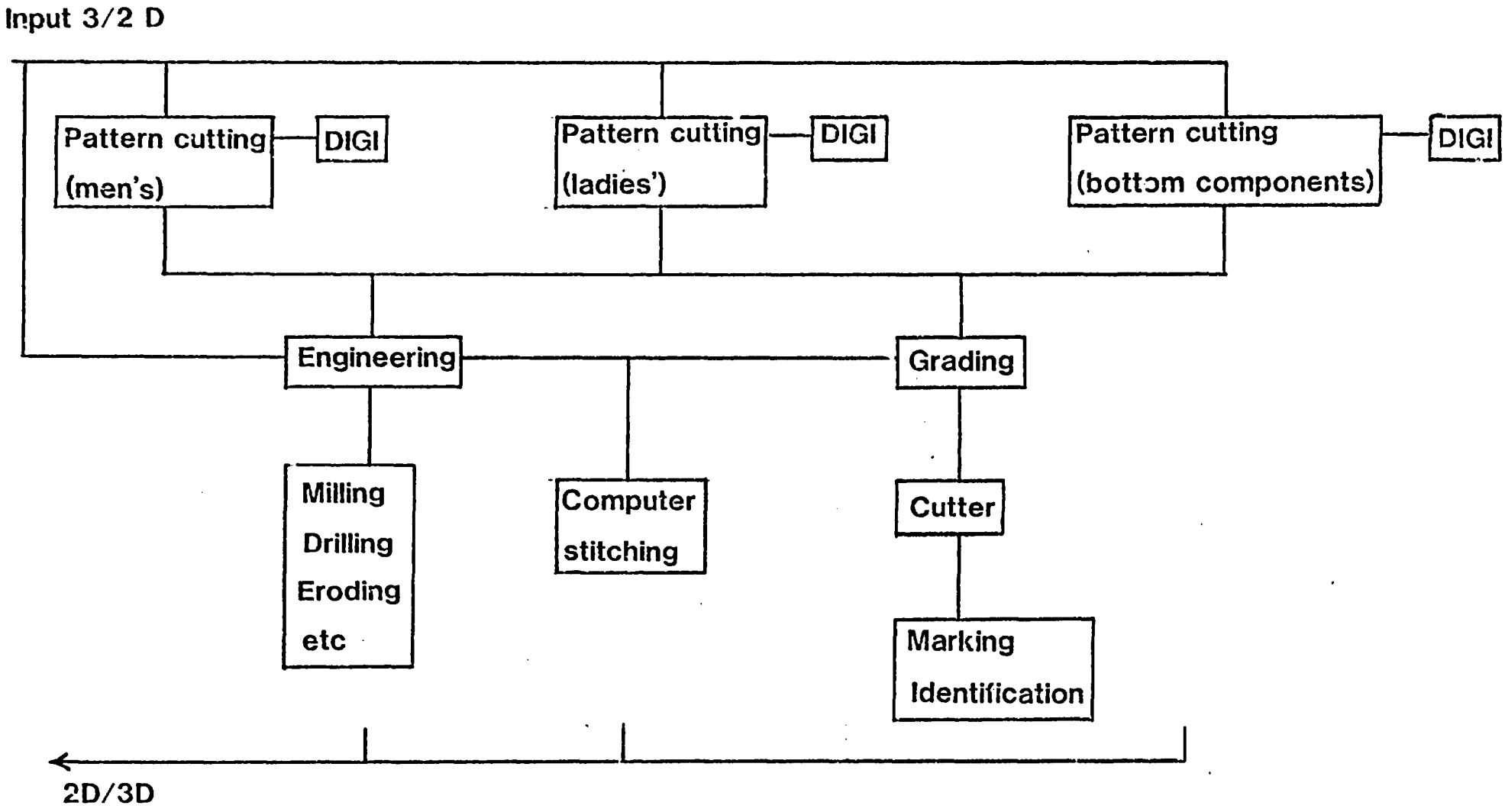
CAD COMPUTER AIDED DESIGN
CAM COMPUTER AIDED MANUFACTURING
PP PRODUCTION PLANNING AND CONTROL

CAM

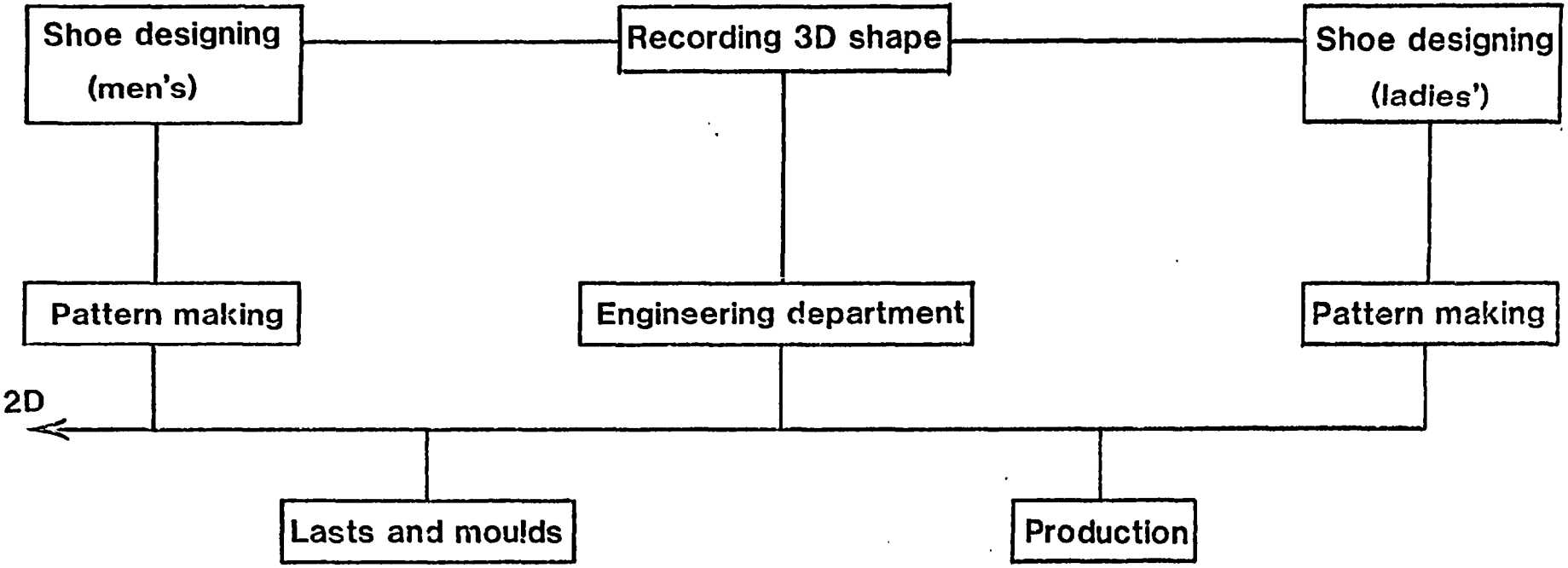
COMPUTER AIDED MANUFACTURING

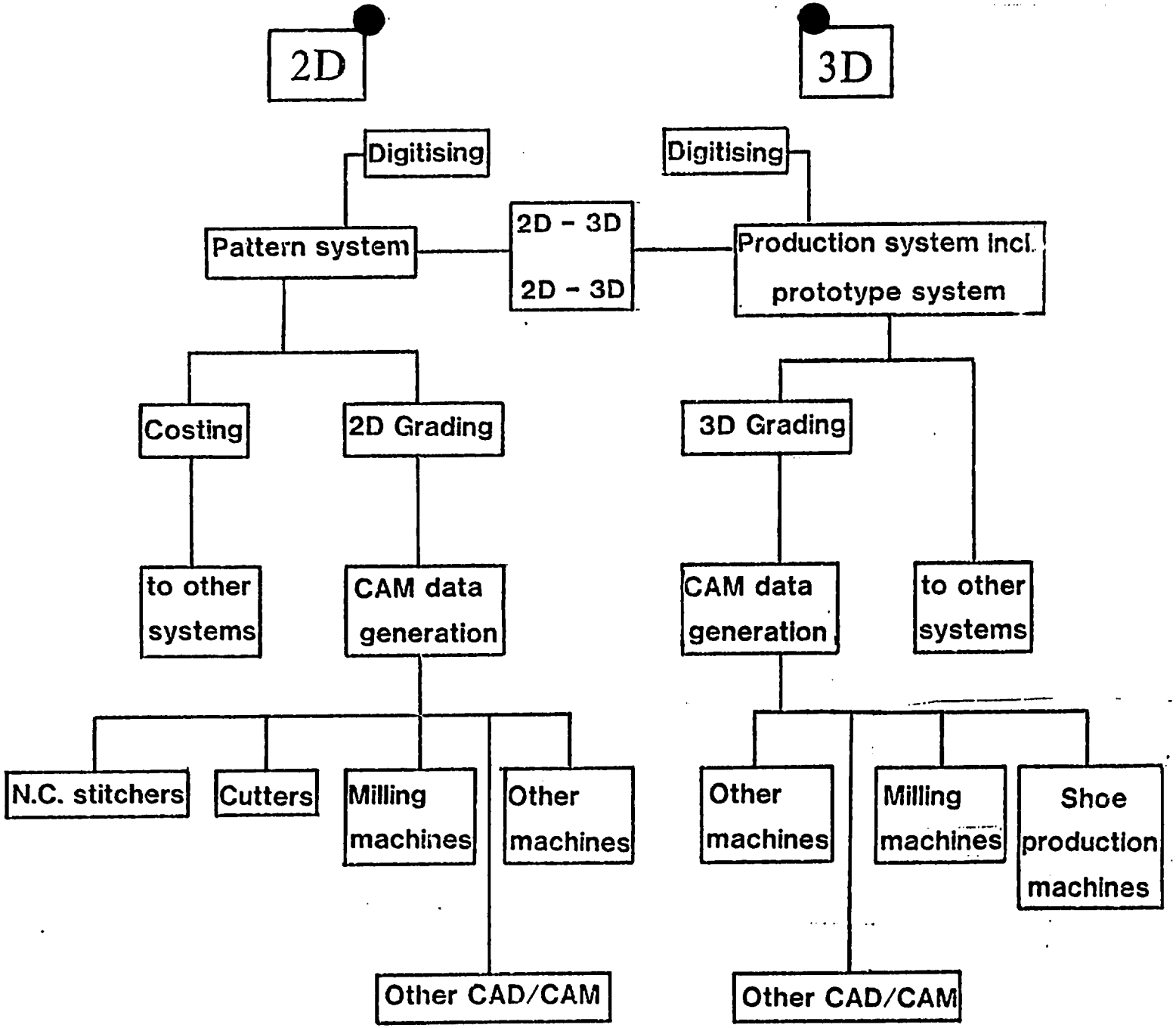
AUTOMATIC CUTTING SYSTEMS
AUTOMATIC STITCHING
MOULDS/TOOLING
LASTING
AUTOMATIC ROUGHING
AUTOMATIC CEMENTING
LASTS

2D APPLICATION



3D APPLICATION




2D
3D
Digitising
Digitising
Pattern system
2D - 3D
2D - 3D
Production system incl. prototype system
Costing
2D Grading
3D Grading
to other systems
CAM data generation
CAM data generation
to other systems
N.C. stitchers
Cutters
Milling machines
Other machines
Other machines
Milling machines
Shoe production machines
Other CAD/CAM
Other CAD/CAM

COMPUTER STITCHING

The new generation of computer controlled sewing machines can either be programmed with an EPROM (erasable, programmable, read only memory) or with an EPROM simulator direct from CAD. Therefore it is no longer necessary to digitize. The same data can be used to programme a CNC controlled milling machine for the production of the holding templates.

The construction of decorative stitching can take place directly on the screen. Precision is particularly important when stitching upper pieces together. It is therefore necessary to have exact press knives because seam variations of 0,5 mm are visible. The construction of templates for holding sections to be joined together, is relatively complex and time consuming.

Computer sewing machines can also be used for perforating. The needle is replaced with a punch tube of maximum 1 mm diameter. Perforating of course, requires a different template construction.

At the present time computer sewing machines are being developed with built in contour recognition systems. This allows exact stitching parallel to the component edge. Through this development it should be possible to simplify and therefore reduce the cost of template production.

It is clear that the greatest savings are to be made on uppers with a high percentage of stitching work. On average, savings of 30 - 40 % can be expected. This figure can however be as high as 2000 % for extreme models! Other advantages are uniform quality, the ability to reproduce existing models, and the production of complex models which would normally not be possible by hand.

CUTTING METHODS FOR LEATHER

Leather is a biological material characterised above all by its versatility concerning softness, fineness of grain, structure and of course also with regard to its appearance, which depends essentially on the care exercised by the tanner during finishing. It is precisely this degree of variation which can cause difficulties in processing. Correct cutting is therefore very important as it is the basis of a good shoe and its appearance, as well as for a perfect fit.

With the most commonly used cutting methods, namely cutting by hand with a knife and press cutting, the above mentioned points can be taken into consideration by the clicker. He has the leather in front of him and can judge it before cutting. This is more complicated with modern cutting systems.

COMPUTER-AIDED CUTTING

In comparison with the classical cutting systems, computer-aided cutting can only be implemented on utilisation of high technical and personnel resources. The cutting tool may be a laser beam, a waterjet or a vibrating knife. Control is always performed by a complicated information system, that means the path followed by the cutting head is determined by the instructions held in the computer memory, which have been generated from the lay planning module of a CAD system. This is not very complicated for man-made materials. For leather cutting it must be carried out interactively. The operator marks the major flaws on the skin and places it on the cutting table. A camera which is suspended over the cutting table, photographs the skin and projects a scaled-down image of it onto a high resolution screen. The operator now positions the various parts, which he calls from the CAD system, on the screen until satisfied with their orientation and until the full layout of components on the skin has been completed. Cutting can now commence.

LASER CUTTING

With this medium, a beam of laser light is focused by a lens onto a minute spot. The energy concentration of the spot is enormous, up to 10 kw per sq mm. Such high temperatures are produced at the focus of the beam, that practically all materials (including metal) can be cut along a very fine line. Although the laser method is technologically highly advanced, the leather is not treated gently. The cut is very clean, however the intense heat leads to charring, which may have an extremely detrimental appearance in the case of light coloured leather. Laser beams are also not very suitable for cutting leather which is not lying completely flat because the laser burns away excessive amounts of leather from the curved surface. Just like the press knife, the laser beam can mark matching points for closing. If the power of laser is reduced, lines can even be drawn. However, the finish of the leather may then be damaged and the leather may tear along the marked line.

WATER JET CUTTING

With this method, filtered water is passed through a very thin nozzle at high pressure. A pump generates the required high pressure of 3000 to 4000 bar. The water then emerges through the nozzle (with a diameter of 0,1 mm - 0,3 mm) at twice the speed of sound. The energy of the water is so great that it carries away anything in its path including leather fibres. Of course the leather becomes wet on contact with the water jet which can lead to dark spots on some delicate materials. Problems also occur if the material is not lying flat. Like the laser, the water jet can also mark orientation points for stitching. However it cannot draw lines as it is much too fast.

RECIPROCATING KNIFE CUTTING

A high speed reciprocating knife is used to cut the material. The blade vibrates vertically and therefore the material, resting on a bristle base, must be held down with a vacuum system. In order to keep the material flat by the vacuum, it is normally covered with a plastic foil.

CONCLUSION

- Each of the three alternative methods has its advantages. Press knives start to become financially interesting between 800 to 1'200 pairs depending on the style. How do the computer-aided techniques compare with press cutting?

- In general it can be stated that cutting by a computer-aided system is not faster than press cutting. An exception may be found in cutting synthetic materials processed in very large quantities. Therefore the advantage can only lay in cost savings resulting from elimination of the press knives and in the saving of materials. It is much more useful to use computer systems for that 20 % of production for which 80 % of press knives are required.

- A point which is becoming more and more important is the ability to adapt faster to the changing wishes of the market. Computer-aided cutting can reduce production time by a factor of 8.

THE MAKING ROOM OF THE FUTURE.

My report, and the short video about the Rink System has already given you some insight about future trends in the lasting room. At the present moment the 3 machine lasting system is still in wide use for ladies' shoes, whereas for men's shoes 2 machine lasting systems are very widespread. The problem with ladies' shoes is twofold; firstly difficulties in processing high heel shoes of 70 - 90 mm and secondly the need to last the waists with tacks for quality reasons. The new generation of lasting machines has gone a long way in solving these problems and in opening the way for 2 machine lasting.

The improvements vary from manufacturer to manufacturer but there are now modern forepart lasting machines available, which apart from small variations, have the following major characteristics:

- a micro processor controlled adhesive applicator system allows the adhesive to be injected parallel to the edge of the insole, by automatic adjustment of the applicators according to the shoe size. The applicator in the previous form was significantly shortened and covers only the point of the insole

- the position of the ball joint wipers is also programmable and automatically adjusts to the shoe size

- due to the micro processor it is almost impossible for

the machine to go out of adjustment. The machine can always be brought back into the base position

- a menu control allows parameters for specific models to be recorded under a particular model number. The machine automatically adjusts itself when a model is called from the memory

- a fault system shows where to look in the case of breakdowns and how the problem can be solved

It is important to mention automatic roughing and, as a recent development, automatic adhesive application. There are various types of automatic roughing machines e.g. template and contour-following controlled, or types with digitising equipment. A new development is that data from the automatic roughing machine can, by using the teach-in method from the lasting margin, be transferred to automatic adhesive applying machines.

The increase in automation requires however better and more precise manufacturing of the upper. This precision, for example the fit accuracy of the upper or the width of the lasting margin, can already be influenced during the construction of the model. The quality of the upper leather must not of course be underestimated.

The modern lasting room is turning away from the traditional handwork unit, and is becoming an assembly plant where pre-manufactured components are assembled in a rational manner.

By this I mean that the upper with attached toe-puff, pre-formed stiffener and close bonded lasting margin, will be supplied for assembly together with other components such lasts, insoles and pre-finished soles.

The introduction of computer aided shoe manufacturing can only be carried out with standardised lasts. This does not mean standardising the last shape but:

- the height of the last
- the use of a standardised last plate instead of the thimble
- a last coding indicating article, size as well as left or right last

These requirements are essential because for example, the shoe must be inserted absolutely straight into the waist and seat lasting machine. Also a significant increase in precision can be achieved with the automatic roughing machine and the automatic adhesive applying machine. Present last thimbles cannot meet these requirements.

For CAM in the lasting room, or for roughing, a computer based processing, dependent on model and size takes place. The term isolated solution is used. If however a machine has a high-tech connection (interface) for direct data transmission, this is already the basis for a CIM concept.

A scanner is used to read the data from a coded last about article, size, left or right last, when operating a 1 man lasting system (1 operator, 2 machines). The data is transmitted to the micro processor controlled forepart and joint lasting machine. This machine must be programmed for each model, but the micro processor does however calculate the necessary values for all sizes from each model. The machine automatically sets each adjustment for a particular article number. In the near future it will be possible to transmit the data from a central memory to each machine.

After forepart lasting, the operator can place the shoe in the waist and seat lasting machine, or this transfer can be carried out by a robot arm. The waist and seat lasting machine has already received the necessary data regarding article, size, as well as left or right last, and has adjusted itself ready for the model. After completion of lasting, a robot arm transfers the shoe to the heatsetter.

Subsequently the shoe is processed in a similar manner on the automatic roughing machine and on the automatic adhesive applying machine.

These types of lasting units are not equipped with the usual transport systems such as racks or tracks. The work force works hand in hand, and handling equipment and short conveyor belts combined with additional functions such as steaming, drying etc, take over transport operations. With this system fewer workers operator capital intensive production equipment. Accordingly the introduction of such equipment

will initially take place in high salary cost countries, where the rationalising effect will be greatest.

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NEW ADHESIVES IN THE SHOE INDUSTRY AND THEIR APPLICATION.

by Paul Regli

BALLY INTERNATIONAL, Switzerland.

INTRODUCTION

In modern shoe manufacturing, various special adhesives are needed to perform a great number of operations. It is impossible today to think of a modern and efficient shoe technology which does not require the extensive use of adhesives. Their application extends from upper manufacturing and prefabricating bottom elements to lasting and sole attaching. Cementing soles has become a vital function, calling for the highest possible standards in adhesives and their application.

For the diversity of natural and synthetic materials with totally different bonding properties, a range of specially formulated adhesives is needed to optimise bond strength and durability.

ADHESIVES

The physical quality of an adhesive depends on the following two main factors (Table 1) :

1. Bond strength of the adhesive to both material surfaces

2. Coherence or bond within the adhesive

First a few words about the most frequent adhesives for sole attaching.

SOLVENT TYPE ADHESIVES

In shoe making, solvents are employed to transfer the actual adhesive into a suitable form for use.
In the case of dispersion adhesives, this is accomplished with water, while with thermoplastic adhesives the bonding substance is brought into workable form by melting at temperatures between 120 and 200 °C.

POLYCHLOROPRENE

Polychloroprene adhesives have been widely used for the past 40 years as one-component adhesives. They are used in cold as well as in warm or reactivated applications. With the exception of synthetics, all other shoe materials can be bonded with polychloroprene adhesives. Their main disadvantage however is a lack of resistance to higher temperatures.

POLYURETHANE

Polyurethane adhesives are universally used as one- and as two-component adhesives.

However, there exists a basic difference between polyurethane and polychloroprene adhesives :

Polychloroprene adhesives can be used cold, that is without heat-activation, whereas the use of the cold bonding method with polyurethane adhesives is very limited. It is therefore strongly recommended to use always heat-activation with polyurethane adhesives.

The use of polyurethane adhesives is advisable if the bond between two materials must meet special demands regarding bond strength and durability.

FUTURE DEVELOPMENTS

In recent years solvent based adhesives have come under heavy criticism. The protection of the factory workers, as well as the protection of the environment, are of increased importance to public authorities in the USA and in Europe. In addition most solvents are highly inflammable and there is the danger of explosion. Further problems arise from toxicity labelling, the transportation of dangerous goods and from their disposal in accordance with environmental laws. (Table 2)

All these problems were widely discussed during the last two UITIC-conferences (International Technical Shoe Congress) in Budapest and Alicante. Mr. Stein from HELMITIN and

Mr. Endriss from FULLER, both representatives of German adhesive producers, have expressed interesting opinions on the subject of reducing solvents in adhesives.

DISPERSION ADHESIVES.

Dispersion adhesives are largely solvent-free and have been used in shoe manufacturing for a long time. Until two or three years ago they were unsuitable for replacing solvent -based sole adhesives. Thanks to new discoveries in the area of dispersion techniques, it has now become possible to produce water-based adhesives suitable for cementing soles. However, due to the different methods of utilisation, the introduction of water-based adhesives has been more time consuming than was anticipated.

The following is a list of physical characteristics required in a modern, solvent-free adhesive :

- no organic solvent
- non-inflammable
- no danger of explosion
- non-toxic
- easy handling, application with a brush or by machine
- excellent penetration on all types of material
- highest possible bond strength on all known upper and bottom materials.
- short drying time
- responsive to heat activation

- high tack after heat reactivation, for placing soles
- quick tack at first touch
- short press time
- high initial bond strength

There are two different dispersion adhesives for sole cementing. One is based on polyurethane dispersions and the other on polychloroprene latexes.
Adhesives based on polychloroprene latex can be used for cold bonding. This is not normally possible with polyurethane based adhesives. However, excellent results have been achieved with the shock activation process. Due to their greater range of application, polyurethane dispersions have so far acquired a larger market share than polychloroprene latex products.

Despite initial interest, water-based adhesives have so far failed to generate much demand, beyond factory trials.
The reason for this limited uptake can be partly attributed to process and performance drawbacks, although developments to overcome these are in progress.

PRACTICAL EXPERIENCE

At the BALLY SHOE COMPANY in Switzerland we carried out a large number of tests with a water-based polyurethane adhesive for sole bonding on men's and ladies' shoes.
I would like to inform you about our experiences, problems during the manufacturing process and problems which still have to be solved. However, I have to point out clearly that

this information can only be a guiding rule, as different raw materials and components influence the adhesives and their application.

ADHESIVE

BALLY has developed a heat activated, aqueous two-component adhesive based on polyurethane which we mix with hardener (catalyst). The initial strength, heat and hydrolysis resistance meet the requirements of the shoe industry.

Why are we using a two-component adhesive ?

There are two main reasons. A large number of our shoes are exported to the Far East, to countries with a hot climate and a rather high degree of humidity. Secondly, depending on fashion, we use upper materials with a fat content of over 12 % and soles which have a special treatment for water resistance. Our experience has shown that all these facts, which can negatively influence good sole bonding, can be eliminated by using a two-component adhesive.

ROUGHING OF UPPER MATERIALS

Normal roughing or scouring with wire brush or scouring band.

PREPARATION OF SOLES

Normal roughing or scouring. Materials which have to be halogenated for solvent based adhesives, need the same

treatment (TR material)

APPLICATION OF ADHESIVE

One of the differences in the properties of solvent adhesives and dispersion adhesives is that the dried film of a solvent adhesive can be reactivated by using the solvent found in the adhesive or the adhesive itself. This is not the case for dispersions. The dried adhesive film of a dispersion is no longer soluble in the actual adhesive. This means that wear on brushes is much higher, because the adhesive coagulates. Application by a special sponge roller brush has given better, but not yet satisfactory results. Excess adhesive can be removed by wiping while still wet; if left to dry adhesive may appear white for example along the feather line. With coloured adhesives it is possible to overcome this problem. Another problem was that on some roughed upper materials the dispersion adhesive could not be applied because of immediate coagulation in contact with the leather. The reason for this, was the high acid content in the leather.

The application by machine with rollers has also shown some problems. There is a risk that steel components in contact with the adhesive will corrode. They should be replaced by stainless steel or non-ferrous materials. Similarly, gelatine coated rollers are likely to be attacked by the water, and could even be dissolved. Rubber coated rollers have given better results. However, it remains a fact that the application of water -based adhesives remains a problem which has yet to be solved. Cleaning must still be carried out with an organic solvent.

For ladies' shoes we have applied one coat each on upper and

sole. On men's shoes excellent results have been achieved with one coat on the upper and two coats on the sole.

DRYING TIME

The drying time for water-based adhesives seems to be one of the most critical points in connection with sole bonding. Water of course evaporates more slowly than the usual solvent mixtures. For example, the evaporation of water is about 40 times slower than for acetone. But we have noticed that with porous materials, the water in the applied adhesive is conducted away quite rapidly, and the formation of the adhesive film occurs relatively quickly. Upper materials and leather soles begin to dry at room temperature within 15 to 20 minutes. On non-leather soles, drying time will be extended.

The drying time can be reduced by using drying tunnels. We have used a drying tunnel with a temperature of 40 °C. Within 20 minutes, the same time we require for drying solvent based adhesives, the water based adhesive was dry enough for bonding. With a higher temperature, of course, the drying time could be reduced even more. As we are using a two-component adhesive, we could not go higher in temperature because of the hardener (catalyst).
Table 3 shows the relation of temperature to drying time.

HEAT ACTIVATION

Water based adhesives should always be reactivated by heat. Bonding by conventional heat reactivation has proved to be

feasible. It is advantageou; to use an infra-red shock activating device with a temperature of 70 to 80 °C on the adhesive film. Immediately after the activation of both parts - upper and sole - the sole should be attached to the upper and pressed because the temperature of the adhesive film drops rapidly. The time for reactivating the adhesive depends on the power output of the activating unit and the type of sole. If the temperature is correct but the reactivating time too short, the adhesive film cannot melt properly and this leads to insufficient bonding. According to our experience, the reactivating time for leather soles should not be less than 10 seconds. For various other sole materials the time depends on the reaction of the material. For example a brown or black TR sole requires about half of the reactivating time than a white or beige sole.

SOLE PRESSING

The time of full pressure should not be below 10 seconds.

LABORATORY TESTS

Bond strength (resistance to peeling) can be tested on the INSTRON Universal Testing Instrument. According to internatio ,l material testing standards, bond strength - after 7 days of ageing at 50 °C and 90 % relative humidity - must reach at least 40 (Newton) N / cm.

The laboratory tests have shown the following results :

Between upper leather and leather soles the different bond values lay between 30 N to 110 N. With the exception of sheep leather which usually only reaches 30 N, all other upper leather types show good results.
Although acceptable results are achieved with well-roughed leather soles, some bottom leathers can give poor bonds.
As the sole leathers were of different origins, we are of the opinion that certain chemicals used in the tanning process are responsible for differences in bond strength. It also seems that the sensitivity to the nature of the leather surface is greater with solvent based adhesives.

Clearly unsatisfactory bond strength was achieved with natural crepe and EVA (Ethylene vinyl acetate).
In contrast, CHLORINE WATER halogenated TR soles, as well as PUR soles washed with ACETONE, and ordinary rubber soles have shown good bond strength results.

We have not tested PVC soles. However, tests carried out by SATRA Footwear Technology Centre in England, have generally shown good results with injection moulded, stuck-on soles.
SATRA also confirmed that most roughed PU-coated fabrics generally give satisfactory bond.

In conclusion, the test results and the practical experiences suggest that upper leathers and sole materials must be carefully selected to assure satisfactory bond strength.
We can definitely say that an all-round dispersion adhesive is not yet available, although some test results are very promising. On the other hand we have to take into

consideration that a general, all-round adhesive of any type does not exist.

For the time being, solvent based adhesives as well as PU solvent based adhesives are showing the same unsatisfactory test results.

COMBINATION OF SOLVENT BASED AND WATER BASED ADHESIVES.

It is possible to combine a water-based polychloroprene latex film and a polychloroprene film from a solvent adhesive. The same applies to bonds between a polyurethane dispersion film and a polyurethane film from a corresponding solvent based adhesive. For instance, a water-based polyurethane adhesive can be applied to the upper and a solvent-based polyurethane film to the sole. The advantage of this procedure is that it would be possible to overcome bonding problems with certain materials, particularly soling materials and, at the same time, reduce the solvents in the environment at the workplace. Unfortunately the tack, which means the readiness for contact bonding between the two different adhesive films, is rather low and must be improved. A point on which the adhesive chemists are working.

CONCLUSIONS

The positive aspects of water based adhesives are :

- ease of handling in shoe manufacturing because
  . no solvents

. non-inflammable

. no danger of explosions

. no health hazards at the workplace

. simplified warehousing

- good penetration and high bond strength
- practically no change of viscosity
- high temperature resistance
- possibility to be combined with solvent-based adhesives of the same base.
- high hydrolysis resistance if utilised as two-component adhesive.

The negative, still unsolved aspects are :

- the application of the adhesive :

  problems with brushes and machines.

- drying :

  additional drying tunnels require higher investments.

- tack :

  insufficient tack especially when applied in a combined adhesive system.

- adhesion :

  used as a single adhesive, bond strength is not yet up to the required standards for all upper and soling materials, (CR- or PU-based).

THERMOPLASTIC ADHESIVES

An additional group of solvent-free adhesives are the thermoplastic or hot melt adhesives. They have been well known for a long time in shoe manufacturing, especially for folding, lasting machines, sock lining attaching etc. These adhesives are transformed into a workable form by heating and melting. Some years ago hot melt adhesives were tried in the shoe industry for sole bonding, the so called "one-way" adhesives. The problems which arose with this process, such as floating of the sole when the coat was too thick, insufficient "depth effect" (lack of penetration) with roughed upper materials and the problems of the adhesive application, could not satisfactorily be solved. Recently however, big improvements have been made by the chemical industry, which developed the **reactive hot melt** adhesive. This is a comparatively new hot melt group, where a special prepolymer with an isocyonate terminal group reacts in the presence of the humidity of the air. This fact gave the new adhesive group its name : **moisture-curing reaction hot melt.**

As this adhesive reacts with humidity, it must of course be protected from contact with moisture until it has been applied to the parts to be bonded. The process in the shoe industry is not easy. Reaction begins immediately after the material leaves the applicator. The application temperature lays between 90 and 120 °C.

Hot melt adhesives have the following advantages :

- high initial adhesion

- short setting time
- free of organic solvents
- no fire hazard
- simple transport
- high hydrolysis resistance

Compared with ordinary thermoplastic adhesives the following points have been improved :

- wetting of fibrous materials
- penetration into porous materials
- heat resistance of the reacted adhesive
- adhesive strength
- resistance to high grease contents
- elasticity

Real disadvantages are :

- melt applicators required
- danger of pyrolysis and fumes from overheating

Despite all the advantages of the reactive hot melt adhesive it must be pointed out , that the initial strength depends on the relative humidity, which is not always constant in a shoe factory. This important point could have different influences on press times and setting rates. The installation of accurate melt applicators will not always be easy and can be very costly.

FINAL CONCLUSION

Today we can say that solvent-free sole attaching adhesives are no longer a dream of the future. The target has come much nearer, but still a few problems remain to be solved. A general change from solvent based adhesives is not possible from one day to the next. Further developments are required and shoe manufacturers, should work in close cooperation with the chemical and the machine industries. Parameters such as the variety of materials and the various production systems have to be taken in consideration. Shoe manufacturers embarking on trials of these new adhesive systems are advised to follow the suppliers' instructions carefully. However I am convinced that in the near future solvent-free adhesives can be introduced in the shoe industry.

Table 1

Basic Cementing Process

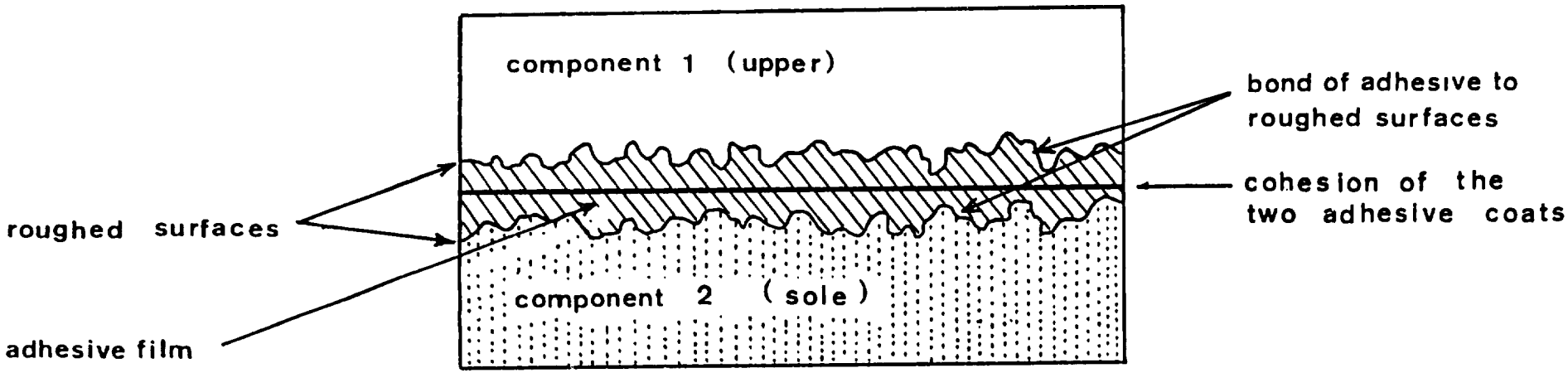
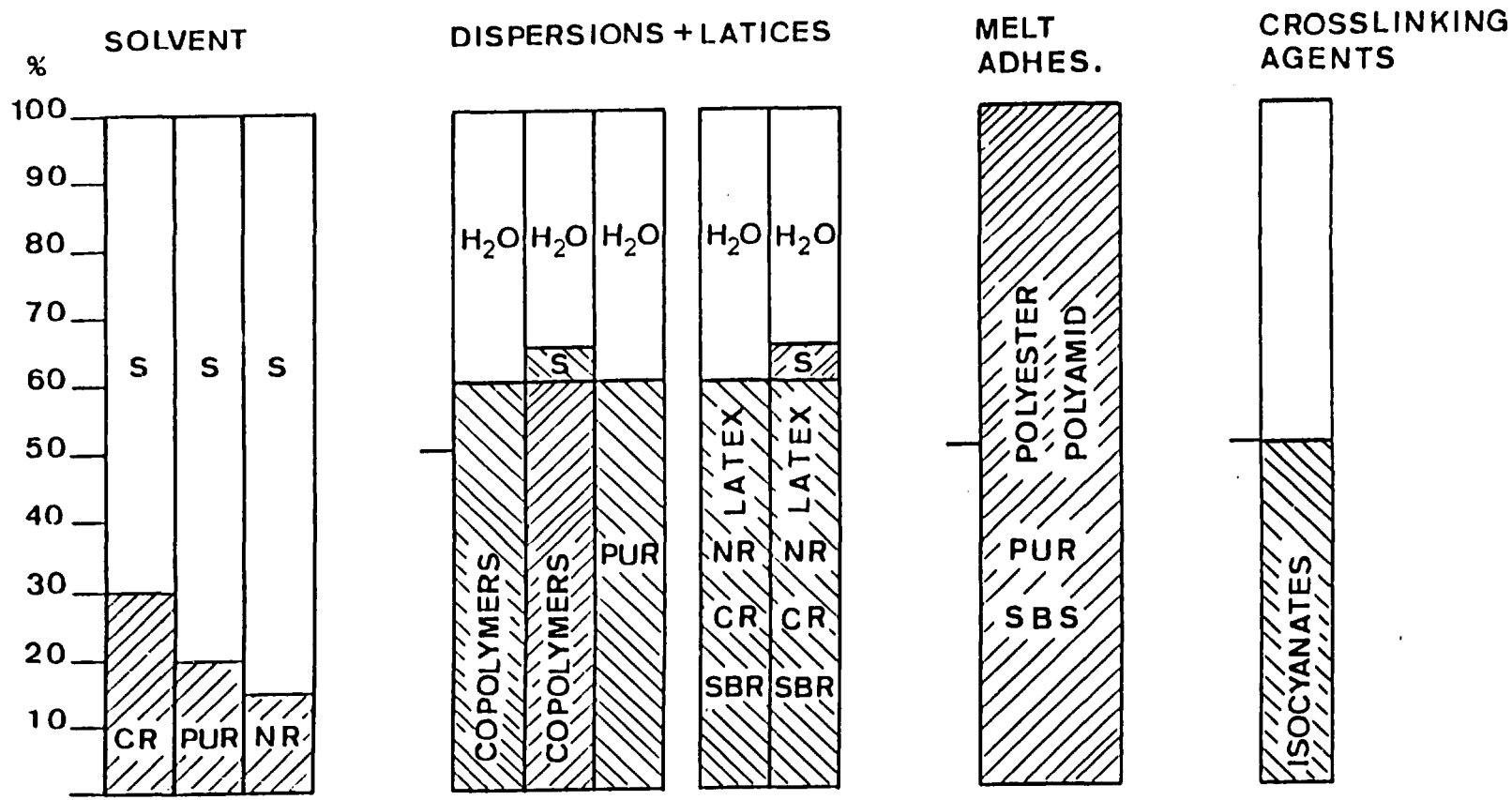


Table 2

Adhesives for shoe production

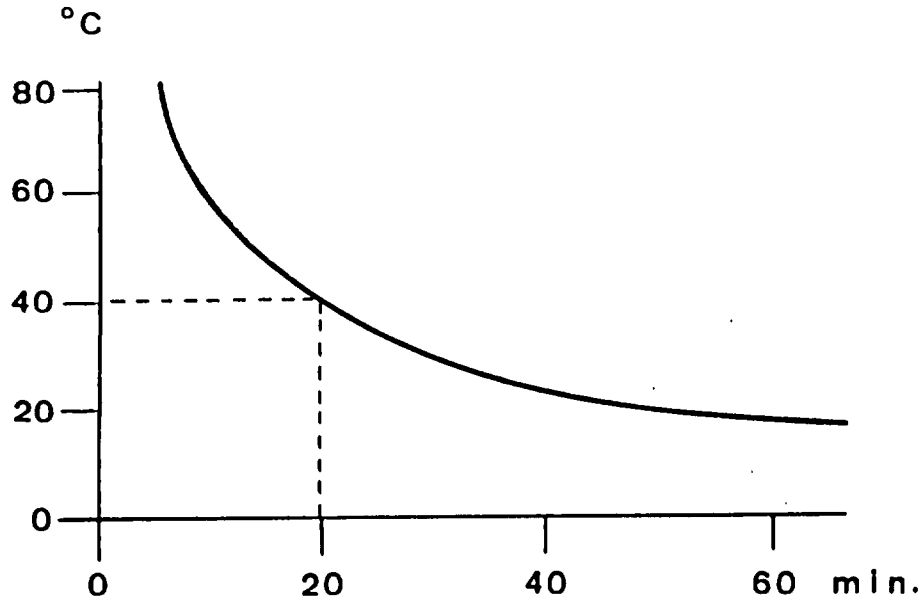
Proportion of solids



O. Stein, Helmitin

Table 3

Relation of temperature to drying time of a PU dispersion adhesive



O. Stein, Helmitin
E. Endriss, H.B. Fuller

UNIDO/BALLY/EGYPT PROJECT

Securing of quality

Seminar in Cairo

- June 1989 -

Bally International Ltd., Switzerland

Upper Leather, Part 1

This lecture dealt with the classification and sorting of upper leather prior to issue to the clicking room. The general duties of the leather sorting room, control of delivery, quantity, sorting, administration of leather stock and distribution to the clicking room according to model suitability, were defined. Each of these topics was dealt with in detail.

- Control of delivery quantity

  This included advice on checking the number of skins delivered against the tannery slip, various methods of defining the area of the skins, developing simple coding systems for colour and leather type/finish classification and the preparation of a leather delivery recording book.

- Sorting

  The duties and responsibilities of the leather sorter were defined. The layout of the workplace and the correct type of lighting was shown. The actual sorting operation, together with a sorting code system was explained in detail, including assessing the substance, grain, colour and quality of the leather.

- Administration of leather stock

  A suitable sheet for recording the stock of sorted leather, together with details of how to fill out the recording sheet, was presented.

- Distribution to the clicking room

  The leather sorter must ensure that each order is allocated the optimal leather from stock. The leather sorter is responsbile for issuing the leather which he has sorted to the clicking room. This has been explained to the participants in the seminar.

Upper Leather, Part 2

This lecture dealt in detail with various aspects of clicking including:

- Qualities required in a clicker

  The qualities required for a clicker (reasoning ability), spatial perception, colour realisation, decision making, were explained to the participants.

- Workplace layout and lighting

  The correct method for laying out the workplace for press and hand clicking, together with a description of ideal types of natural and artificial lighting was described.

- Pressknife storage

  Slides of two methods of pressknife storage (racks and drawers) were shown and the relative advantages and disadvantages defined. Unsuitable storage methods were also defined.

- Care of the cutting block

  The necessity for cutting across the whole surface of the cutting block was described. Also slides about block planing machines were shown and the names and addresses of the manufacturers given out.

- Leather characteristics

  Characteristics of leather, regarding stretch, skin division and usage, guidelines for substances and cutting direction for various components were dealt with in detail.

- Preparing leather for cutting

Sorting the skins into sizes before cutting to ensure maximum material utilisation (larger shoe sizes from largest skins, smaller shoe sizes from smallest skins) together with fault marking on the leather surface, was explained to the participants.

- Layout diagrams

Diagrams of various layout on different skins were shown, and the relative merits described.

- Consecutive numbering

The need for consecutive numbering of cut components, together with 2 methods of carrying out this operation was explained.

- Cutting reptile leathers

This part of the seminar was concluded with a brief explanation of how to cut and reinforce reptile leathers.

Incentive scheme for the clicking room (leather saving)

This lecture commenced with a description of why an incentive scheme for leather saving should be used in a clicking room. The methods of defining the pattern area, with the unavoidable interlocking waste were shown (layout of patterns on a skin, Centiplan machine, parallelogram). The additional allowances for leather quality and number of patterns were briefly explained. The method of calculating the actual leather usage and comparing this figure with the costing, in order to determine the amount of leather saved, and thereby the level of bonus for the clicker, was explained. This talk was concluded by explaining the advantages of introducing a suggestion scheme into the shoe factory and how a financial reward can be offered for the savings achieved.

Testing machinery and equipment

This lecture commenced by explaining the importance of material testing for quality shoes. The avoidance of costly mistakes due to material problems was also explained. with the aid of slides, overhead projector foils and a video, the participants were shown a selection of the most important testing machines and corresponding test values were given. The following tests were described:

- Bally Flexometer (including Mini-Flexometer)
- Bally Penetrometer
- Bally Tensometer
- Satra Lastometer
- Veslic Finish Abrasion Tester
- Tesa Band test for leather finish
- Colour fastness test
- Light fastness test
- Bally Permeometer
- Heat resistance test
- Water drop test
- Solvent resistance test
- Soxhlet test (fat content)
- Tabor abrasion test (for fabrics)
- Shank testing on the Instron machine
- Bennewart sole flexing machine
- Bally Insole Flex Tester
- Sole abrasion test
- Bally Spreadometer
- Sole attachment test (Instron)
- Heel attaching test (ladie's shoes)

Inspection of work in progress

This lecture began with the explanation of the need for inspection during the shoe manufacturing process. The two main methods of inspecting, namely static inspection and roving inspection were defined, together with the necessary characteristics required in a person who is to become an inspector.

The individual inspection points, as can be found at Bally Switzerland, were described. The sequence for inspection, and the necessary equipment at each inspection point, was explained to the participants. This comprised of details about:

- clicking room inspection
- closing room inspection
- lasting inspection
- pre-inspection (prior to finishing)
- final inspection

As a final point, the need for a roving inspector in larger factories was explained. The duties of the roving inspector, in particular checking machine settings and temperatures, was illustrated by means of slides. The carrying out of sole adhesion tests by the roving inspector in the making room, was also mentioned.

UNIDO/BALLY/EGYPT PROJECT

Modern training method for closing room

Seminar in Cairo

- June 1989 -

Bally International Ltd., Switzerland

Audio visual training method for the closing room

In this lecture the seminar participants were informed in detail about the Bally video training method, which is in use in the Bally closing rooms in Switzerland and France.

Information was given about the various video programmes and the background work (preparation of script and studio work) which is needed before a programme can be used in the closing room.

The necessary equipment was described and the choice of a situation for the training place was explained. This lecture was concluded by showing 3 short videos:

1) excerpts from the sewing programme on the Pfaff 441 (in English)

2) excerpts from the folding programme on the USM TCF folder (in English)

3) the layout and organisation of the training place in the closing room, including the video equipment

UNIDO/BALLY/EGYPT PROJECT

Leather finishing methods in the shoe factory

Seminar in Cairo

- June 1989 -

Bally International Ltd., Switzerland

NEW FINISHING PRODUCTS AND THEIR CORRECT APPLICATION

by Paul Regli

BALLY INTERNATIONAL LTD., Switzerland.

INTRODUCTION

The use of leather for shoe production has a very long tradition. Today - shoes and the materials of which they are made - are subject to constant changes dictated by fashion. Moreover, leather production itself also changes in step with technological progress and new developments in chemistry. To a great extent the finishing of the leather influences the finishing of the shoes.

FINISHING IN THE TANNERY

The surface of the leather has to be treated and adapted to meet the requirements and the demands of the customer. However, as there are so many different kinds of leathers and applications, there are a large number of different dressings.

The aim of finishing is :

- concerning the appearance :

    * to equalise irregularities from the dying process
    * to cover grain damages
    * to improve the appearance in respect of fashion look as e.g. brightness, dull- or antique effects
    * to achieve a better economy when cutting the leather

- concerning quality :

    * protection of the surface of the leather against chemical and mechanical effects.
    * to meet the steadily increasing demands concerning durability of the shoes, and ease of care

During the tanning process the parts of the skin which have a protective function on the living animal are removed. Simply expressed, the dressing has to replace this function.

For environmental reasons the leather industry is attempting to replace dressing systems containing organic solvents by aqueous dressing systems. For the shoe manufacturer it is of importance to know which type of finish has been applied, because this will influence the use of cleaning and finishing products. The dressing applied in the Shoe Room must be compatible with the leather finish. Due to demands for more

variations from the fashion side, the manufacturing process of leather has become more and more complicated. On the other hand the number of dressing products for application in the Shoe Room could be reduced because they have beccme more versatile.

FINISHING AND DRESSING IN THE SHOE FACTORY.

During the shce manufacturing process, the finish of upper materials is subjected to a variety of abrasive and stretching actions. The finish may also be heated and/or treated with steam. Of course all these processes can adversely affect the appearance of the finished shoe, resulting in time consuming repairs, or even in rejects.

The aim of the Shoe Room is to emphasise the original character of the upper leather and to remove, wherever possible, marks from the manufacturing process. The Shoe Room is not in the first place a repairing department; wrongly chosen materials cannot be corrected.

The basic requirements for correct application of dressings are :

- Correct selection of the upper material concerning brightness, touch, colour and adhesion of finish.
- Cleanliness during the manufacturing process
- Avoidance of any wrinkles on upper and lining.
  Uppers must fit properly on the last (pattern making),

the necessary reinforcements must be placed correctly and the lasting processes well executed.

It is advisable to remove wrinkles while the shoe is still on the last, preferably with an iron instead of a hot air blower.

- Of great importance is of course the requirements of the customer.

SOLVENT-BASED FINISH PRODUCTS

Solvent-based finishes are still widely known in today's shoe industry. They are mainly used as polyurethane sprays with a high solvent content and relatively small amounts of solids. Depending on the amount of spray applied, a more or less substantial film remains on the leather after evaporation of the solvent. This film must be as thin as possible if a good bond and the required elasticity are to be achieved. The repeated application of spray in several layers will result in breaks and peeling of the film and should be avoided at all costs.

A thin finish film, however, will not completely cover the pores of an upper leather with a coarse grain, and will not give sufficient gloss. In addition, on unglazed leather the solvent may open up the pores. In both cases it is necessary to fill-in the pores and the uneven grain surface with a primer or a filler. After drying, the thin spray film is applied on top of the filler and it is obvious that the filler must be compatible with spray. Under no circumstances

can a solvent based spray be applied on top of a wax containing filler. On upper leather with a high fat content, solvents in the spray may dissolve fat particles, bringing them to the surface and causing a grey appearance.
On the other hand, to obtain more gloss on dark coloured leathers it is advisable to use coloured fillers.

Advantages of solvent-based finishes :

- relatively low labour cost
- high gloss possible
- gloss remains stable over a longer period of time (several month), - even if shoes are left in the box.

Disadvantages of solvent-based finishes :

- hard, rather synthetic touch.
- relative high investment for spray-guns and cabins with explosion-proof, extraction systems.
- high environmental pollution (solvents).

WAX FINISHES

In Europe aqueous wax emulsions have become more important in the past few years. Particularly the Italian footwear manufacturers, still considered " the kings of the shoe industry", have pioneered in this field. Solvent based finishing products have practically disappeared from Italian

shoe factories. The main reason was the continuing fashion trend toward softer, more flexible upper leathers with a natural touch and, as a consequence, with a slightly less glossy appearance. As an additional benefit the pollution of the environment through solvents has been reduced.

We have to distinguish between liquid wax finishes and those in the form of a soft paste. Both are produced by liquifying the wax and then emulgating it. In other words the water -repellent wax is broken down into very fine particles and then mixed with water. When applied to the leather, the resulting emulsion closes the pores and fills in the unevenness of the grain. The water evaporates and the wax particles remain on the surface of the leather, giving it a softly brilliant appearance with a slightly waxy touch.

Waxes have different characteristics according to their different melting points. Waxes with a high melting point are usually hard and brittle, giving the shoes a rather glossy appearance. Those with a low melting point are softer, with a less durable gloss, but with better adhesion on the grain surface.

It is part of the skill of the chemist to find an optimal mixture of hard and soft waxes so that the finishing product contains as many positive properties as possible.

The use of wax finishes in liquid form versus paste form is only a question of the working method one wishes to apply, it has no effect on quality.

The liquid wax emulsions usually applied with spray guns are in most cases self-shining finishes.

Finishes in the form of a paste or a cream need to be brushed. The temperature resulting at the brush facilitates the fine and even distribution of the wax particles on the surface of the leather.

In addition, a liquid self-shining finish may be applied with a spray gun to obtain a more brilliant appearance. Not the thickness of the finish film but an absolutely smooth and even surface is decisive in the effort to reach the desired degree of brilliance. As in solvent based finishes, too thickly applied wax finishes have a tendency to break.

PRACTICAL APPLICATIONS

At BALLY we currently are using 3 different wax finishes :

- a self-shining, aqueous wax paste.
- an aqueous wax spray with high self-shining properties which does not cause spotting when applied to Nappa. (It also can be used as a filler.)
- an aqueous wax spray with very high self-shining properties.

All 3 wax finishes have the following characteristics :

- mild smell, do not turn yellow.
- good wetting properties, high filling power.
- excellent adhesion and permanent elasticity.

Wax finishes are used on practically all kinds of upper leathers. However, with sheep Nappa in light colours which often presents an open grain structure, we identified the formation of dark spots after the application of a wax finish in paste form. Therefore a wax spray should be used.
And it also should be understood that it is neither desirable nor possible to reach a very high gloss on this type of Nappa leather.

For the successful application of wax finishes it is very important to correctly prepare the shoes.
By ironing the upper on the last, the pores of the leather are closed and some small wrinkles made to disappear. For this operation we do not recommend hot air blowers because there effect on the grain surface is not the same.

The uppers must be cleaned with an aqueous cleaner before or after ironing.

Upper leathers with a coarse grain surface or open pores must be brushed on the last with a soft cotton disc-brush at approximately 1000 r.p.m. and with a grinding wax.

WAX PASTES

Wax finishes in paste form are applied by hand, as thin as possible and with a natural or a synthetic sponge. If lines appear on the finish, we highly recommend the use of a natural sponge. Preferably finish pastes should be coloured to match the upper leather. After 20 minutes drying, the shoes are brushed with a woollen yarn-brush at 800 - 1000 r.p.m. and, depending the characteristics of the upper leather and the desired degree of gloss, with bottom polish on the brush. If even more gloss is desired, a wax spray can be applied on top of the pasted and brushed surface. Afterwards the shoes must be allowed for 20 to 30 minutes.

LIQUID WAX FINISHES

The procedure for wax sprays is the same as for wax pastes. Upper leathers with a smooth grain surface normally receive one generous coat of spray and are then allowed to dry for 20 to 30 minutes.

For all other types of upper leather we recommend to first apply a coat of wax paste by hand with a sponge and allow the shoes to dry for 20 minutes. Then apply a 2nd coat of liquid wax finish with a spray gun and allow the shoes to dry for 20 minutes. A final brushing on the woollen yarn-disk may or may not be needed.

GENERAL RECOMMENDATIONS

- Shoes finished with wax pastes lose part of their brilliancy after a certain period of time.
  However, light rubbing with a soft cotton cloth will bring back the original gloss.

- For shoes sprayed with wax emulsions, the self-shining effect even increases for a certain time.
  It is therefore advisable to wait for a few hours before judging the finish on samples.

- The woollen yarn-brush should not revolve faster than 800 to 1000 r.p.m. At higher speeds smearing may occur and destroy the finish.

- Wax emulsions should, if necessary, be diluted with water.

- Lightly coloured upper leathers of certain types, such as Sheep Nappa, which do absorb a lot of liquid, should be sprayed with care. There is a tendency for spotting if pastes are used.

- If wax paste finish is applied to very smooth calf leather we often observe the appearance of lines. Therefore it is be advantageous to spray wax emulsion and, if necessary, to brush the shoes lightly afterwards.

- We strongly recommend to absolutely respect the

prescribed drying times.

- It is absolutely possible to apply solvent based shadow finishes before applying any kind of wax finish.

- Under no circumstances it is possible to apply a solvent based finish on top of a wax finish.

- It is also obvious that shoes, which have been finished with a wax finish, should never be exposed again to a hot air blower or treated with a hot iron.

I hope, Ladies and Gentlemen, that this presentation of the technical aspects of modern wax finishes has been of interest to you and that my recommendations will find their way in your shoe factories.

UNIDO/BALLY/EGYPT PROJECT

Orthopedic basics

Seminar in Cairo

- June 1989 -

Bally International Ltd., Switzerland

The inner or hidden values of a shoe

- comfort

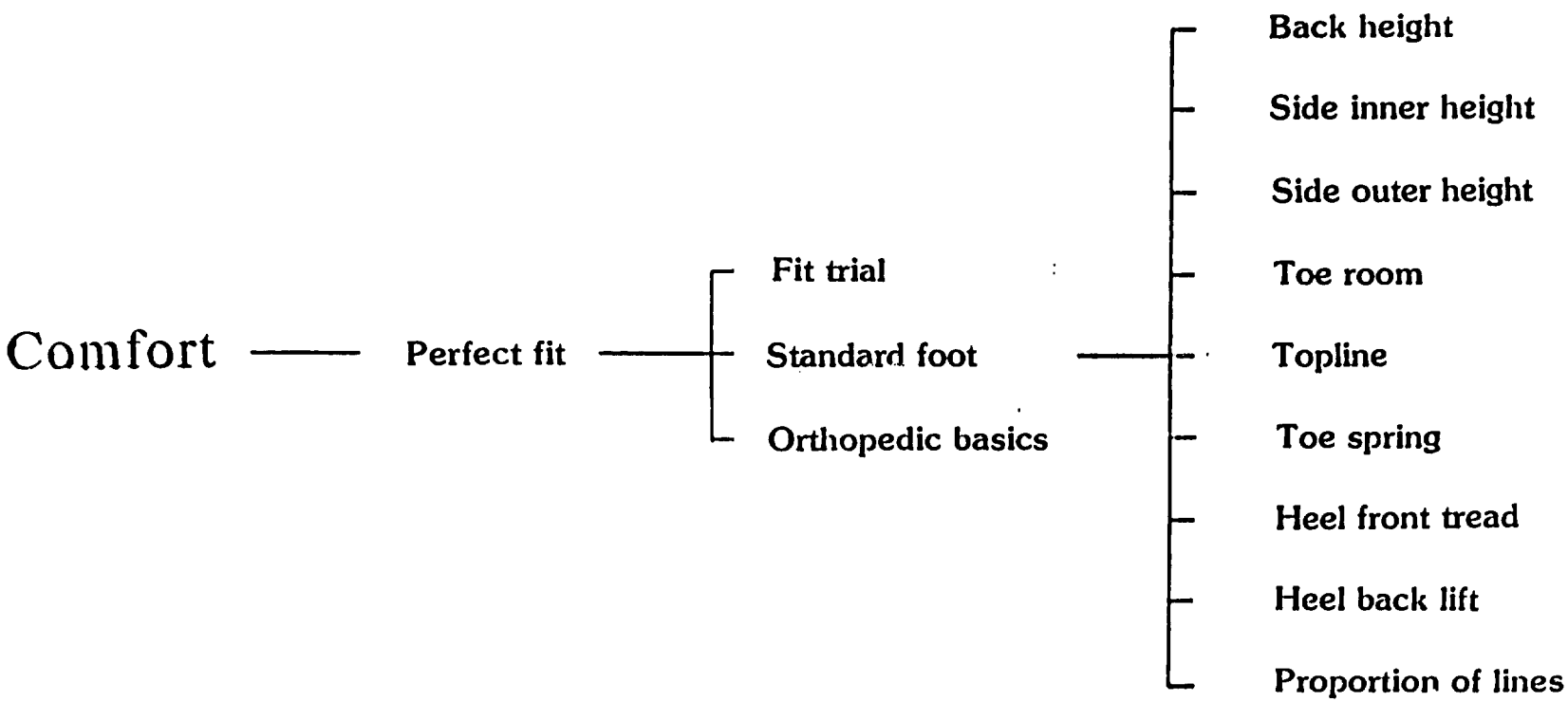
- shape retention

- durability

- visual attractiveness "fresh look"

- special effects

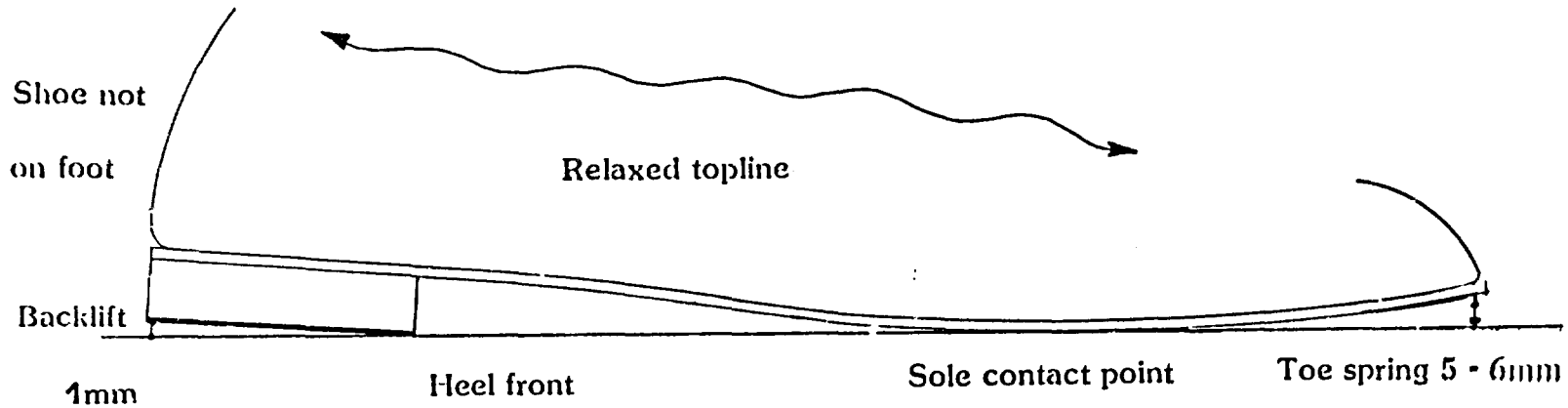
BALLY


Comfort
Perfect fit
Fit trial
Standard foot
Orthopedic basics
Back height
Side inner height
Side outer height
Toe room
Topline
Toe spring
Heel front tread
Heel back lift
Proportion of lines

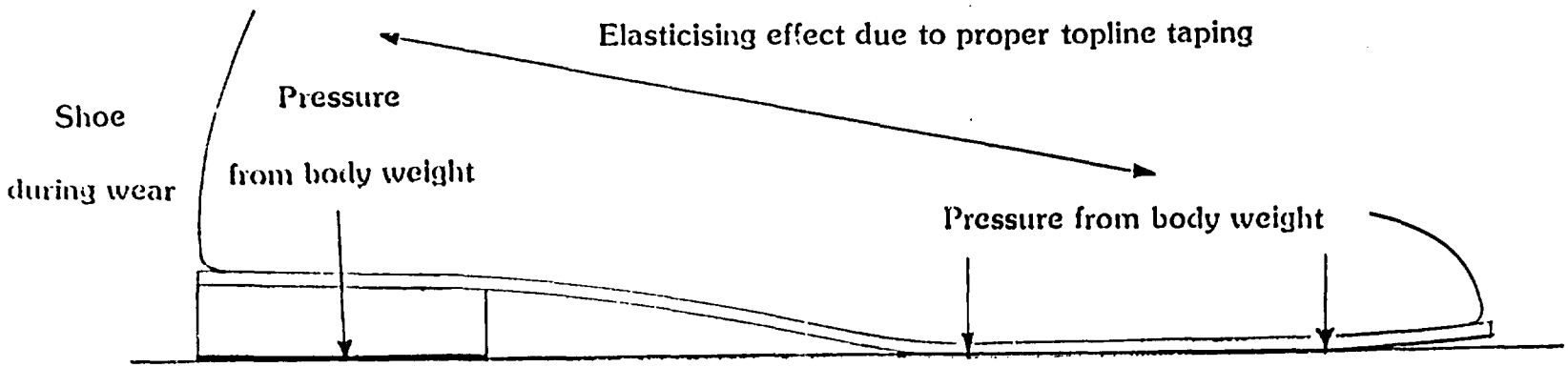
BALLY

THE PERFECT FIT

How to achieve a proper fit by tightenining the topline in wear



Shortening of topline



BALLY

Shape retention

- Correct cutting, substance
- Tape reinforcement of topline
- Reinforcements on vamps, stiffeners etc
- Correct interlining
- Insole material

Balanced selection of materials for each style

BALLY

Durability

Following specific instructions for:

- sole leather
- upper leather
- lining
- cementability etc

Comply with test reports from laboratory

Physical wear test

BALLY

Visual attractiveness

"fresh look"

Shoe care instructions

Treatment of upper and sole leather

BALLY

Special effects

- Contoured insoles
- Anti - bacterial (fungus) treatment of lining
- Laquer treatment for ornaments on shoes

with destination in tropical climates
(corrosion protection)

BALLY

UNIDO/BALLY/EGYPT PROJECT

Time study and piece work systems

Seminar in Cairo

- June 1989 -

Bally International Ltd., Switzerland

INCENTIVE SYSTEMS

The basic idea of a performance based payment system is the incentive to produce more and to improve quality. If such a system is to be used 2 things are important:

- that the standard performance must be used as basis for the comparison of the actual given performance

- through measurement, counting or evaluation the shown performance must be evaluated

It is obviously clear, that it is much more difficult to determine performance standards than to evaluate a given performance. The performance level is relatively easy to calculate for a salary based on quantity payment.

$$\text{Performance level} = \frac{\text{actual quantity (prod. quantity)}}{\text{required quantity (std. allowc.)}} \times 100$$

It becomes more complicated when only the perfect quantity instead of the actual quantity is taken as a basis. A new element now influences salary, namely quality.

In the following talk, I would like to show you various possibilities for the composition of a salary and for different payment methods. These possibilities are of course only suggestions, because criteria such as factory

organisation, quality and performance policy, personnel situation, as well as agreements with trade unions and government regulations all have an influence on the salary system and method of payment.

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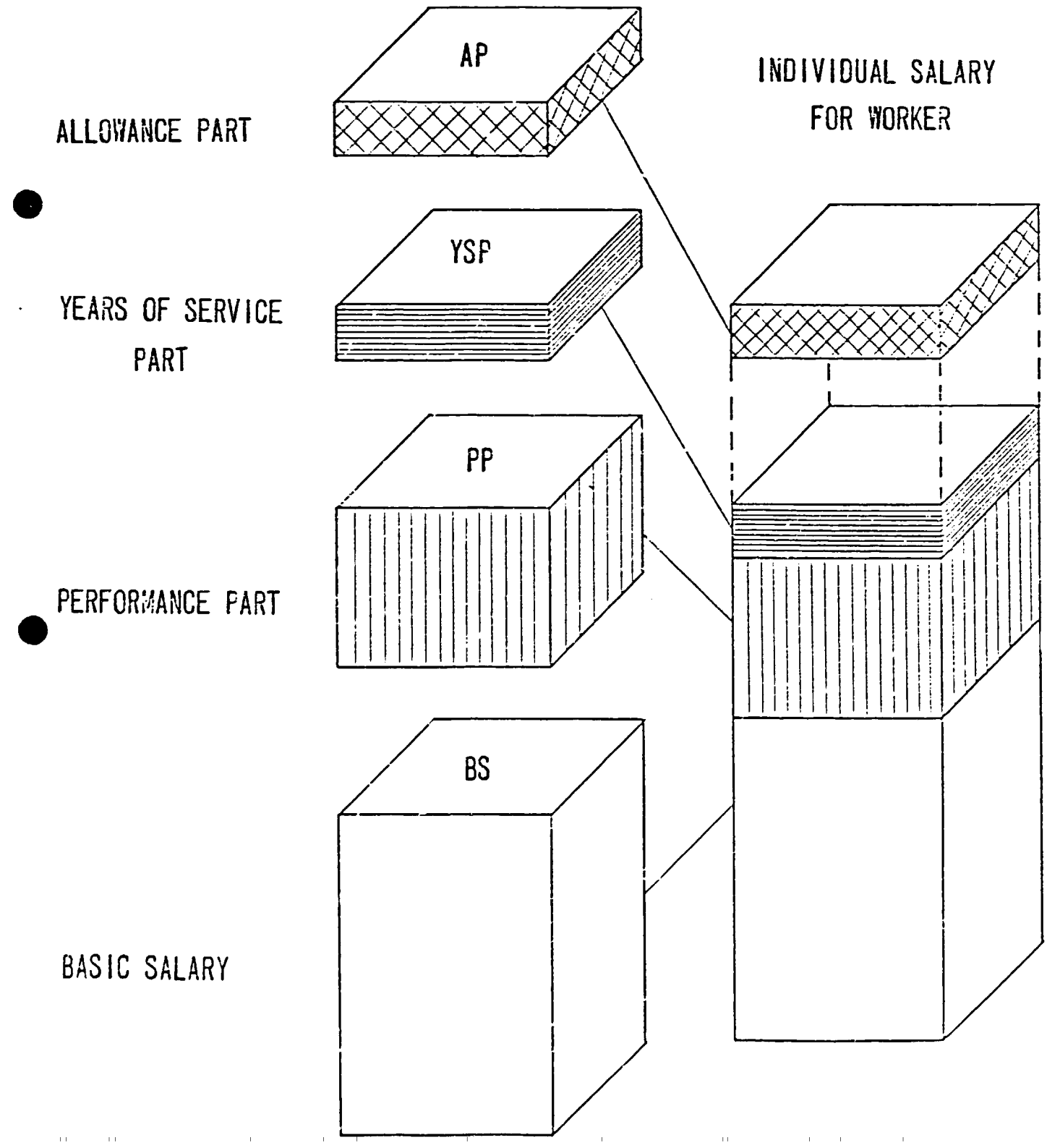
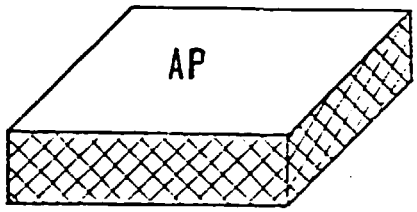
COMPOSITION OF SALARY SYSTEM



ALLOWANCE PART (AP)

According to law
or voluntary

e.g.
- Child allowance
- Overtime allowance
- Shiftwork allowance
- Night shift allowance
- Inconvenience allowance
- Dirt allowance



According to law or voluntary

↓

Allowance for
worker

COMPOSITION OF SALARY SYSTEM

ALLOWANCE PART

Which criteria should be considered?

a) allowances required by law

1. child allowance
2. overtime allowance (+25%)
3. night shift allowance

b) allowances according to contract

1. loyalty payments, years of service allowance
2. inflation payments
3. year-end bonus

c) voluntary allowances

1. shift allowance
2. inconvenience allowance
3. gratuity

COMPOSITION OF SALARY SYSTEM

ALLOWANCE PART

Which criteria should be considered?

a) allowances required by law

1. child allowance
2. overtime allowance (+25%)
3. night shift allowance

b) allowances according to contract

1. loyalty payments, years of service allowance
2. inflation payments
3. year-end bonus

c) voluntary allowances

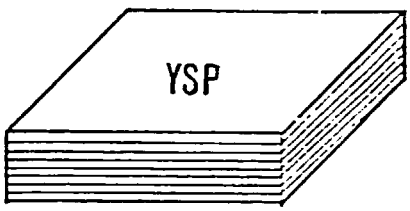
1. shift allowance
2. inconvenience allowance
3. gratuity

YEARS OF SERVICE PART (YSP)

According to years of service

Justification

- Workforce stability reduces fluctuation and cost of training
- Experience reduces amount of damages
- Possibility of fall in performance from older workers



→ Loyalty to company

Agreement with trade union

↓

Years of service part of worker

COMPOSITION OF SALARY SYSTEM

BASIC SALARY (related to the work task)

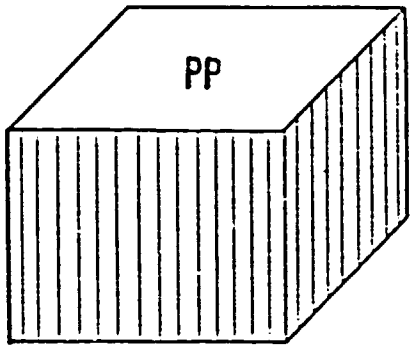
Which criteria should be considered?

Technical knowledge and capabilities	1.	Job training (apprenticeship, training)
	2.	Experience
	3.	Skill and dexterity
	4.	Mental capabilities
Responsibility	5.	for execution of work
	6.	for material and equipment
Effort	7.	Use of sense organs
	8.	Physical demands
Working conditions	9.	Risk of accident
	10.	Unpleasant work

PERFORMANCE PART (PP)

How can the worker carry out the tasks expected of him?

- Performance (quantity)
- Quality (level of quality)
- Behaviour



→ Performance level of worker

Performance evaluation
(time study and worker evaluation)

↓

Performance of worker

COMPOSITION OF SALARY

Evaluation of work

Evaluation of performance

Time allowed

Time study

Performance level

Basic salary

Salary class

+

Performance part

Earnings level in

=

Individual salary without allowances

+

Years of service allowance

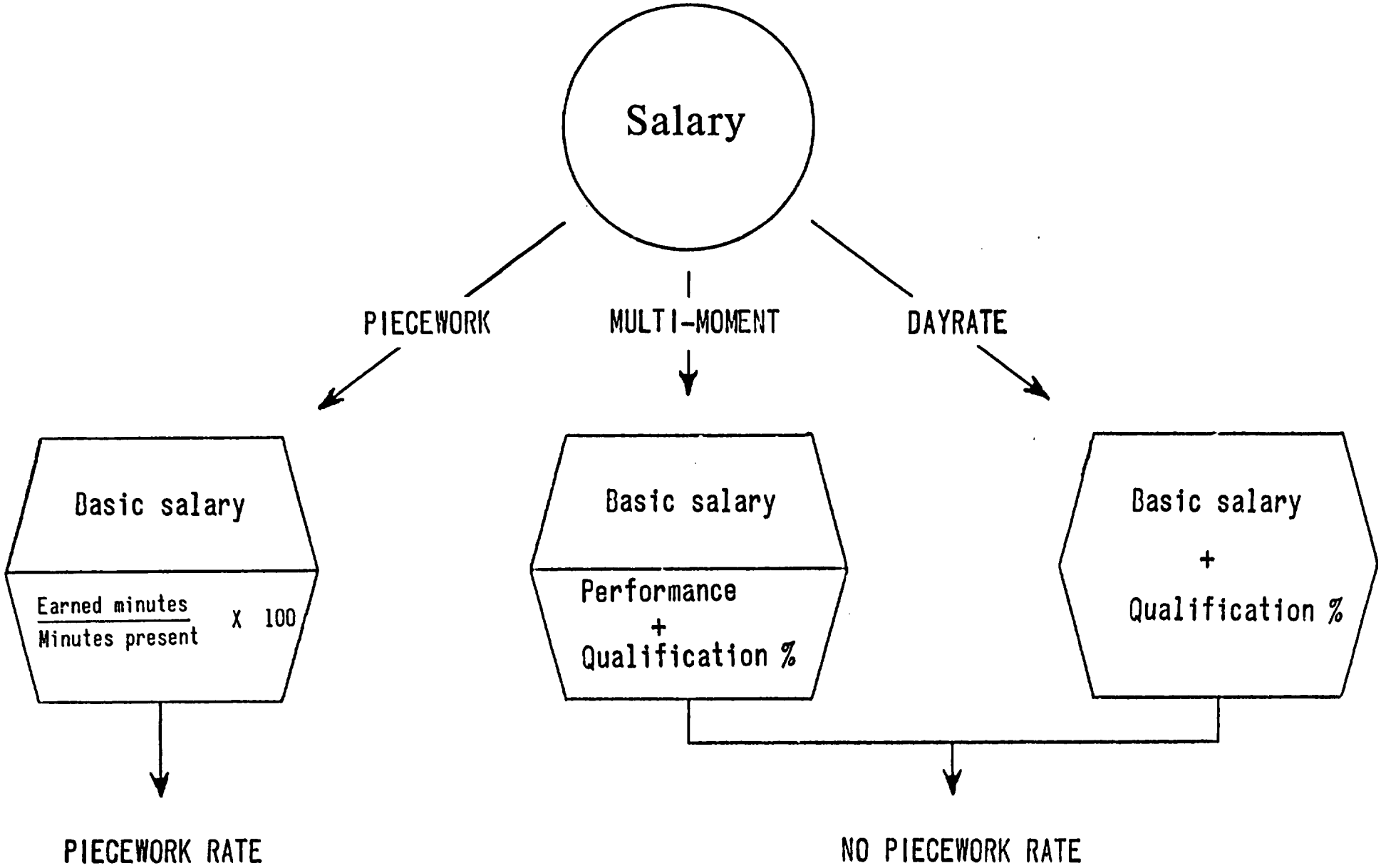
+

Individual allowances

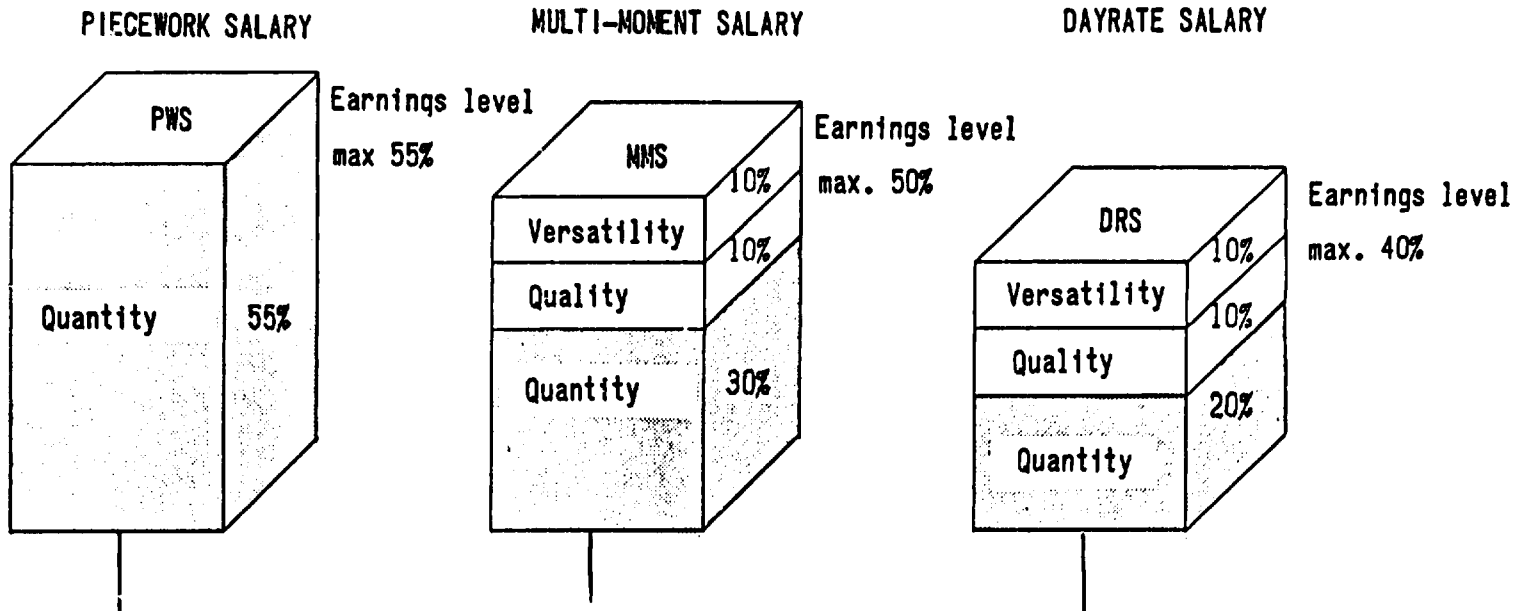
=

Individual salary including allowances

PAYMENT METHODS FOR WORKERS



DISTRIBUTION OF PERFORMANCE EVALUATION



Quantity

(Quantity performance)

PERFORMANCE (QUANTITY) = PART OF EARNINGS LEVEL

The actual performance is:	level	
significantly under average	inadequate 75–84 = 80	1
under average	adequate 85–94 = 90	2
average	normal 95–104 = 100	3
above average	good 105–114 = 110	4
significantly above average	very good 115–124 = 120	5
maximum output	excellent 125–134 = 130	6

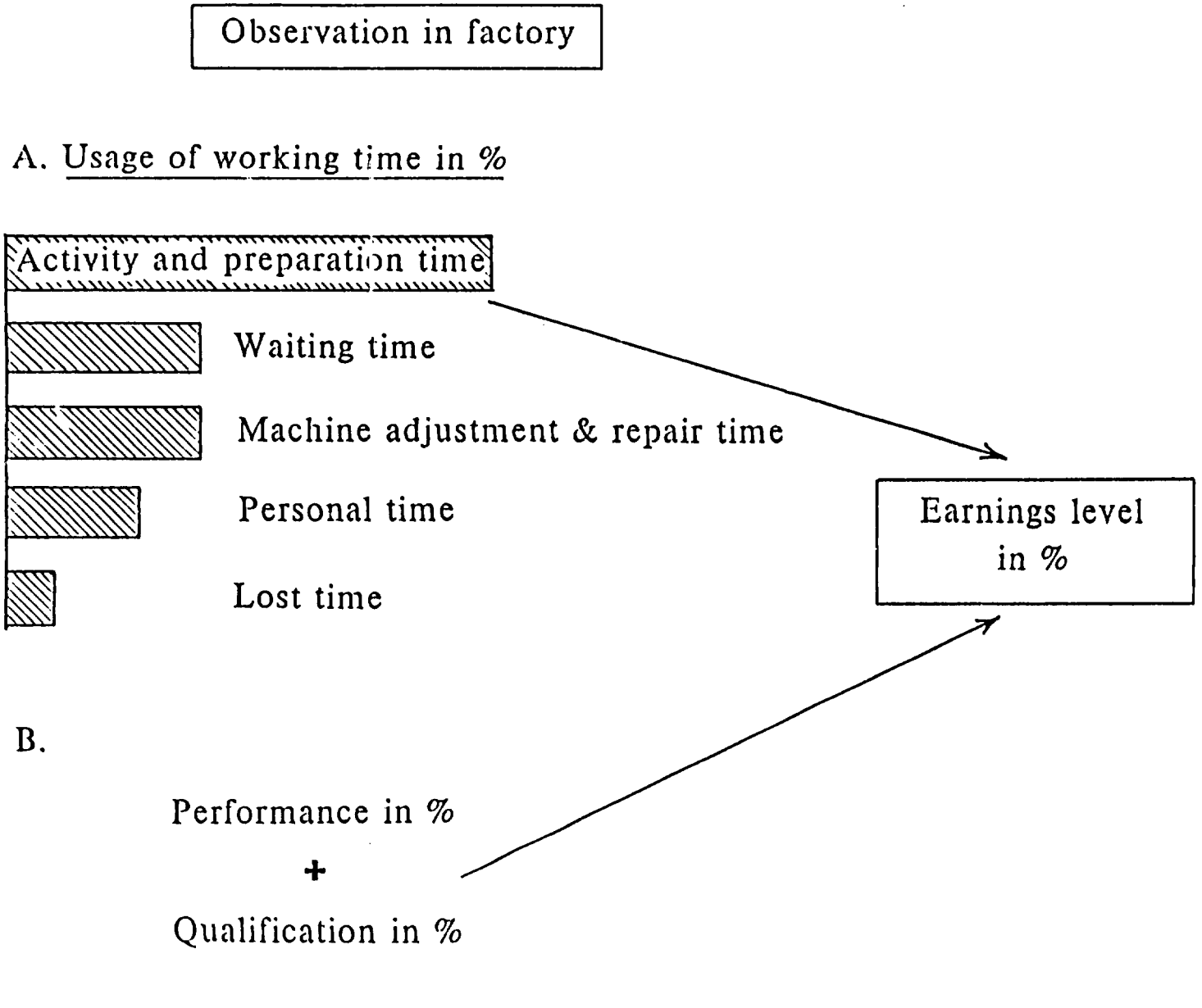
VERSATILITY = PART OF EARNINGS LEVEL

Actual versatility for various operations is:	level	
significantly under average	inadequate - 2½%	1
under average	adequate - - - -	2
average	normal + 2½%	3
above average	good + 5%	4
significantly above average	very good + 7½%	5
exceptionally versatile (moves often from operation to operation)	excellent + 10%	6

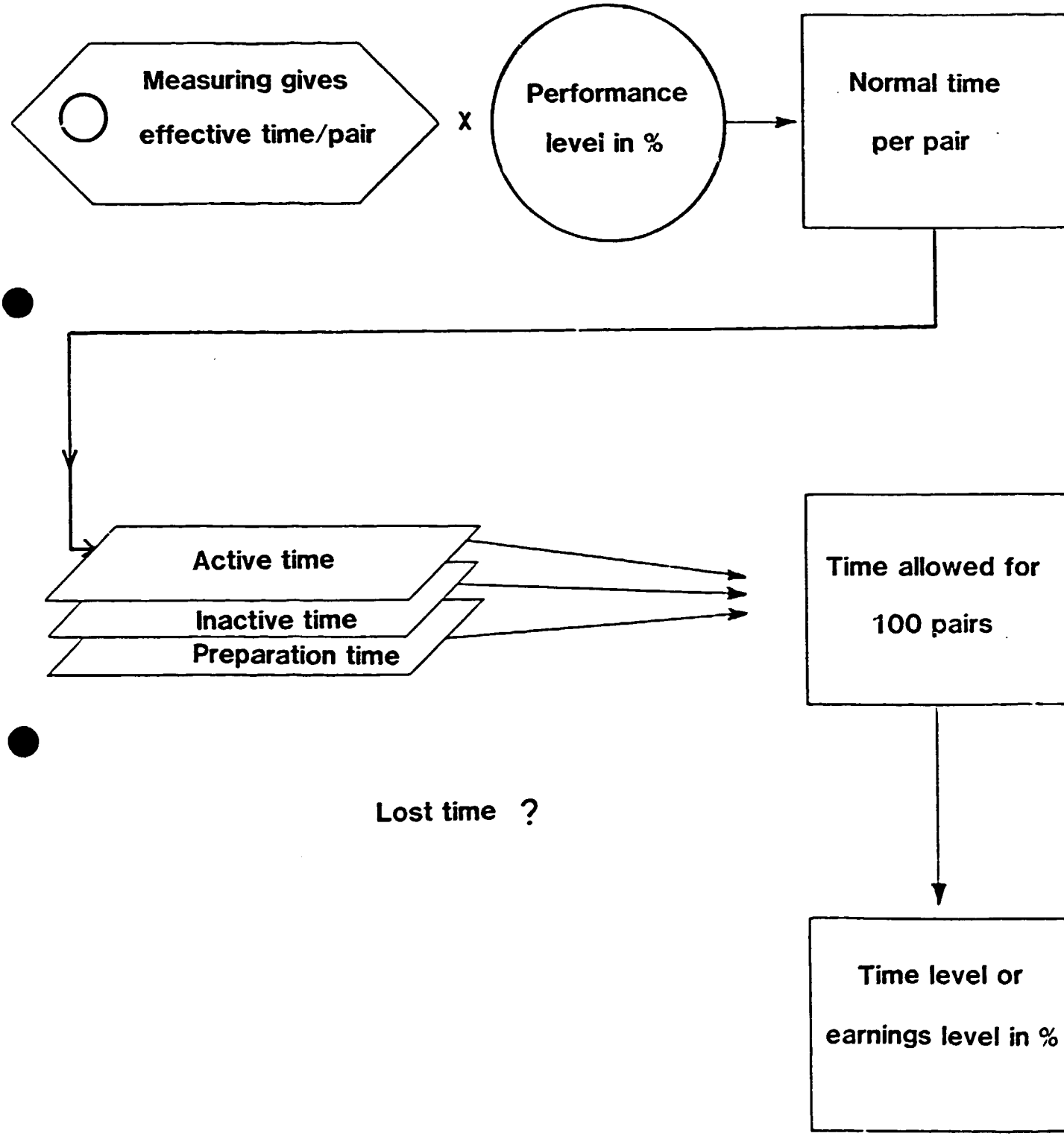
QUALITY LEVEL OF WORK = PART OR EARNINGS LEVEL

Quality of work carried out:	level	
significantly under average	inadequate - 2½%	1
under average	adequate - - - -	2
average	normal + 2½%	3
above average	good + 5%	4
significantly above average	very good + 7½%	5
top quality, execution and precision cannot be further improved	excellent + 10%	6

SCHEME FOR MULTI-MOMENT RECORDING



SCHEME FOR TIME STUDY RECORDING



CALCULATION OF TIME LEVEL

(monthly performance)

505	Trim piece	18,0		505
041	Strap	6,3		041

← Coupon book

PRESENCE IN PIECEWORK SALARY

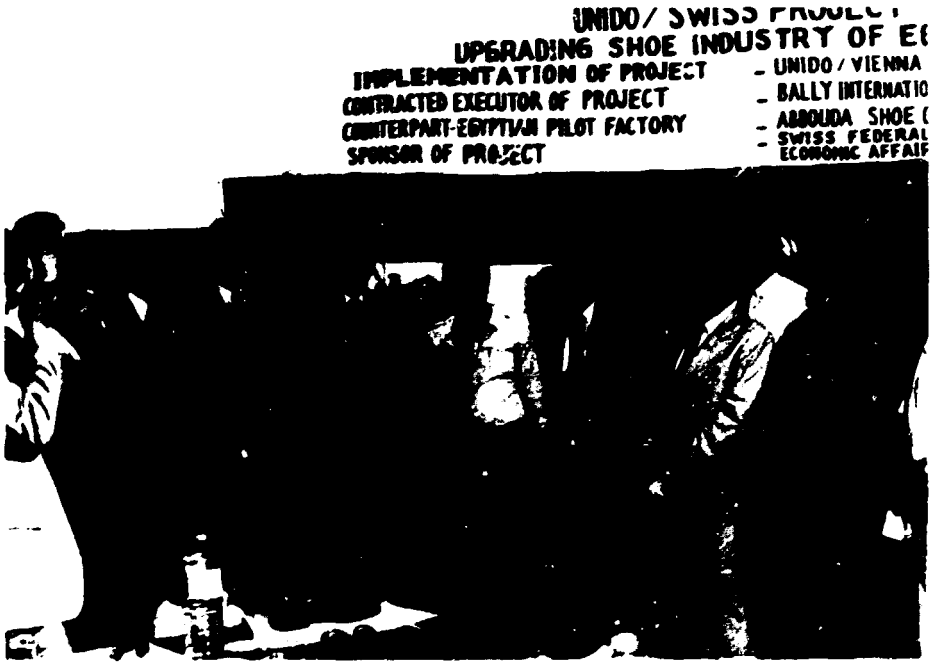
e.g. 186,0 HOURS PRESENT/MONTH

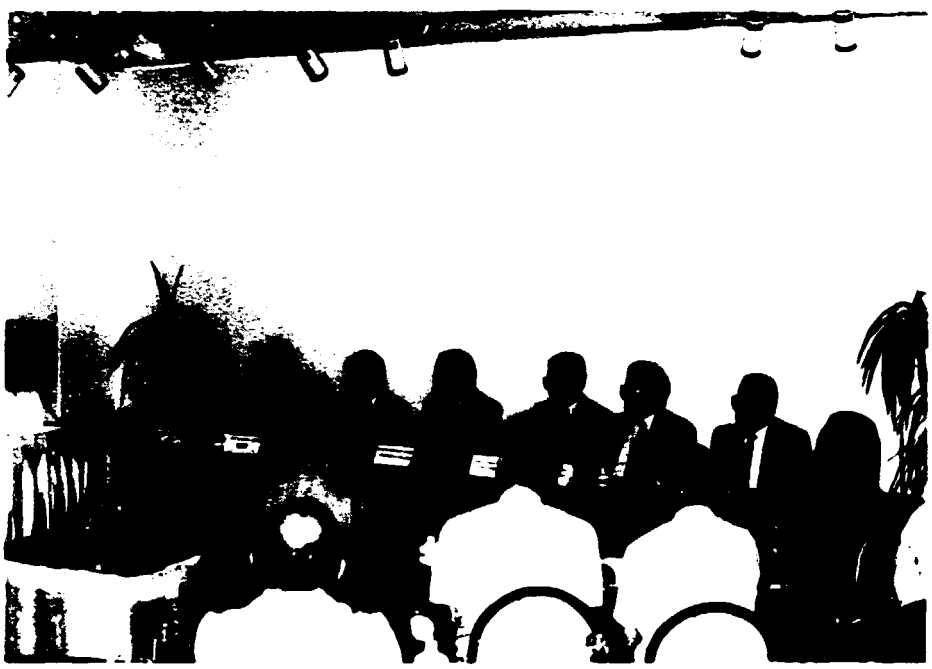
MINUTES ALLOWED PER MONTH e.g. 13'057
= 217,6 HRS.ALLWD./MONTH

$$\text{TIME LEVEL} = \frac{\text{HRS.ALLWD./MONTH} \times 100}{\text{PWS - HOURS PRESENT/MONTH}}$$

$$\text{e.g.} \quad \frac{217,6 \times 100}{186,0} = 117\ \%$$


UNIDO/ SWISS PROJECT
UPGRADING SHOE INDUSTRY OF EGYPT
IMPLEMENTATION OF PROJECT - UNIDO / VIENNA
CONTRACTED EXECUTOR OF PROJECT - BALLY
COUNTERPART-EGYPTIAN PILOT FACTORY - ABBOUDA SHOE CO.
SPONSOR OF PROJECT - SWISS


UPGRADING SHOE INDUSTRY OF E
IMPLEMENTATION OF PROJECT - UNIDO / VIENNA
CONTRACTED EXECUTOR OF PROJECT - BALLY INTERNATIO
COUNTERPART-EGYPTIAN PILOT FACTORY - ABBOUDA SHOE
SPONSOR OF PROJECT - SWISS FEDERAL
ECONOMIC AFFAIR



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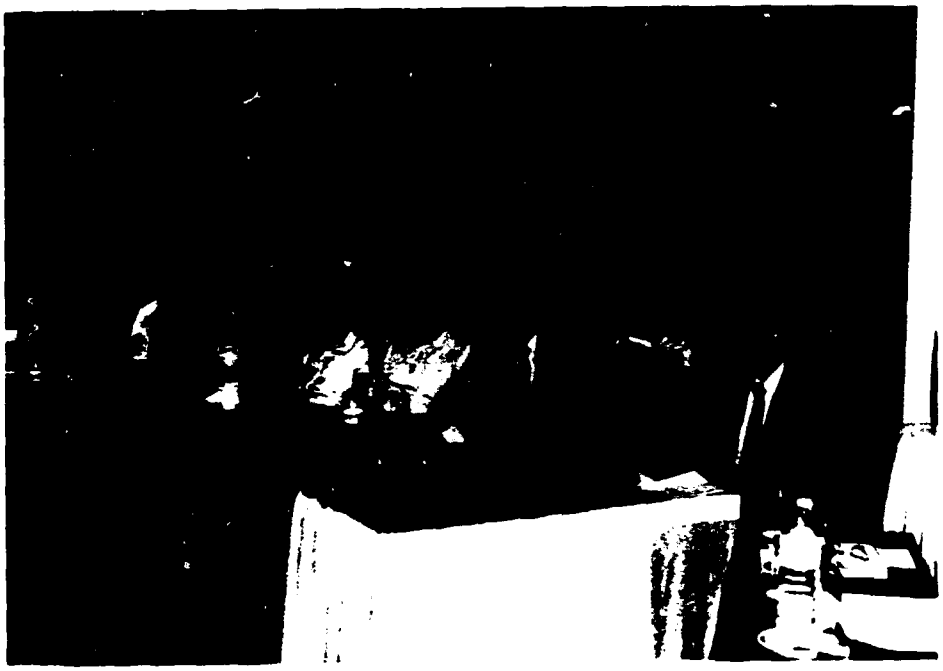
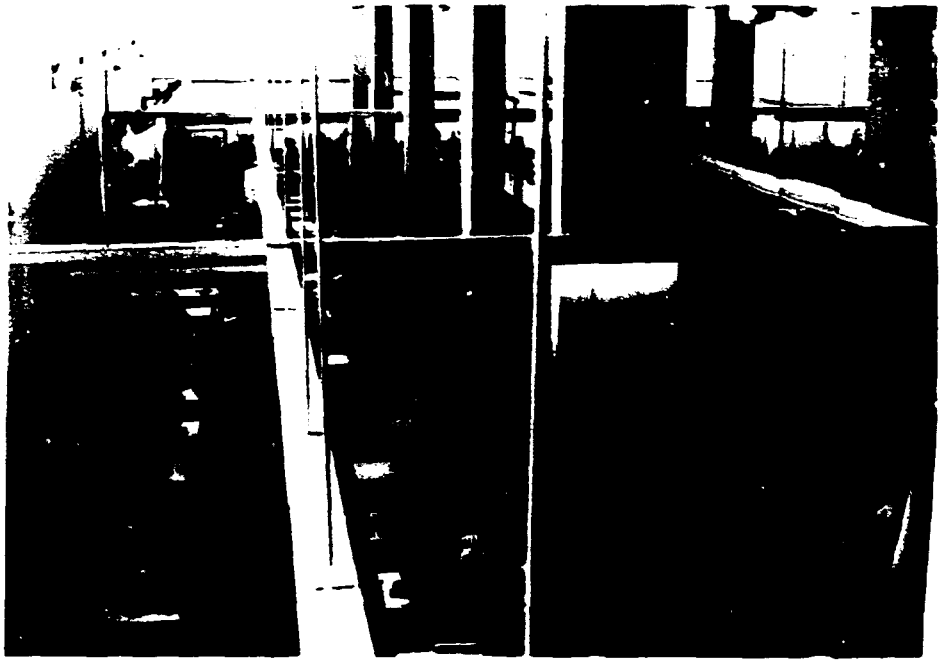


BALLY INTERNATIONAL Ltd.



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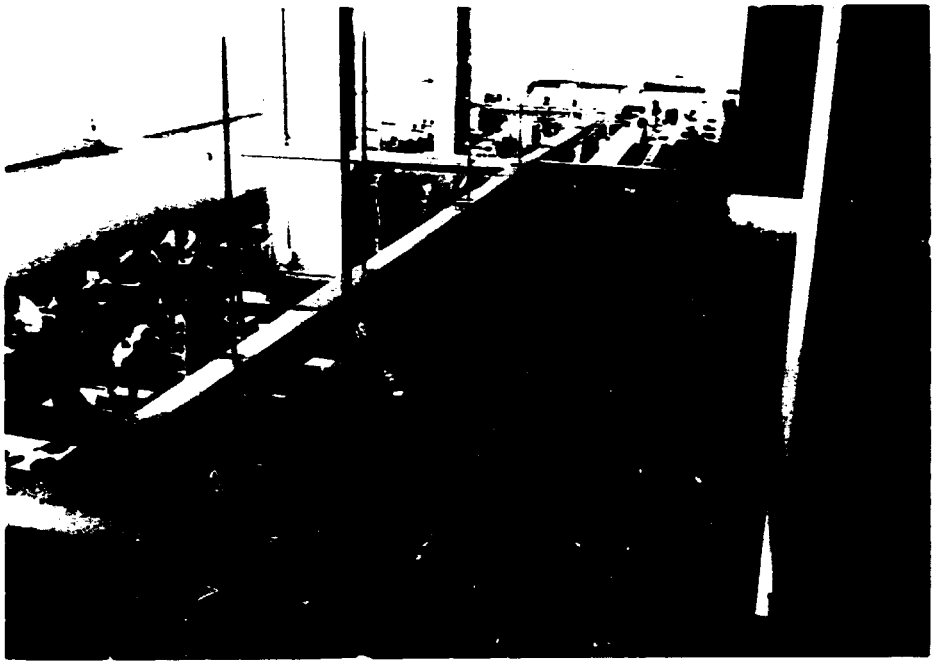

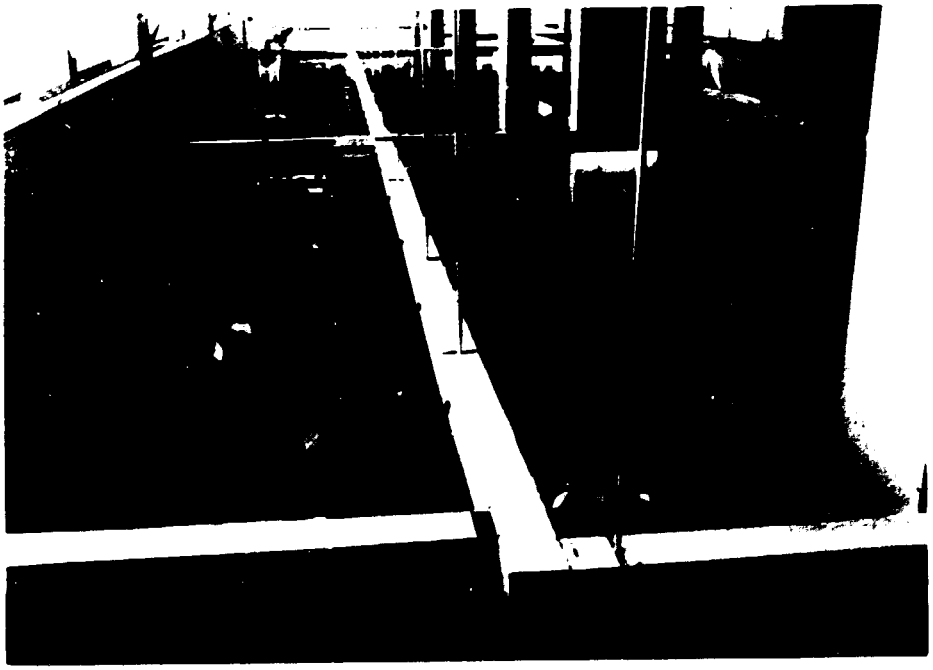

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