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Technical Report: U.K. Study Tour of Dr. Chaudhary with Dr. Ellis\*

Prepared for the Government of Pakistan  
by the United Nations Industrial Development Organization,  
acting as executing agency for the United Nations Development Programme

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Vienna

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## INTRODUCTION

The Study Tour (ST) was arranged by UNIDO for three weeks and commenced on Wednesday, October 9th 1986. It was originally intended to start on Monday, 6th October, but a Board meeting of the Pakistan Industrial Development Corporation (PIDC) on October 7th prevented the start on October 6th for Dr. Chaudhary, Managing Director (MD) of Qaidabad Woollen Mills. The British Council, London, contacted the organisations in the U.K. that were to be visited, both to arrange the tour as originally planned and, also to change the dates when the MD could not arrive for the original start on October 6th. The ST was made up of four essential parts, each of these dealing with the subjects as follows:

- 1) Radio Frequency Drying (RF) for textile materials processed at Qaidabad.
- 2) Quality Control Equipment for Qaidabad Mills.
- 3) Training Facilities for Qaidabad staff who were to be given Fellowships.
- 4) Other essential studies on
  - (a) UK techniques of processing Face-to-face Wilton carpet which could be helpful in improving quality and productivity at Qaidabad;
  - (b) techniques for processing the man-made fibres, acrylics and polypropylene;
  - (c) exporting of Wilton carpet from Pakistan.

These four parts involved meeting a total of fourteen organisations which will be listed and dealt with separately below. Respectively, for the four parts of the ST there were 4, 4, 2 and 4 organisations.

### 1. Radio Frequency Drying

The four organisations with whom discussions took place were

- (i) International Wool Secretariat (IWS), Ilkley, West Yorks.

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- (ii) Strayfield International of Reading
- (iii) Rosefair Electronics, Watford, England
- (iv) Pegg-Whiteley, Leicester

Each will be considered below:

- (i) IWS - this organisation, financed by the main wool growers of the world, is principally concerned with research and development (R+D) for Textiles internationally, with the obvious emphasis on wool processing. Their R+D results in many most useful free services to industry, and, in addition, they give testing facilities; Qaidabad uses this service. They have full scale textile processing at Ilkley, including carpet manufacture, with specialists in this field. For the ST the main aim was to discuss their own Strayfield International Radio Frequency Drying equipment, and obtain an unbiased opinion on this drying technique, IWS confirmed the complete success of the RF technique and its now relatively long and satisfying use in the UK textile industry.

Their Strayfield International RF Dryer was examined in detail and was fully successful for the kind of materials to be processed at Qaidabad. It was fortunate that staff from Strayfield were at IWS with a delegation from the Chinese Republic, and many aspects of the system were dealt with for us by Mr. Tweedie (Director) and his colleague, Mr. Blake. One important point was discussed concerning the Wool Industries Research Association's (WIRA) mild warning on the RF system mentioned in a letter to UNIDO/Qaidabad in the correspondence concerning the UNIDO project at Qaidabad. Mr. Tweedie explained why WIRA might have felt such a mild warning was necessary, but emphasized the invalidity of such a warning with respect to Strayfield RF machine. He confirmed again what has been said by other successful users of Strayfield RF equipment - it is totally successful and goes from strength to strength.

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Additionally, Dr. John Ince of IWS gave other useful data on Wilton carpet processing, in particular the vital aspect of 'yield' with woollen yarn processing. This involved the variables of moisture content and lubricants. The quality control equipment needed for Qaidabad was also discussed, item by item, and priorities established.

The question of agents for exports to the UK was raised by the MD, and speedy and effective action by Dr. Ince resulted in the meeting with an agent as discussed below.

- (ii) Strayfield International. This relatively large company has sold the most RF systems to textile manufacturers; recently the figure of 250 machines was published. It is important to realise that Strayfield manufactures only RF systems, not only for textiles, making all the necessary parts; they have also a service base in India. This makes them outstanding for experience and reliability in after servicing.

Mr. Tweedle, a director, discussed fully the important features of their system; safeguards for the generator were particularly examined because of the high proportionate cost of this item. On the matter of the total cost, since no agent was used, there would be a 10% discount allowed, and a further 10% discount would be given because of the promise to show the RF system to others in Pakistan interested in purchasing RF drying machines.

Mr. Beattie gave us a tour of the works after Mr. Tweedle's discussion and we saw an impressive layout which indicated the continuing success and development of the Strayfield RF drying system. Mr. Beattie, on questioning, explained what Strayfield had done about the diagnosing of any difficulties that may arise in the use of their system, for the customer, when the machine was received. It was stressed how infrequently troubles occur and how relatively simple Strayfield had made diagnosis. Their machine specifications, sent with the quotation, show necessary safeguards used for the RF machine technique; the

oscillator specification includes a D.C. conversion efficiency, at full load, of between 67 and 72%.

- (iii) Rosefair Electronics. A company not as large as Strayfield, and involved with industries other than the textile industry. It is, however, very successful and is owned and run by Mr. Conway, a dynamic RF specialist who would give an excellent personal after service should it be required. It was not envisaged that the RF system would give any major problems in its use in Pakistan but Mr. Conway's method of dealing with any problems is to fly out and deal personally with them.

As with Strayfield, matters such as voltage fluctuation and its effect on the expensive RF generators were discussed; extraction of moisture, automatic arc limiter in case of excess power, and overheat and overload protectors are specifically mentioned in their quotation. The latter, incidentally, is considerably less than Strayfield's, but it is necessary to weigh this against the wide and successful textile experience of Strayfield International and their after-service arrangements.

- (iv) Pegg-Whiteley. A company, long established in the successful manufacture of textile dyeing and finishing machinery. There was a mention of 50 RF machines sold, but they do not produce their own generators - a most important and costly part of the RF system. They were able to quote also for a hydro-extractor, the first (mechanical) drying machine in the sequence of drying textile materials. It is essential to have an efficient hydro-extracting drying procedure prior to RF drying.

Their quotation will be similar to that of Strayfield, and therefore higher than Rosefair, but it is essential to consider, even with Pegg-Whiteley, the outstanding experience and success of Strayfield in the RF drying field.

Pegg-Whiteley mention in their RF generator specifications that suppression and overload protection are provided. They have sold an RF machine to Premier Hosiery of Pakistan.

## 2. Quality Control Equipment

There were three main suppliers of quality control (QC) equipment to visit in the UK.

- (i) WIRA in Leeds
- (ii) James Heal of Halifax
- (iii) Shirley Developments Ltd. (SDL) of Manchester

The items finally decided upon as the first priorities for Qaidabad were:

- (1) Fibre length measuring machine
- (2) Portable carpet thickness gauge
- (3) Hand driven wrap reel
- (4) Fibre fineness meter
- (5) Rapid regain tester
- (6) Two balances - one low range precise and digital, and the
- (7) other wide range general digital
- (8) Digital tachometer
- (9) Rapid oil extraction tester
- (10) Laboratory bench dyeing equipment
- (11) Single thread strength tester with a suitable strength range
- (12) Templates for nep count
- (13) Whirling hygrometer for humidity measurement
- (14) Digital pH meter
- (15) SDL 210 A Laboratory colour matching cabinet
- (16) SDL Laboratory oven
- (17) Tension meter

In addition to the discussions with the three firms above, Dr. John Ince at IWS gave his views on the items listed. Quite sensibly, he made the points that equipment purchased should be purposefully and regularly used, and that sophistication is not always necessary or the best criterion. He queried, for example, whether a fibre length diagram could be made manually rather than by using item(1) above. He also mentioned that item (10) might be used for tuft withdrawal

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testing and commented upon Soxhlets for grease content measurement.

The cost and function of each of the items listed were discussed with the three suppliers; most could be provided by each of them. All items could be purchased through these suppliers. In the case of WIRA, they have an agent, Brady and Co. of Pakistan Ltd. in Karachi.

The discussions were most helpful and useful in establishing priorities ensuring better understanding of machine functions and suitability. On these latter points, we were able to visit the demonstration laboratories of suppliers and examine closely the equipment in use.

#### NOTES

1. The making of pile height gauges, as shown to us at IWS by Dr. Ince, was raised with Mr. Tom Govier at SDL and also at James Heal. These gauges do give a quick and reliable pile height measure. Could they be made at Qaidabad if not quoted for?
  2. WIRA mentioned that for measuring humidity there could be a Thermographic device used.
  3. WIRA stated that no oil extraction test, for grease content of less than 1%, was needed.
3. Training facilities for Qaidabad staff
- The two organisations that be used for training are:
- (i) The Textile Department (Carpets) at the College of Further Education, Kidderminster, Worcs.
  - (ii) Wilson and Longbottom of Blackburn, Lancashire (previously of Barnsley, Yorkshire).

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Carpet Studies at Kidderminster College

We were given a most useful visit at Kidderminster, and the discussions with the Head of the Department of Art, Design and Carpet Studies, the Vice-Principal, the Principal and two staff members, Mr. Derek Smith, who deals with the theory and practice of carpet manufacture, and Mr. Len Griffin who is senior staff overlooking the Degree Course were extremely useful.

There was full co-operation in offering the facilities of the Department for Carpet Studies to give training to the PIDC Qaidabad Fellowship holder. Mr. D. Smith would be able to give a special training programme in Wilton face-to-face carpet production. The College has a very comprehensive range of carpet producing machinery, and the training programme would be practical in nature, as we emphasized. Mr. Smith is an excellent tutor since he has a wide and deep knowledge of the actual running of carpet looms and tufting machinery in the department.

The Head and Mr. Smith have supplied a full syllabus on Wilton face-to-face looms. The general approach is stated as follows:

- (a) Theory
- (b) Demonstration
- (c) Timing and Setting exercises
- (d) Erecting and Dismantling.

Mr. Smith has invited us to suggest any additional topics for the detailed syllabus that we may wish to have.

The College executives and staff made it clear to us that they would be willing to accommodate our special requirements in every way possible. We stated our estimated training period, our special requirements on the practical side with respect to Wilton face-to-face weaving, and the details of the Qaidabad staff member who would be awarded the Fellowship. The College were quite satisfied with these requirements and details of personnel from Qaidabad. There is already a student from Pakistan in the Carpet Studies Department who would be able to help with language or other problems.

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Wilson and Longbottom - Wilton carpet loom makers

The company were not making face-to-face looms when we visited, and it seemed that on loom training facilities at this company would be very uncertain in the future. There could be training in the sense that staff at this firm would co-operate in discussing loom matters and we found that they were helpful and useful in this respect, throughout our visit.

The two staff members, Mr. Burns and a colleague, promised to get out for Qaidabad, a loom manual which would help considerably in training programmes, for a Fellowship holder and staff at Qaidabad. The urgent need for such a manual was emphatically stressed to Mr. Burns, and the discussion on the question of loom efficiency (not unrelated to training matters) was dealt with at a point in the visit. Preparation of beams was emphasised by Mr. Burns, and the discussion led on to the nature and function of the two beamers at Qaidabad. The pile yarn beamer was particularly mentioned, and the need for such a beamer to be extremely robust was reiterated. The tensioning arrangements for the yarns should be such, together with the required strength of the machine, as to produce the correct winding-on tensions leading to suitable yarn (on beam) hardness.

Many weaknesses in the yarn can be more effectively taken out from correctly tensioned beamed yarns, thus avoiding their being present in weaving and causing loom stoppages. A beamer stop, due to a weak yarnbreaking, is more easily dealt with than at the loom; loom efficiency will thus improve with more effective beaming.

Mr. Burns made the following points and requests:

1. Could the weft cops be measured so that they will run out together, i.e. give one loom stop for two cops being replenished instead of two? Some waste reduction and increase in loom efficiency could result.
2. Humidifying the atmosphere should improve weaving and spinning performance.

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3. Could they have the horse-power H.P. of the pile beamer?
4. Could samples of yarns be sent to them at Blackburn?

4. Other essential studies

(a) Techniques of producing face-to-face Wilton carpet in the UK

We were permitted to visit the commercial plants of Gilt Edge Carpets in Kidderminster (now sold to Crowthers), and Firths Carpets in Bailiff Bridge, Brighouse, West Yorkshire (part of Readicut International). These were large and interesting production units making Axminster as well as Wilton carpets; the latter firm also made tufted carpets on a large scale. Our main interests were in the Wilton section and there were useful points gained there. These comprehensive visits, however, did give a fuller insight into all carpet processing and this was extremely valuable.

- (i) At Gilt Edge Carpets we studied loom staffing, the nature of the preparatory processes for the loom and were given high strength polypropylene yarn samples which were used in the backing fabric. Loom efficiency was higher than Qaidabad with only one weaver per wide loom. The beams used were hard and obviously performed very well, bearing in mind the loom efficiency and staffing.
- (ii) At Firths Carpets, there were the same good standards in loom efficiency and staffing, and the preparatory processes for the loom were good. There were high strength yarns used for the carpet backing base fabric, and polypropylene was used as at Gilt Edge Carpets. The ancillary minor processes of hand shearing of carpet samples (made of tufting board by hand) and pile yarn splicing were seen, names and addresses of suppliers were obtained. A quotation has now been obtained for the hand shearer.

In the finishing of carpets, the machine shearing of carpet pile surface was restricted to one main and one light shearing. Another useful aspect of processing seen was the handling of materials for hydro-extracting (in this case hanks and not loose stock as a Waidabad). The important

feature of this handling was that all the hanks in the batch were placed in canvas containers, and this only was mechanically hoisted in and out of the hydro-extractor, avoiding the wasteful handling of individual hanks.

(b) Techniques for producing acrylic and polypropylene fibres

- (i) It had been possible for Dr. Chaudhary to meet the UK agent, Mr. Gilbert Salmona of Leeds, who acts for the West German company, Neumag; they make acrylic processing machinery. During the very informative talk, Mr. Salmona stressed that the acrylic production line had first a chemical manufacturer involved before the Neumag processing machinery was used. Mr. Salmona stated that there were regular visits to Pakistan by Neumag representatives, but also a visit to Neumag near Hamburg could be arranged for Dr. Chaudhary. Mr. Salmona 'phoned Baildon for Dr. Chaudhary's telephone number in the U.S.A., but subsequently Dr. Chaudhary telephoned him for a final discussion before leaving the UK.
- (ii) A visit was arranged to Plasticisers, Drighlington, Leeds ( a branch of Readicut International), and Mr. Firth, the Managing Director, and his Production Director gave us a comprehensive tour of the works. The whole plant was impressive and the newer production lines were even more so. Mr. Firth kindly arranged for Dr. Chaudhary to have a bale of polypropylene staple fibre delivered to him in Pakistan along with a batch for a customer of Plasticisers in Pakistan. The main carpet outlet of the polypropylene staple made at Plasticisers was in carpet pile yarns.

(c) Exporting of Wilton face-to-face carpet to UK from Pakistan

A meeting was arranged with Mr. Stan Lister, an agent known to Dr. Ince of IWS. Samples were sent by Qaidabad and received within a few days by Mr. Lister, who expressed a great deal of satisfaction on their quality. He did mention that tuft definition might be improved, and that the quality might be lessened somewhat with the advantage of reaching a mutually

acceptable price. He 'phoned Baildon several times to follow up on the first discussion. and on one occasion he asked about quota and/or tariff regulations for Pakistan carpets imported into the UK.

On another occasion, there was a discussion about the pile yarn specifications, turns per inch, fold number and count, since he felt that a 2-fold yarn might be more suitable for the carpets with which he might deal from Qaidabad.

#### SUMMARY

The study tour throughout was successful, and the kindness and co-operation of all who received us was outstanding. The business with which we had to deal was accomplished smoothly and effectively.

All the RF visits yielded valuable information; it has to be firmly stressed that Strayfield International impressed us the most as providing a reliable unit and after service with a well-established manufacturing base. This is said despite the lower quotation from Rosefair, and the energetic, dynamic and technically sound owner of this company who dealt with us.

There were full discussions and viewing for the QC equipment, and the purchase of everything required at Qaidabad will be straightforward. The question of which of the four suppliers will be chosen for each item will be dealt with thoroughly, when the quotations and specifications have been closely studied at Qaidabad.

Training facilities can be suitably arranged for a Fellowship holder to study the production of face-to-face Wilton carpet. The place will be the Technical College in Kidderminster, in the department dealing with Carpet Studies. All staff there assured us of their full co-operation in this venture, and their ability to cater for the needs of the Fellow and PIDC, Qaidabad. Some back-up can be provided at Wilson and Longbottom at Blackburn, and this company has promised us a manual for using particularly with the training at Qaidabad.

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The technical visits to two large UK carpet manufacturers were excellent because they provided first hand experience of face-to-face weaving and other forms of carpet manufacture. Additionally, the use of weaving yarns and properties of these yarns were discussed in detail, as was the preparatory processes for weaving these yarns i.e. beaming in particular. Some important aspects of finishing were also examined during these visits.

Techniques for processing acrylics and polypropylene fibres were discussed with the agent for the former, and seen and discussed with top executives of Plasticisers for the latter. The outcome was that all the main essentials of these processes, particularly the machinery, were very well understood after these meetings. Contact is still being maintained with the agent for the acrylic processing and a large sample of polypropylene is being sent to Pakistan for Dr. Chaudhary gratis from Plasticisers. They will also remain open for discussion as and when required.

The export of Qaidabad carpet to the UK was thoroughly investigated with an important agency in the UK. The agent was very pleased with sample sent, in fact they seemed a little too good; discussion is being continued on reducing slightly the quality to obtain a mutually acceptable price.

(signed) Peter Ellis  
8/11/1986