

**Restricted  
Technical Report  
PP/1992-1993/II.A**

# **SAUDI ARABIA**

Participation Programme

## **Assistance with Computerized Braille Production**

by David Deere

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SAUDI ARABIA

ASSISTANCE WITH COMPUTERIZED  
BRAILLE PRODUCTION

by David Deere

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Summary

The mission described in the present report was carried out from 23 October 1993 to 8 November 1993 at the request of the Government of Saudi Arabia, and was funded by UNESCO under its Participation Programme for 1992-1993.

The purpose of the mission was to carry out an assessment of the present system of computerized braille production and advise on improvements and further developments in line with recent technology.

This report considers the options available to improve the braille production facilities used by the Ministry of Special Education in Riyadh, Saudi Arabia.

The staff at the *Special Education Press for Braille* are producing good quality books but are using old and outdated machinery to do so. Most of the equipment is 15 to 20 years old, and some is over 40 years old. Employees have a good knowledge of braille production and have the potential to utilize new technology to increase braille production.

The existing press buildings are in good condition and there is sufficient space for the proposed new equipment without requiring any additional site works. A completely new building of twice the existing size is planned within the next three to four years.

Many new pieces of equipment are proposed to modernize both office administration and braille production. The latest braille computer systems greatly speed the transcription of books by providing quick braille translation and easy error correction. A computerized system can print directly to a paper embosser (which makes smaller print runs economical) as well as a zinc plate embosser.

A printing press using zinc plates will still be required for high volume printing and it is proposed that the existing equipment be supplemented with a new press.

Some computer technologies that could be utilized in an English speaking environment such as text-to-voice and optical character recognition (scanning) are not generally available in the Arabic language.

Selection of individual pieces of equipment needs to be investigated further by a person with good knowledge of computer braille systems. This would best be done by someone travelling to the countries of manufacture of the equipment.

In summary, there is great potential to enhance the quantity and variety of braille output from the Braille Press by upgrading facilities.

## I. BACKGROUND INFORMATION ON THE BRAILLE PRESS

1. The Braille Press at Riyadh produces books for the Ministry of Education for primary, intermediate and secondary school children. Most of the books produced are Arabic language (90%) with the remainder being English language. The demand for braille materials from schools is higher than the current production capacity. The services provided could be expanded if extra capacity was available - for example, general reading books/monthly magazine/children's books, etc.

2. Saudi book production is centralized in Riyadh. Completed books are distributed to Institutes for the blind throughout Saudi Arabia. A separate organization (Middle East Regional Bureau for the Welfare of the Blind) distributes books to neighbouring Arabic countries such as Oman, Jordan and Bahrain.

3. Statistics from a 1992 survey show the number of institutes and children served. The Ministry of Education estimates that the number of students has increased approximately 10 per cent since this survey.

Sex	Number of Institutes	Classes	Students	Teaching Staff
Boys	7	87	426	189
Girls	3	29	199	75

4. Braille transcription onto zinc plates is achieved with:

- a computerized embosser
- three manual stereotyper embossers
- a manual drawing embosser

5. Printing is performed using zinc plates in a printing press. Binding of books is by stitching and gluing.

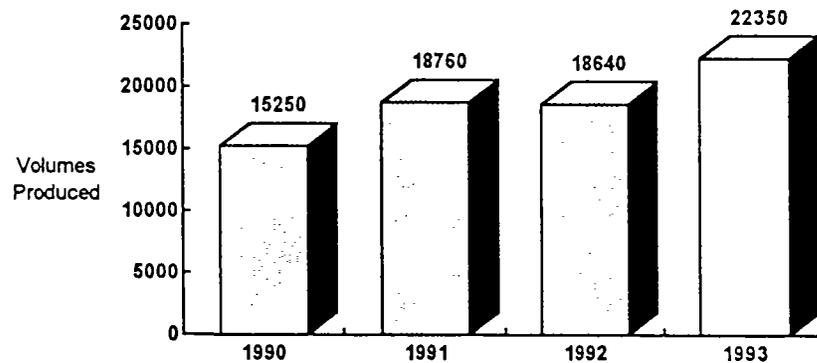
6. Almost all of the equipment used is old and in need of modernization. A complete inventory of major equipment used in the Braille Press is listed in the following section of this report.

7. Requests for books to be produced are issued to the Braille Press by the General Secretariat of Special Education (Ministry of Education). Requests for any thermoformed diagrams are issued (by the Ministry of Education) to the Educational Materials Department at the Al Noor Institute.

8. The following points summarize some additional observations about the press:

- Funding for the press comes from the Ministry of Education.

- Staff have a good idea of what is needed to produce braille books - many experienced people.
- There is an engineer with a high level of mechanical skills for repairing braille production equipment (and Perkins Brailers too).
- The single computer embosser produces 40 per cent of zinc plates. The three stereotypers produce 60 per cent. (Therefore the computer braille system is approximately twice as productive as each manual embosser.)
- The Braille Press has transcribed approximately 300 books/titles.
- Physical quality of books being distributed is good (binding/covers/etc.).
- The buildings that currently house all of the equipment are in reasonably good condition and no further building work or expansion is required to accommodate the proposed new equipment. A new complex of over 3000 square metres has been planned, and architect drawings have been completed. It is envisaged that the new complex may be constructed in three to four years time. The new complex will be approximately twice as big as existing facilities.
- Braille Production for the last four years (in Braille volumes) was as follows:



- Thermoformed diagrams are produced at the Al Noor Institute for the Blind. The Institute is adjacent to the Braille Press, but is not directly managed by the Braille Press. There is a low degree of direct co-operation between the two facilities as management is handled by the Ministry. Diagrams produced by the Institute are distributed throughout Saudi Arabia.

## II. EXISTING FACILITIES

9. The Braille Press has many items of machinery available to produce books. However, almost every piece requires refurbishing or replacing. A summary list of major equipment follows:

Type of equipment	Qty	Brand/Model	Country	Age	Condition
High Speed Industrial Printing Press	1	Krause Mirus	Germany	20	Fair
Stereotype Embosser	3	Marburg	Germany	16	Fair
Diagram Machine for zinc plates	1	Ernest Moy	England	16	Poor
Computer Embosser for zinc plate	1	Marburg PUMA ESV with Facit tape system	Germany	12	Fair
Vertical embosser	1	Lynes	England	24	Poor
Binding/Stitching machine	1	Martini - FD/3253	Switz.		Fair
Binding/Stitching machine	1	Freccia	Italy	1	Excellent
Guillotine (Med. Duty)	1	Hofherr	Germany	32	Fair
Guillotine (Heavy Duty)	1	LMN	Italy	16	Poor
Printing Press (used for test printing)	1	Polygraph Victoria	England	48	Poor
Wire stitching machine	1	Thumeke	Germany	21	Fair
Large Thermoform	1	Illig	Germany	11	Good
Offset print machine	1				Poor
2 tonne Fork lift	1	Toyota	Japan	1	Excellent

### Notes:

- Some of the machines were second-hand when acquired for the Braille Press.
- The offset printing machine is no longer used and is considered unusable. It may be possible to recondition this machine if there was sufficient demand for its use.
- The PUMA computer Braille system was one of the first models manufactured. The NCR/Facit tape system is still operational, but is now obsolete.
- The Diagram embosser is in extremely poor condition. The engineer has been forced to substitute makeshift parts to keep the machine operational.

### III. SUGGESTIONS/REQUESTS FOR IMPROVEMENTS

10. Both the Ministry of Education and the staff of the Braille Press offered ideas on how the current system could be improved to increase braille production.

#### **Suggestions from the Ministry of Special Education**

11. The following preferences were stated by the Ministry of Special Education regarding any solutions offered:

- There are not many jobs available to blind persons in Saudi Arabia, and therefore the Ministry would like to utilize as many as possible in any new developments.
- Integration of any new equipment with existing equipment.
- A computer to be used for administration was discussed. One of its main uses would be keeping statistics for historical purposes and for forward planning.
- More communication with the committees who prepare the syllabus, so that they might have advance notice of which new books are to be prepared.
- In the longer term the Ministry would like to produce a greater variety of materials such as magazine articles and general interest brochures, as well as university books.

#### **Suggestions from the Braille Press**

12. The staff at the Braille Press requested the following:

- That many of the old machines be replaced. They have difficulty obtaining spare parts, and production time is lost due to malfunctions and breakdowns.
- A computer system be installed to produce Braille text, both onto paper and zinc plates.
- Consider the possibility of using lighter weight paper to reduce the bulk of each Braille volume. This would be especially useful for the younger children.
- They would like to produce some books in "Braille over Text" format (e.g. each Braille line is overlaid with a matching print line). This format would allow sighted persons to assist a blind student to read.

#### IV. DIFFICULTIES WITH EXISTING SYSTEM

13. The main problem with the day-to-day production of Braille is the poor mechanical state of embossing and printing equipment. Almost all machines are 15 to 20 years old and one is nearly 50 years old. The engineer responsible for maintaining this equipment has devised many ingenious solutions to keep things working. For example, the braille diagram embosser has been repaired using pieces salvaged from a home video recorder.

14. The size of the zinc plates used on the computer embosser are different to the Stereotyper zinc sheets (see table below). This obviously leads to a different number of cells per line and lines per page. To confuse things further, the print head in the computer embosser is larger than the head in the stereotypers, so the size of each braille cell is different. The different sizes are:

	<b>Computer</b>	<b>Sterotyper</b>
<b>Sheet height</b>	339 mm	393 mm
<b>Sheet width</b>	284 mm	241 mm
<b>Cells per line</b>	36	33 or 36
<b>Lines per page</b>	28	28 or 30

15. This complicates printing production and binding. For example:

- It is more difficult to fit the computer size sheets into the printing press.
- Different zinc sheet/paper stocks.
- The stitching machine used for binding does not handle the wider computer format, and
- Computer based books are bulkier than the Stereotyper books.

16. There is no easy way to create proof copies. Proof sheets are currently made by printing from the zinc masters using an old Victorian printing press, which is very time consuming.

17. Sufficient advance warning of which new books are in the Syllabus is sometimes not given by the Ministry of Education. Braille books take a great deal of time to prepare, so it is impossible to have them ready for students if the Braille Press is not notified early.

18. A request submitted to the Ministry of Education four years ago (and every year since) for a new, additional high speed press to increase printing capacity has brought no result to date.

19. Another request submitted two years ago for a Monotype printing machine for printing covers and "Braille over text" has brought no result to date.

20. There is a low degree of co-operation between the Al Noor Institute and the Braille Press regarding the production of thermoformed diagrams.

21. Embossed zinc sheets are stored in a horizontal position due to lack of good storage facilities. This causes the braille dots to flatten out over time. Books printed after four or five years of horizontal storage have weaker dots.

22. There is a lack of specialized knowledge regarding maintenance on the Krause printing machine. The machine requires a complete overhaul due to its age and usage.

#### **V. IMPROVEMENTS TO THE SYSTEM**

23. There are many areas which may be improved upon, which are presented in the following sections. The first considers the administrative aspect (Ministry of Special Education), the second looks at production questions (Braille Press) and the third discusses other issues.

##### **Administrative improvements**

24. In general, both the Ministry of Special Education office and the Braille Press office would benefit from modernized equipment. There is currently no Fax or Photocopier, and no office computer at either location. These items are considered a necessity in most work places, and there would be considerable efficiency gains if these items were to be installed and used correctly.

25. The use of Fax and Photocopier machines are obvious, and the following table describes the uses for an office computer for the purposes of managing braille production. It would be straightforward to commission a customized database to track the required information.

26. The staff at the Ministry of Education need to have access to some braille tools for correspondence, and a specialized computer, such as a Baum 'David' model (or equivalent), is suggested. These types of specialized braille computers have synthetic voice output (text to speech) as well as a braille display.

27. A small braille printer such as an ETC Juliet (or equivalent) embosser would allow printing in the office.

28. If funds permit, a braille voice reader such as a "Reading Edge" style machine would be useful. This type of device allows documents to be scanned in a manner similar to a photocopier and read aloud, but there is currently no Arabic version available.

Function	Benefits/Use
Register of blind persons	Statistics by area/age group and so on. Analysis of causes of blindness. Percentage in institutions/ working, etc.
Register of Teachers	Statistics of children per class. Skills available. Qualifications.
Register of Organizations	Keep basic financials for each organization to get overall view of funding/expenses.
Produce brochure of available books	To inform schools which titles are available "off the shelf"
Rejected applicants for schools	Reasons for rejection - statistics
Classes offered and number of places offered in each class	Determining number of places available. Useful for forward planning of demand.
Braille volumes and pages per volume for each book	For paper/binding requirements.
Location of completed zinc plates for each book	It is sometimes difficult to locate sets of zinc plates with the current system. (Note that this administrative improvement also requires a better system of storing zinc plates.)
Entering production costs/ stats (zinc plates usage, paper usage, etc.)	To determine the costs of production.
Orders placed for books	To see the books in high demand.
Annual braille production	For historical purposes.
Time taken to produce a book (transcription + proofreading)	Useful to estimate the time required to transcribe new books.
Word processing	For correspondence/repetitive letters, etc.
Distribution statistics	To keep track of book distribution.

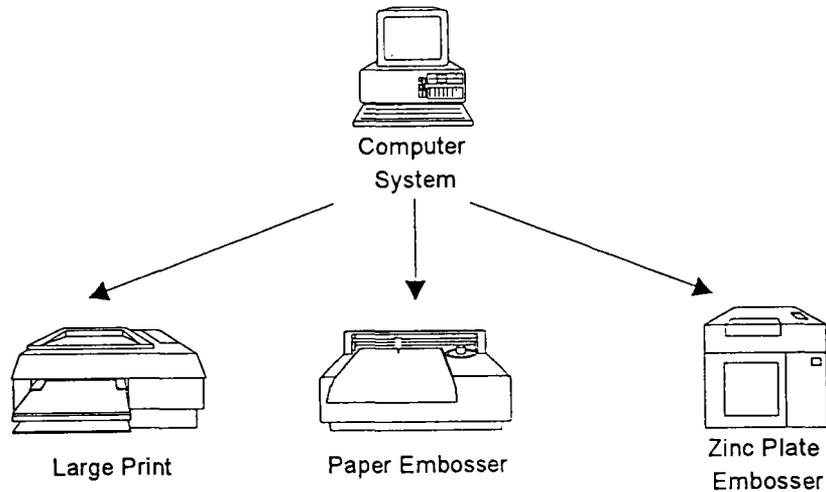
### Braille Production Improvements

29. Unfortunately, most of the equipment currently in use requires updating. This is especially true of the braille transcription/printing equipment.

#### Braille Transcription

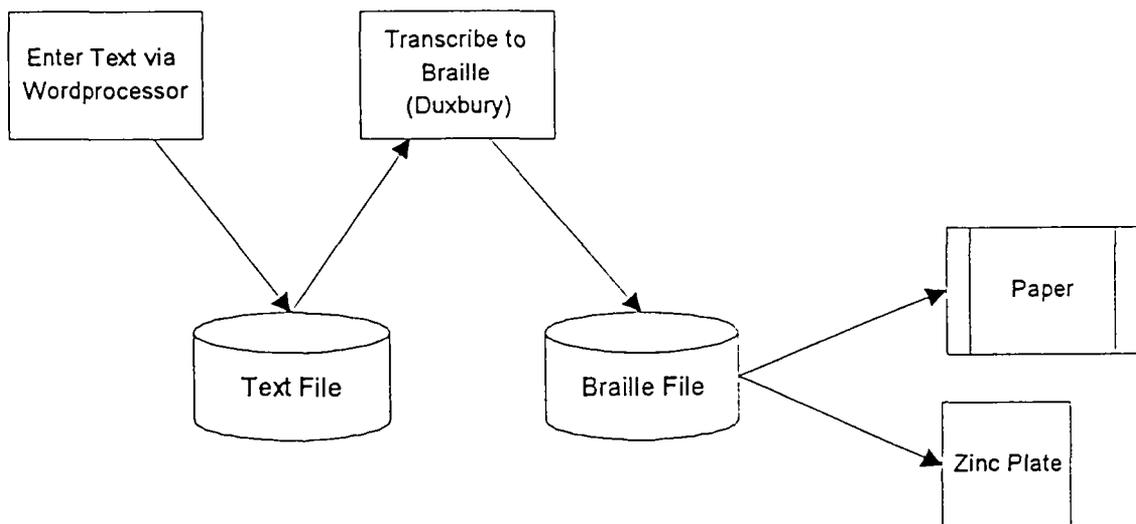
30. There are several possibilities available for modernizing braille transcription, each with their own positive features and drawbacks. The consultant would recommend using computer

translation technology similar to that used by the Regional Bureau for the Welfare of the Blind. This will speed transcription and produce high quality braille.



31. This method uses an operator to transcribe text from a book, into a 486 Personal Computer, using a standard word processing system (such as *WordPerfect 5.1*). Text can be input by either blind persons or sighted persons. A sighted person would enter text in a similar way to that for typing a normal letter. A blind person would use a specially designed computer with a braille keyboard and display or a special add-on keyboard to a standard computer.

32. A computer program (such as *Duxbury*) reads the text input file and converts it to braille format, saving it on a new file. This new file can be printed to either a zinc plate embosser, or a paper embosser.



33. The consultant would suggest that three standard IBM compatible 486 computers, and two specialist braille computers be purchased. They may be linked together in a Local Area Network (LAN) to share resources such as embosser and printers.

34. The existing PUMA embosser can still be used but it will be connected to a computer instead of the current NCR/Facit tape system. Existing books held on cassette tape would be retained for future use but no new books would be commenced.

35. The proposed new system will permit short print runs on paper embosser and long print runs via zinc plates and printing press.

36. Computer translation can offer the following **benefits**:

- Standard computer hardware is mostly utilized. This equipment is readily available in Saudi Arabia.
- Saudi computer companies can repair the hardware in the event of component failures.
- Many computer companies can offer software support for the word processing package *WordPerfect 5.1* (preferred by *Duxbury*).
- The Regional Bureau for the Welfare of the Blind has used the *Duxbury* translation software for many years, and would be able to offer assistance if required.
- The person entering the text does not have to know Grade II braille contractions. The translation software automatically constructs the Grade II braille.
- Special PCs with braille keyboards are available to permit blind persons to enter and correct braille on the computer.
- Text can be spell-checked by the computer for any typographical errors.
- Corrections to spelling or formatting can be made quickly and easily.
- Small print runs are easy and economical, using a paper embosser.
- If required, the translated braille can be viewed on the screen (in dot format) for proofreading by a sighted or partially sighted operator.
- A proof copy can be printed to paper, and errors corrected, which is far quicker and easier than proofreading via zinc plates.

- When a volume is proofread and free from errors, zinc plates can be produced quickly.
- Some books are available on computer disk direct from the publisher. This text could easily be formatted for braille with very little effort.
- The existing PUMA printer can be converted for computer input.
- At some stage in the future, Optical Character Recognition (OCR) software will become available for the Arabic Language. This would enable the scanning of text directly into the computer. This technology is currently available for the English text.
- In the longer term, the text file could be used to produce large-print books for partially sighted persons, using a laser printer.

37. Some of the **problems** associated with computer translation are:

- Operators must acquire some basic typing skills and computer knowledge (for example, backing up data, copying files, word-processing concepts) that are not generally required for braille transcription. Some exiting staff may not be suited to computer operations.
- Blind persons are unable to enter the text using a standard computer. Special computers for use by blind persons are available but they are much more expensive.
- Additional expertise required by Braille Press staff to diagnose hardware problems - more training is required.
- The only organization offering support for the braille translation package within Saudi Arabia will be the Regional Bureau for the Welfare of the Blind.
- A different method of binding will be required for books produced on a paper embosser. This is because each page is an individual sheet, unlike pages from the printing press that are folded in half.
- There have been some reported translation errors of Grade II braille in the current Arabic version of the *Duxbury* software. Joe Sullivan (the President of *Duxbury*) has advised that these can be fixed for a reasonable price.
- The operators must be trained how to use the special transcription software. This would either require an

expert to come to Saudi Arabia for the training or co-operation with the Regional Bureau for the Welfare of the Blind (as they already use this software).

- Continuous paper embossing is good for small runs, but extra machinery is required to remove the perforations and cut the pages into separate sheets before binding. A *bursting* machine will perform both of these operations.

38. **Computer specifications** are as follows:

*Standard computer configuration (3 units suggested):*

486 processor - minimum of 25Mhz, prefer 33Mhz  
SVGA Screen  
Minimum 4Mb RAM  
Minimum 120Mb IDE disk, prefer 245Mb

39. Each standard computer will require an Arabic version of the WordPerfect 5.1 word processor. If English translations are to be done then an English version will be needed as well.

*Specialized braille computer configuration (2 units suggested):*

40. Probably the easiest way to set up a system that can be used by blind people would be to use braille displays, possibly augmented by braille keyboards. It is then possible to edit braille directly, either for proofreading and correction or for original entry as braille. Duxbury systems have a braille editor designed to be used on such systems.

41. Two possible options could be:

- Baum David dedicated braille "workstation" (or equivalent). This type of device is basically a repackaged PC designed specially for braille access.
- or
- Braille keyboard/display fitted to normal IBM compatible systems, for example ALVA display from The Netherlands, MODULAR from Blista in Germany, or Blazie or TeleSensory from the USA.

42. The MODULAR system from Blista offers integrated components that can be combined in many different configurations. It comprises braille displays, special keyboards, braille keyboards and voice output units that clip together to suit user preferences. It is recommended that someone should investigate the specialized computer braille equipment further by visiting Germany, The Netherlands and the United States of America as is determined necessary by the Ministry of Education.

*Other requirements:*

43. It would be very useful to connect the computers together in a peer to peer network, such as *Windows for Workgroups* (or

similar). *Windows for Workgroups* allows the sharing of resources such as printers and disk drives, without requiring a dedicated file server. *Novell* is another option with an excellent reputation, but an extra computer is required to act as a file server. Whichever system is used, each computer will require a network card such as a *Novell NE2000* (or similar) running on a Thin Ethernet cabling system.

44. Some degree of power filtering is advisable, and if budget permits an Uninterruptable Power Supply (UPS) for the computers would be best. The capacity required for each computer would be 0.5KVA.

45. For general printing requirements, a couple of small dot matrix printers such as *OKI's 391* or *393* models would be fine.

#### *Zinc Sheet printing*

46. The existing PUMA embosser can be attached to a computer system by replacing the FACIT tape drive with an RS232 slide in unit. The manufacturers have stated that this is an easy modification to make, and that they have such units in stock. Spare parts for this original machine are still available from Germany.

47. To supplement the existing PUMA embosser, the consultant recommends the purchase of another new zinc plate embosser, to be driven by computer. Due to the fact that the Ministry already has a PUMA, it would make good sense to purchase another similar model, as maintenance and so on is very much the same.

48. The current PUMA computer zinc plate embosser prints on different sized sheets from all other machines in use at the Braille Press. This complicates both printing and binding. The consultant would recommend that all zinc sheets be standardized. Plates of up to 350mm may be used without mechanical modification.

49. The cell size of the existing PUMA embosser can be changed so that it is the same as the Stereotypers. It would make good sense if all machines produced the same size braille cells.

50. The Stereotypers are currently using zinc sheets that are too long, which means that quite a bit of material is wasted when each sheet is trimmed. When the main braille production is performed by computer driven embossers this will not be such a problem.

51. Instead of disposing of the three old stereotypers it should be possible to take the best parts from each machine to construct one (or two) good machine(s) for manual brailleing.

#### *Paper Embossing*

52. Paper embossers are very useful for quickly printing proof copies of books, and for short print runs. For higher volumes

zinc sheet printing is preferable. The reasons for this are:

- The print quality from printing plates is superior to that obtained from paper embossers.
- Long print runs take a lot of time on an embosser, and there is quite a bit of work involved in the bursting of the continuous computer paper.
- Paper for the embossers is more expensive, since it has to be perforated and punched.

#### *Braille Diagrams on Zinc Plate*

53. A new braille diagram machine is required to enable high quality drawings to be produced. There are two possibilities:

- A manual diagram machine to emboss directly onto zinc plates (direct replacement of existing machine).
- A computerized graphics program. A product from America called *ETgraphX* (from Enabling Technologies Company, Florida) allows one to draw diagrams using a conventional graphics package, then convert them to a lower resolution for printing on a braille embosser. One is even able to add labels and integrate them with other braille text. The cost is less than US\$500 for the software.

54. In the consultant's opinion, a manual diagram machine would be preferable. The staff member who is currently responsible for producing diagrams has many years experience producing diagrams in this manner. The quality of his diagrams are excellent, and it would be a pity to lose this expertise.

55. The computer graphics program could be used at some later date once staff have gained experience in the basics of computer braille.

#### *Zinc Plate Printing*

56. A new printing machine is required to increase production capacity. The existing Krause machine would still be used to supplement printing capacity, as its condition is fair. When the new machine is installed it would be wise to temporarily de-commission the existing machine and give it a complete overhaul to extend its working life. This will require the purchasing of many spare parts.

57. The engineer at the Braille Press reports that the current Krause press has been a good machine, and would be happy to have another one. Blista, the manufacturers of the PUMA embosser also recommend Krause printing presses. It would be worthwhile discussing this issue with the local agents for Krause to determine which model is most appropriate for the Ministry's

needs, and it would be good to send a person to Germany to determine which model is most appropriate.

58. Thinner paper than is currently being used is available and this will reduce the physical bulk of the books. The Regional Bureau for the Welfare of the Blind uses paper imported from England in their Paper Embosser that is considerably lighter than the one the Ministry uses. They report that the lighter paper holds braille dots just as well as the heavier paper. It would be worthwhile testing a lighter weight paper and seeing what the results are.

#### *Binding*

59. The two stitching machines are in good condition. There does not seem to be any highly automated procedure for binding and the consultant would suggest that the current procedures are quite adequate, if labour intensive.

60. Braille produced on the paper embossers requires:

- a bursting machine to remove the perforations and cut the continuous paper into separate sheets
- a different method of binding, such as plastic ring binding. The equipment for this is not very expensive. Given that the paper embosser would only be used for short print runs this should not be a great problem.

#### *Bursting Machine*

61. When braille is printed onto continuous computer paper it requires bursting to remove the perforations and separate the sheets. A standard bursting machine will accomplish this task.

62. A good office supply company within Saudi Arabia will be able to recommend which make and model is appropriate for the task.

#### *Offset Printing Press*

63. The request for a new offset printing machine to print book covers is not high on the priority list.

64. Book covers could be done economically by subcontracting out the printing to a commercial printing house. This would eliminate the need for further capital spending.

65. For Large Print books, masters can be produced by the computer system using laser printers. Once again, the printing could be subcontracted out to a commercial printing specialist.

66. If there is a good reason to do so, it may be worth reconditioning the existing offset press as it appears to have had very little use.

### *Guillotine for Paper Cutting*

67. There are currently two large guillotines at the Braille Press. At the moment the printing paper is purchased ready cut to the correct size, so a guillotine is not required.

68. There may be a future requirement for a guillotine so it would be unwise to dispose of both of them. The machine in the best condition should be retained and if possible reconditioned. The other machine could be sold.

### *Large print facility*

69. This is a possible add on to the computer system. The consultant would suggest this facility is tackled later when the basics are up and running smoothly. The computers suggested will be able to run large print software without problems with the additional purchase of high speed laser printers.

### *Optical Character Recognition*

70. Apple computers showed the consultant a brochure on an Arabic OCR package but no one had any practical experience using the product. From the consultant's encounters with OCR in English, it is very dependent on the typestyle used and the size of the text.

71. OCR may become more feasible at some future date. The recommended computers have enough speed to cope with scanning, and the hardware has come down in price over the last few years, but the consultant did not find any mainstream package that could reliably interpret Arabic characters. This will probably change in the next few years and OCR will become a viable option.

### *Thermoform Diagram Production*

72. Thermoformed diagrams are currently produced at the Riyadh Al Noor Institute, adjacent to the Braille Press. It might make sense to change the location of the diagram workshop to the Braille Press compound to simplify the production of books that include these diagrams. A practical factor which might stop this would be lack of space in the current buildings. This issue should certainly be re-considered when the new building is eventually constructed.

73. The existing *Illig* thermoform machine is in good condition and will be used to produce large (up to 1000mm x 700mm) diagrams.

### *Braille over Text*

74. It is possible to overlay print and text on the same page to assist low vision students to learn braille, or for sighted persons to read a braille page. The Braille Press has expressed an interest in such a system for special books. This will

require pages to first be printed on a monotype press before being embossed.

75. Note that braille over text in Arabic will have a slight problem, as Arabic braille is written from left to right but printed Arabic is written from right to left. The words will not synchronise exactly, but this should not be a great problem. At this stage the consultant would consider it a low priority to implement such a system.

#### *Training*

76. This is **extremely** important. The installation of new systems will require staff to undergo a lot of training regarding their operation and maintenance.

77. The computer embossers and printing machine will require one or more staff members to receive special training. This would either mean the staff member(s) need to travel to the country of manufacture, or perhaps the company supplying the equipment would be prepared to send a technical representative to Saudi Arabia for training purposes.

78. The general software training for word processing and so on will be available from the local supplier of the computer hardware.

79. The specialized braille translation software training can either be arranged by *Duxbury* or the *Regional Bureau for the Welfare of the Blind* (as they already use this software). The consultant would recommend getting *Duxbury's* Mr. Joe Sullivan to come to Saudi Arabia for approximately two weeks once the computer hardware has been installed.

80. Some problems currently exist with the maintenance of the Krause printing machine due to a lack of training. Any new purchase will require a staff member to be fully trained in its operation and maintenance.

#### *Environment Requirements for Equipment*

81. The existing buildings are in good condition and quite adequate for all of the proposed equipment. The computers will need to be kept at a comfortable room temperature which can be provided by air-conditioning. They do not require special environmentally controlled rooms. Power conditioning for all computers will be required.

82. It is noted that a new facility is on the drawing board with a proposed construction data of perhaps three to four years time (depending upon funding).

## **Other issues**

### *Computers and Embossers at each Institute*

83. If each of the Ministry of Education Al Noor Institutes had a small computer/embosser system with translation software it would allow the staff to produce: Tests, Handouts, Information sheets, etc. locally. It would be easy to share information between schools via diskettes, which means material entered by a teacher at one school could be mailed to other schools for their use.

84. It may also be economic to distribute some books or magazines via diskette to be printed at the school instead of distributing braille volumes from the Braille Press. Having local production capability gives each school more independence in the material presented to their children as well as reducing the demand on the central Braille Press facility.

85. The type of computer required would be a standard IBM compatible system connected to a paper embosser (similar to the Braille Press system). Each system would require a copy of the braille translation software and the appropriate word processing package. Teachers using the system would require specialist training, and this could be provided by the Braille Press once it has become familiar with its own system.

## **VI. FURTHER INVESTIGATION**

86. It would be useful to obtain preliminary information and documentation from suppliers to help in the decision-making process. It may be possible to make a final decision on which equipment is to be purchased from this documentation but for proper assessment the consultant would recommend that an experienced computer braille person travel to Europe and/or USA for final evaluation - especially for embosser and specialized computer hardware selection. Several issues require further investigation at a more detailed level. (See Appendix C for suggested equipment and suppliers.)

APPENDIX A

List of Contacts

**Ministry of Education Contacts**

Mohammed Ateeq, Director of Public Relations

Saleh Al-Muhanna, Director of Education of the Blind

Mohammad Zaid, UNESCO Delegation

Dr Zaid Al-Muslat, General Secretariat of Special Education

Abdullah El Tayar, Supervisor in charge of Braille Press

**Tours of Braille Facilities**

*The Special Education Press for Braille*

Run by the Ministry of Education. They currently produce primary, intermediate and secondary braille textbooks for distribution to schools within Saudi Arabia.

*Al Noor Institute for the Blind*

This Institute is associated with the Ministry of Education and is physically adjacent to the Special Education Press for Braille. They teach blind students braille/mobility, etc. and produce excellent diagrams. The staff of the diagram workshop are skilled in producing many different types of concepts for thermoforming.

*World Blind Union - Regional Bureau for the Welfare of the Blind*

This organization is funded by several Arab countries. They supply books to Bahrain and Jordan, and copies of the Koran throughout the world. Not associated with the Ministry of Education press.

**United Nations Contacts**

Mujahid Hussain Sheikh, Ali Farawa, UNDP Riyadh

APPENDIX B

Supplier Contacts

**General Computer Hardware:**

**al Alamiah Company**  
Al Salam Building  
Olaza Street  
Riyadh

**Jeraisy Computer Services**  
792 King Fahd Road  
Riyadh

**Braille Entry Systems:**

**Deutsche Blindenstudienanstalt E.V. (Blista)**  
Postfach 1160  
Am Schlag 8  
D 3550 Marburg  
Germany  
Tel. (49) 6421 80221  
Fax. (49) 6421 80214

**Baum**  
Germany

**ALVA**  
The Netherlands

**Blazie**  
USA

**TeleSensory**  
USA

**Braille Software:**

*Translation Software*  
**Duxbury Systems**  
435 King Street  
Littleton, MA 01460  
USA  
Tel. (1) 508 486.9766  
Fax. (1) 508 486.9712

*Diagram software*  
**Enabling Technologies Company**  
3102 S.E. Jay Street  
Stuart, Florida 34997  
USA  
Tel. (1) 800 777.3687  
Fax. (1) 507 220.2920

**Embossers - Zinc Plate:**

**Deutsche Blindenstudienanstalt E.V. (Blista)**  
Postfach 1160  
Am Schlag 8  
D 3550 Marburg  
Germany  
Tel. (49) 6421 80221  
Fax. (49) 6421 80214

**Embossers - Paper:**

**Enabling Technologies Company**  
3102 S.E. Jay Street  
Stuart, Florida 34997  
USA  
Tel. (1) 800 777.3687  
Fax. (1) 407 220.2920

**RESUS B.V.**  
Antoniuslaan 1  
3341 GA  
H.I. Ambacht  
The Netherlands  
Tel. (01858) 18777  
Fax. (01858) 18265

**Printing Machinery**

**Krause**  
Germany

**Deutsche Blindenstudienanstalt E.V. (Blista)**  
Postfach 1160  
Am Schlag 8  
D 3550 Marburg  
Germany  
Tel. (49) 6421 80221  
Fax. (49) 6421 80214

**Paper Supplier for Thinner Paper**

**RESUS B.V.**  
Antoniuslaan 1  
3341 GA  
H.I. Ambacht  
The Netherlands  
Tel. (01858) 18777  
Fax. (01858) 18265

APPENDIX C

Suggested Equipment and Suppliers

a) **Selection of paper embosser**

Express or Marathon Braille - *Enabling Technologies Company, Florida, USA*

RS Model Braille - *RESUS - Rotterdam, The Netherlands*

Braillo 270 double-sided embosser - *Norway*

b) **Selection of zinc plate embosser**

PUMA - *Blista, Marburg, Germany*

PED-30 - *Enabling Technologies Company - Florida, USA*

c) **Selection of diagram embosser**

Possibly *Blista, Germany*

d) **Selection of specialized computer hardware**

MODULAR braille input/output devices for computers - *Blista, Marburg, Germany*

DAVID - *Baum, Germany*

ALVA - *The Netherlands*

Blazie - *USA*

TeleSensory - *USA*

e) **Selection of print press**

*Krause, Germany*

*Marburg Rotary Printing Press, Germany*

f) **Bursting Machine**

*Available locally in Saudi Arabia from a company such as Jeraisy Computer Services*