OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

21405

Distr.
RESTRICTED

FMD/R.25
8 January 1996

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ORIGINAL: ENGLISH

TIMBER FRAME BUILDINGS FOR EMERGENCY SHELTER

TF/CRO/93/D10

Report of the Evaluation Mission*

* This document has not been edited.

V.96-80110

Contents

List of Acronyms

Chief Technical Advisor	CTA
European Bank for Reconstruction and Development	EBRD
International Bank for Reconstruction and Development	IBRD
Timber Frame Building	TFB
United Nations Industrial Development Organization	UNIDO

Summary of Conclusions and Recommendations

1. The current project was designed to address the widespread destruction of buildings caused by conflict in the Republic of Croatia. The project had two main aims: (i) to contribute directly to the alleviation of an acute shortage of accommodation, and (ii), to transfer an appropriate construction technology, Timber Frame Building (TFB), to Croatian companies. The transfer of this technology was intended to permit more rapid (and possibly more affordable) construction of buildings than with traditional building methods. The project was thus a departure from more usual forms of refugee assistance in that it sought both to provide emergency shelter and assist the reinitiation of economic growth and social stabilization.

2. Implementation of the project has been subject to a number of delays. These were seen to have stemmed largely from unavoidable external factors. Such factors include changes in the scale and location of conflict areas, with all uncertainties this led to, the related conscription of workers assisting the project, a shortfall in municipality funds earmarked for construction, etc. External factors also explain why the project will provide buildings in fewer sites than stated in the project document. It is considered too early to assess the project's impact because the construction of project buildings, although advanced, is not yet completed. However, the potential impact of the project is great, as a programme of reconstruction throughout much of Croatia is both essential and inevitable.

3. It was considered that the project's strategy would have benefitted from inclusion of activities to promote the TFB amongst construction firms and municipalities once construction of one or more project buildings was under way or completed. Promotional work of this sort is recommended in Chapter 6. Consideration will need to be given to the form which promotional activities should take, how they would be financed and how they should relate to other planned UNIDO activities in Croatia.

4. A full assessment of the project's impact would best be had some time after the project buildings have been inaugurated and promotional work carried out. However, the mission believes that a further visit to the field by Evaluation staff may not be required. This is because implementation of the project is almost complete, while the main lessons from the project have, in all likelihood, already been learned. Any outstanding project funds might best be used to support the promotional work suggested in Chapters 4 and 6. Chapter 6 also suggests, however, that a mechanism be agreed on with any institution(s) promoting the TFB method whereby UNIDO would be kept informed of the extent of use of the technique.

5. This project is clearly relevant to reconstruction in other parts of the former Jugoslavia as well as other post-emergency situations.

6. The evaluation was carried out by Mr.Alistair Nolan, a UNIDO staff member with the Evaluation Section. Mr.Nolan travelled with the backstopping officer to Zagreb, Slavonski Brod, Vinkovci, Lukac, Ceralije, and Vocin during the period 21st to 24th of November 1995. The mission met with representatives of key project-related institutions, viewed construction work at all the project sites, and interviewed the CTA and other project staff.

Chapter 1

Project Concept and Design

A. Socio Economic and Institutional Context

7. This project was prepared in response to the widespread destruction of buildings caused by conflict in the Republic of Croatia. The number of housing units destroyed during the war has been estimated at upwards of 210,000, while refugees in Croatia, from Croatia itself and from other parts of the former Yugoslavia, number in the hundreds of thousands. The project was conceived with two main aims: (i) to contribute directly to the alleviation of an acute shortage of accommodation, and (ii), to transfer a new and appropriate construction technology, Timber Frame Building (TFB), to Croatian companies. The transfer of this technology was intended to permit more rapid (and possibly more affordable) construction of buildings than with traditional building methods. Economic and social benefits were thus expected by: (a) decreasing the time needed for reconstruction; (b) expanding possible sources of income for companies receiving the new technology, and (c) reducing, possibly, the expense of reconstruction for municipalities and individuals.

8. The project was thus a departure from more usual forms of refugee assistance in that it sought to provide emergency shelter while assisting the reinitiation of economic growth and social stabilization.

9. In Croatia, traditional methods of construction employ bricks, clay blocks, mortar and cement. These methods are slow and labour-intensive. It is frequent to see buildings being lived in while still under construction, which often takes a number of years. In the past at least two Croatian companies have manufactured prefabricated houses. The technique used by these companies involved complete construction at the factories of prefabricated components, such as walls, which would be lifted into place at the building site using a crane. By contrast, the TFB technique involves prefabricating at the factory the timber

frame, or skeleton, of major building components. These prefabricated parts can be quickly and easily lifted into place at the site without mechanized assistance. All that is required beforehand is a concrete foundation (as a slab or in the form of pillars). Once the framework has been erected insulation, wiring, cladding and other finishings can be added quickly using hand tools. The insulating properties of buildings constructed using this method are comparable with, if not superior to, those of traditional buildings. Under appropriate supervision, building work can be done speedily by a family or small group of workers. The buildings constructed during this project could be used to house families. Internal walls could also be rearranged, allowing the buildings to serve other purposes at a later date.

10. This project followed on from, and in some ways represents a second phase of, an earlier project funded by the Government of Italy (US/CRO/92/162). The main outputs produced by this earlier project were the following: (i) a 600m² school at Vinkovci. The mission could verify that all work to be done on the school by UNIDO was completed. The installation of utilities - a responsibility of the municipality - is not yet finished; (ii) a 50 m² mini-farm building at Vinkovci. This building has been completed and occupied, and is being extended by the owners; (iii) a 320 m² school at Slavonski Brod. The school requires installation of utilities for its completion; (iv) Six persons trained in the TFB method of on-site building, and (v) a class of 15 students from the Vinkovci Polytechnic familiarised with the TFB technique, with relevant manuals transferred to the Polytechnic.

B. The Project Document

11. The project was designed to be implemented in three phases: preparation, intermediate work and building. Each phase had two immediate objectives. The project's six immediate objectives thus read as follows:

Phase 1: Preparation

1. To determine and agree on details of local inputs.
2. To establish operational and administrative procedures.

Phase 2: Intermediate Work

1. To complete site work and prepare for fabrication of elements.
2. To prepare for the supply of materials and equipment and the recruitment of staff.

Phase 3: Building

1. To construct at least 6 community buildings totalling at least 1800 m^2.
2. To establish timber-frame prefabrication facilities (wall panels and trussed rafters).

In terms of project design, the immediate objectives of phases 1 and 2 are in fact activities leading to the achievement of the immediate objectives in phase 3.

12. Implementation of the project was to proceed broadly as follows: agreements would be sought with around six preselected municipalities under which the municipalities would identify sites, lay building foundations, provide construction labour and install utilities for at least one building per community. The buildings would be provided to the municipalities as a donation. The municipalities would also give logistical support to the project, such as office space, and select sites for demonstration houses. Agreements would likewise be arrived at with one or more firms on the establishment of prefabrication and storage facilities at their premises. Each company would provide three workers to the project without charge. In return for these services, the workers at the company, or companies, would be trained in the TFB technique.[1] The equipment used by the project would also be transferred

---

[1] Skills to be acquired or upgraded would include: precision fabrication; techniques of assembly; the installation of utilities in prefabricated as opposed to masonry-based

to the companies at project completion (including pneumatic nailers, a compressor unit and other basic tools and equipment). At the end of the project the collaborating company or companies would thus have the capability to use the TFB technique on a commercial basis. No provision was made for work to formally promote the TFB technique either among municipalities or construction companies (other than those to directly benefit from the project).

13. The project's main outputs were expected to be the following: (i) six or more community buildings of about 300m² each; (ii) at least 12 carpenters/builders trained in site erection; (iii) one or two prefabrication workshops in operation at Gai, Slatina, and possibly at another site in Sisak county, and (iv) staff and operators trained in the TFB technique.

14. The m' sion confirmed the relevance of the project in that it clearly addresses real needs. There is still an acute shortage of shelter in much of Croatia, while introduction of the TFB technique could help expedite, and possibly reduce the costs of, the inevitable process of reconstruction.

15. The project cost US$ 700,000 inclusive of UNIDO support costs.

---

structures; the use of nail guns (particularly for anchoring prefabricated frames to concrete foundations); the selection of technical specifications (such as for plywood boards, insulation material, etc.); various forms of finishing, and the overall logic of the modular building approach.

Chapter 2

Project Implementation

16. The selection of the counties of Virovitica and Sisak as areas to receive the project was made by the Ministry of Economic Affairs. The Ministry contacted all counties in Croatia, with the selection being made on the basis of interest expressed by the counties themselves. The selection was communicated to UNIDO in June 1994.

17. A number of factors, of diverse origin, have led to delays in project implementation, as well as changes in the project's planned activities and outputs.[2] The causes of these delays and changes are described in the following paragraphs.

18. An important source of delay in project implementation, and one which bears directly on the eventual impact of the project, concerns the attempts to secure collaborative agreements with local construction companies. A draft agreement was prepared with the company Gai Slatina, located near the project sites in Virovitica county. However, after a number of months spent negotiating the agreement, UNIDO decided not to proceed. This was because the firm established as a condition for its participation that UNIDO refurbish a part of one of its plants. The position of the company vis-a-vis its participation in the project may also have been affected by a recent change in the firm's ownership. With a representative of the wood industries subsector, and with assistance from the Ministry of Economic Affairs, the project's Chief Technical Advisor (CTA) undertook a search for a suitable company to replace Gai. This search was without result for a number of months, as companies showed a reluctance to participate in the project. The attitude prevailing among the companies approached was that the project represented an opportunity to extract a short-term rent for facilities provided rather than an opportunity to receive know-how and thereby position themselves to supply the market for reconstruction.

---

[2] With regard to the extent of delays, it is noted that the project document did not include information on "planned duration".

19. It was not until the end of March 1995 that contacts were made with DREN in Zagreb, a small firm making cable reels and supplying softwood. In April the Director of DREN agreed to provide the following: a secure space for the installation of workshop equipment and storage of materials; three workers at no cost to UNIDO, and payment of workshop expenses incurred in the production of prefabricated wood elements. As part of the same agreement UNIDO would, inter alia,: supply all equipment and materials required to produce the prefabricated wood elements; transfer to DREN all technical documentation need for such production; train the three workers assigned by DREN; transfer to DREN on completion of the project the equipment used. The fact of having to recur to a firm in Zagreb, over one hundred kilometres from the construction sites, added to project costs and implementation time.

20. Further delays arose in August 1995 due to the financial collapse of DREN. DREN is now under liquidation. A number of factors led to this development. Following an upsurge in hostilities in August 1995 all of DREN's workers were either drafted into the army, or left for other reasons. Three of DREN's banks simultaneously experienced acute financial constraints, while a number of DREN's clients fell into arrears on payments due. DREN also experienced growing supply problems. The collapse of DREN was clearly attributable, either in part or entirely, to the extraordinary circumstances prevailing in Croatia at the time. Other companies, while larger and more diversified than DREN, and thus less vulnerable to various forms of business risk, might well have been more stable partners. However, such firms were reluctant to participate in the project. Despite DREN's collapse, production and delivery of prefabricated parts continued, albeit at a slower rate.

21. The fact of Croatia being a newly independent country, with a limited experience of UN technical cooperation, created impediments to implementation. For example, there was prolonged uncertainty as to whether imported project inputs would be exempt from customs duties or not. Obtaining clearance from customs authorities created delay. The absence of a UNIDO or UNDP office in Zagreb also complicated logistics for project staff. The lack of a field presence contributed to

unfamiliarity with the institutional context (to some extent overcome in phase 1), which has itself been in flux.

22. External factors also explain why the project will provide buildings in fewer sites than stated in the project document. Specifically, the Sisak authorities did not clear the building design or provide foundations for 3 community buildings. Sites were also not selected for demonstration small houses. The mission did not have the opportunity to discuss with the Sisak authorities why the proposed implementation of the project in the Sisak region failed to take place. However, information provided by the Ministry of Economy suggests that this decision stemmed from the administrative capacities of the authorities being overloaded by a large bilateral aid project, also in the construction field, as well as uncertainties caused by proximity to conflict areas and, possibly, reduced availability of funds for the construction of foundations.

23. Overall, UNIDO provided its inputs in a reasonably timely manner, given the constraints enumerated above.

Chapter 3

Project Results and Achievement of Objectives

A. Outputs

24. The outputs produced to date (end November 1995) are:

(i)(a)One community building of 318 m² almost entirely completed, with utilities installed, in the town of Lukacs (Virovitica county). This building will house a polyclinic, a post-office and a school;

(b)One partially completed community building of 318 m² at Ceralije. The foundation has been laid and the timber frame structure, including the roof, erected. Wall linings (panels) are currently being put in place.

(c)Foundations laid for a community building of 318 m² at Vocin.

All three buildings are expected to be completed by end January 1996. With proper maintenance these buildings may be used for more than 30 years.

(ii) 3 carpenters/builders trained in site erection, and a further twenty builders, provided by the municipalities, familiarized with the timber-frame technique;

(iii) One prefabrication workshop in operation temporarily at DREN, in Zagreb, with 3 operators trained in timber prefabricated production.

(iv) Data collected on total production costs, with preliminary figures on some aspects of the anticipated market size (not foreseen in the original project document).

25. It should also be noted that, in addition to the above, there has been a process of familiarization with the TFB technique amongst local architects and builders as well as municipalities not directly involved

in the project.

26. Data on total production costs for buildings constructed by the project were compiled by a national consultant. These data indicate a cost per square meter of US$ 244.03 for a 320 m² building. This figure may somewhat overestimate production costs in other firms under more normal conditions. For instance, it is likely that the costs cited would fall with production on a larger scale. These cost figures also include transportation from DREN to the project site, a cost which might not have to be borne by companies closer to building sites. Likewise, these costs may be higher than would be the case for firms with prior knowledge of prefabrication, and/or firms not facing the precarious circumstances experienced by DREN. Nevertheless, the cost of US$ 244.03 per square meter, using the TFB method, compares favourably with the price of fully prefabricated houses, estimated by the national expert at US$ 274.12 per m², for a building of 100 m², and US$ 298.76 per m², for a building of 42 m². Unfortunately, data was not provided on production costs using traditional building methods. However, it is recognized that the estimation of these costs is complicated by the fact that construction with traditional building methods often takes place over a number of years, frequently with the assistance of family or volunteer labour.

B. Achievement of the Immediate Objective

27. The immediate objectives of the project were stated in the project document as follows:

Phase 1

- To determine and agree on details of local inputs.
- To establish operational and administrative procedures.

Phase 2

- To complete site work and prepare for fabrication of elements.
- To prepare for the supply of materials and equipment and the recruitment of staff.

Phase 3

- To construct at least 6 community buildings totalling at least 1,800 m².
- To establish timber frame prefabrication facilities (wall panels and trussed rafters).

28. As noted in chapter 1, section B, the first four objectives are in fact project activities. The principal objectives are those of phase 3, on which this discussion will focus.

29. As detailed in section A of this chapter, three community buildings are nearing completion. The mission considers that the completion of three buildings, rather than six, would constitute achievement of the first immediate objective of phase three, as the non-participation of the Sisak authorities was beyond the control of the project. Again, as described in section A of this chapter, timber frame prefabrication facilities were established in a company which has since gone into liquidation. Hence, the project has not yet achieved its key objectives. However, the three community buildings currently under construction will soon be finished while other construction companies may be encouraged to adopt the TFB technique. When that occurs the project will have fully realized its immediate objectives. Thus, the mission considers that it is too early to assess the project's impact.

30. The full impact of the project (beyond that resulting from the provision of a number of community buildings) will be achieved when construction companies adopt and promote the new building technique, and when public authorities and individuals are convinced that a change from traditional to the new technique is advantageous.

31. As regards the construction companies, the mission saw evidence of early private sector interest. The mission met with representatives of one firm wishing to adopt the TFB technique. Three fully-trained project staff are also considering whether to establish their own company using the TFB method. With respect to the public authorities, interest and a demand for information appears to be spreading to municipalities not previously involved in the project. The mission saw letters from municipalities expressing interest in replication of the project. The mission was also informed that the municipal authorities in Lukacs had received requests for additional information on the project from other municipalities. This interest may grow as project buildings are inaugurated.[3]

32. UNIDO should ideally follow-up by promoting the new technique amongst construction companies and, possibly, training institutions. This promotional work will be facilitated by data on production costs and market size provided by a national consultant. Companies wishing to take up the technique may require further assistance. On the demand side, UNIDO might simultaneously help promote the technique amongst national and municipal authorities (demand for new buildings will also be determined by a series of additional factors, including the ongoing restructuring of the banking system,[4] changes in building regulations,

---

[3] It is relevant to note that the above-mentioned report on production costs, prepared by a national consultant, indicates that the Ministry of Development and Reconstruction estimates that at least 15 to 20 public buildings are required in municipalities in Sisak county, Brod, Vinkovci, Lika, Zadar and Dubrovnik. The Ministry is likewise interested in constructing farm buildings (a 50 m^2 mini-farm building was erected under project US/CRO/92/162). The same report notes that the Croatian government is allocating substantial funds (in the order of 670 million Deutschmarks equivalent) for the renovation of housing in 1996.

[4] In this connection, future attempts at promoting the TFB technique should include an exchange of views/information with HKBO, the Croatian Credit Bank for Reconstruction. This bank was established less than one year ago with the aim of assisting reconstruction by the private sector, while seeking to integrate reconstruction efforts with the international community. The mission was informed that this bank has recently received assistance under an IBRD/EBRD-sponsored programme for

the direction of macroeconomic policy, and a definitive cessation of hostilities). A comprehensive assessment of the project's impact would best be had some time after the above-mentioned promotional work.

33. In assessing the project's strategy it is recognized that the circumstances in which the project was developed were unfavourable. These involved many uncertainties, combined with the imperative of speedy implementation in an unfamiliar and changing institutional context. However, the mission considers that the project strategy might have benefitted from greater attention to promotional work. Promotional work - disseminating information and advice on the costs and benefits of the TFB method - might have been planned for on a sector-wide basis, possibly through an existing training institution or an industry representative body. In any event, promotional work on a sector-wide basis would have helped diminish the risks arising from reliance on one or two companies only as vehicles for technology transfer. Even if such companies were to prosper (which was not the case), the longer-term aim would still be to disseminate the TFB throughout the industry, which would require promotional work. Promotional activities might have been planned to begin once construction of one or more project buildings was under way or completed.

34. Choosing a strategy for this project was clearly extremely difficult in that the objectives pursued (providing emergency shelter and transferring technology) in some ways militate against each other: the provision of shelter requires speedy implementation on a significant scale, while technology transfer involves learning, is time-consuming and is often complex. It might well have been easier to formulate a strategy for a project prioritising either construction or technology transfer (this point is developed in Chapter 6).

---

restructuring of the banking sector.

C. Contribution to the Achievement of the Development Objective

35. The development objective of the project was described in the project document as follows.

> "To contribute to the re-establishment of acceptable living conditions in certain areas of Croatia damaged by the war, through the immediate provision of means to build or rebuild dwellings/shelters and other buildings for the affected population. It will also assist in restoring economic and community life in these areas."

36. As seen from the preceding sections of this report, the project has not yet brought about changes in living conditions in areas afflicted by war. The mission believes however that the potential impact of the project is great (by introducing a building technique which permits speedy and possibly more affordable construction), as a programme of reconstruction throughout much of Croatia is both essential and inevitable. The development objective will begin to be met as project buildings are completed and used. The extent to which the project achieves its development objective will depend in large part on the effectiveness of follow-up activities.

Chapter 4

Conclusions

37. The relevance of the project was confirmed.

38. Delays in completion stem largely from unavoidable external factors. These factors include changes in the scale and location of conflict areas, with all the uncertainties this led to, and the unexpected conscription of workers from DREN. External factors also explain why the project will provide buildings in fewer sites than stated in the project document. UNIDO was seen to have provided its inputs in a reasonably timely manner, given the influence of external factors.

39. It is considered too early to assess the project's impact because the construction of project buildings, although advanced, is not yet completed, while the single company to which technology was transferred has since gone into liquidation.

40. The potential impact of the project is great (by introducing a building technique which permits speedy and possibly more affordable construction), as a programme of reconstruction throughout much of Croatia is both essential and inevitable.

41. It was considered that the project's strategy would have benefitted from inclusion of activities to promote the TFB amongst construction firms and municipalities once construction of one or more project buildings was under way or completed. Follow-up work of this sort is recommended. Consideration will need to be given to the form which promotional activities should take, how they would be financed and how they should relate to other planned UNIDO activities in Croatia.

42. This project is relevant to reconstruction in other parts of the former Yugoslavia as well as other post-emergency situations. Lessons learned from this project may be valuable in undertaking similar projects elsewhere.

Chapter 5

Recommendations

43. A full assessment of the project's impact would best be had some time after the project buildings have been inaugurated and promotional work carried out. However, the mission believes that a further visit to the field by Evaluation staff may not be required. This is because implementation of the project is almost complete, while the main lessons from the project have, in all likelihood, already been learned. Any outstanding project funds might best be used to support the promotional work described above (and in the following paragraphs of this chapter). Nevertheless, it is suggested that an arrangement be made whereby any local institution(s) chosen to promote the TFB method report to UNIDO on the rate at which the technique is adopted and used. The Ministry of Economic Affairs might be encouraged to periodically collect related data from municipalities once promotional work has finished.

44. A number of suggestions are made in the following paragraphs with respect to possible follow-up work for this project. These suggestions are necessarily stated in general terms. More detailed knowledge would be needed of the construction subsector and of relevant institutions for more precise recommendations to be made. The practicability of these suggestions likewise depends on the availability of project funds.

45. Institutions could be identified suitable for disseminating information on the TFB method to the construction industry. These might include chambers of commerce, industry representative bodies or even training institutions. One or more of these institutions could be approached with a view to their undertaking a programme of TFB promotional activities. Such promotional activities would be facilitated by data on the costs and benefits of the TFB method to be provided by a national consultant. The completion of project buildings would also assist promotional work. UNIDO might compile and present technical material

for promotional purposes, possibly with advice from its investment promotion and human resources development branches. One means to initiate promotional work might be for the backstopping officer to deliver a presentation on the results of the project to representatives of construction companies. Such a presentation could be given at the institution(s) chosen to undertake a programme of promotional activities.

46. On the demand side, the Ministry of Economic Affairs and/or other institutions might be encouraged to disseminate information on the costs and benefits of the TFB method to municipalities throughout the Republic of Croatia. Once commercial enterprises have adopted the TFB technique they will themselves be able to publicize its advantages among individuals wishing to purchase or build a new home.[5]

47. Contacts might also be established with institutions engaged in the financing of reconstruction work. Collaboration between such institutions and municipalities might be explored, depending on the mandates of the financing bodies.

48. Where complementarities exist, the actions outlined above should also be integrated with ongoing and/or planned UNIDO projects in the Republic of Croatia. In this connection, the ongoing project XP/CRO/95/015 should be borne in mind.[6] In addition to preparing project proposals in a number of industrial subsectors, including the wood products industry, this project will involve an assessment of broader institutional development needs.

---

[5] Opportunities may also exist in the near future for Croatian companies to participate in reconstruction in Bosnia Hercegovina.

[6] The title of this project is as follows: "Assistance to the Government of Croatia in Designing a National Industrial Strategy and Industrial Policy: A Technical and Policy Level Analysis".

Chapter 6

Lessons Learned

49. Perhaps the main lesson learned from this project concerns the choice of project strategy. The chosen strategy entailed direct collaboration with and dependence on firms and municipalities facing conditions of great uncertainty. This gave rise to a number of delays. For example, many of the firms approached with a view to collaboration assessed the opportunity from an extremely short-term standpoint, seeking a risk-free rent rather than the expansion of growth opportunities. Such short-termism is perhaps inevitable in a situation of extreme uncertainty. Under such conditions it might be prudent to reduce reliance on any counterpart for project inputs, assuming that what might go wrong will go wrong, and to shape the project strategy accordingly.

50. The degree to which one should reasonably rely on counterparts for project inputs will also depend on the purpose of the project. If speed of construction is uppermost then as many aspects of implementation as possible should be brought under project control (such as the laying of foundations, prefabrication of building components, etc.). While this could add considerably to project costs, the likelihood of rapid implementation would be increased. In such circumstances backstopping officers may thus face a trade-off between increasing project costs (to expedite implementation) and speed of implementation. The merits of increasing project costs would have to be judged on a case by case basis, reflecting the urgency of each situation, the nature of implementation activities (i.e. whether they were amenable to acceleration through increased project expenditures) and the magnitude of the costs in question. Controlling all aspects of implementation might not be so important if technology transfer is the primary goal. If technology transfer were the overriding consideration in a project such as this one, then an alternative strategy might be to work on only one or two buildings, and then promote the results of this work intensively.

Annex 1.

List of Persons Contacted

Company/Institution	Person (s) Met
Fund for the Aid and Restoration of Wood Industry in Croatia	Dr.Salah-Eldien Omer Director
Hrvatska Gospodarska Komora	Mr.Zvonimir Cordasic
Lukacs Municipality	Members of the municipality and project support group.
Ministry of Economic Affairs Industry Sector	Mr.Franjo Misak Head of Department
Project engineer	Zeljko Jelcic
Project clerk (and liaison assistant)	Antun Radosevic
PROSO, Enterprise for Production and Domestic Trade	Mr.Berislav Brkic Manager
Slovanski Brod School Committee	Mr.N.Pavic Head
UNIDO Chief Technical Advisor	Peter Vidovich

TERMS OF REFERENCE

TF/CRO/93/D10

"Timber Frame Buildings for Emergency Shelter"

I. Background

The project aims at providing six basic community buildings of about 300m^2 as emergency shelter buildings in the regions of Sisak and Virovitica by introducing prefabrication of timber framed wall elements and trussed rafters as an appropriate building technology to help the population to return to their damaged towns and villages and resume normal life.

Those building sites are to be located in the above-mentioned regions according to the project document, however, in the project file it is not exactly specified where they are.

The project follows the adoption by the General Assembly at its 47th session of item 144 "International cooperation and assistance to alleviate the consequences of the war in Croatia and to facilitate its recovery", GA Resolution 47/166.

This project is the second phase of a similar project (US/CRO/92/162) started in October 1992 and financed by Italy with a contribution of US$ 800,000. The present project (TF/CRO/93/D10) is financed by Japan and the contribution amounts to US$ 700,000 including the agency support costs. The project started in October 1994 and the foreseen duration was one year.

The target beneficiaries of the project are the refugees and displaced people returning to war damaged communities of Croatia. The evaluation of the project was foreseen in the paragraph H of the project document, in accordance with UNIDO policies and procedures. The donors, the Government of Croatia and the backstopping section will be the main users of the findings and recommendations of the evaluation.

The evaluation will assess the overall achievements of the project and identify the needs for possible further assistance.

II. Project objectives

The development objective of the project is to contribute to the re-establishment of acceptable living conditions in certain areas of Croatia damaged by the war, through the immediate provisions of means to build or re-build shelters and other buildings for the affected population.

To achieve this objective the activities of the project are focused on the following actions:

1st phase

1. Agreement with administrative authorities on local inputs: use of the standard 300m^2 school building and preparation of site plans, obtaining all necessary permits for the six buildings.

   The activities to achieve these outputs will include identification of six or more villages and sites for the community buildings and identification of interested builders.

2. Agreement with UNHCR for administrative assistance.

3. Agreement with local enterprises for setting up prefabrication and storage facilities.

4. Agreement with local authorities for office space and logistical support.

2nd phase

1. Complete site work with architectural drawings and prepare for fabrications of elements.

2. Prepare for the [illegible] supply of materials and equipment and for the recruitment of staff.

3rd phase

1. Constructing six community buildings totalling at least 1,800m^2.

2. Establishing timber frame prefabrication facilities, installing doors, windows and basic utilities.

   Materials, equipment and labour for the site preparation, the utilities (drainage, electricity and water) and their installation is the responsibility of the Government or Municipalities.

III. Mission members

- A representative of UNIDO
- A representative of ...

These representatives should not have been directly involved in the implementation of the project.

IV. Timetable

The evaluation mission will take place .... and will visit the sites

V. Mission aims

The evaluation mission will focus on:

1. Assessment of the achievements of the project against its objectives and expected outputs.

   Particular attention will be paid to :

   - the preparation of the site plans;
   - the issuance of purchase orders;
   - the construction of at least six community buildings;
   - the training on site of building contractors, carpenters and builders.

2. Identification of factors that have facilitated the achievements of the project's objectives, as well as those factors that have impeded the fulfilment of those objectives.

VI. Consultations in the field

The mission will contact the Programme Support Unit for Croatia in Vienna, the focal point for UNIDO at the Ministry of Economic Affairs in Zagreb, the UNHCR, the concerned local Government Authorities, the local industry representatives and the local UNIDO staff.

The mission is expected to visit the building sites and to discuss any issue related to its mandate with the involved bodies, including governmental or non-governmental organizations and end-users.

VII. Final report

The mission will complete its work and prepare a final report within one month from the starting of the field research. The report will be submitted to the donor countries and the recipient authorities.