

# INTERNATIONAL TROPICAL TIMBER ORGANIZATION

## ITTO

### PROJECT DOCUMENT

TITLE	PERFORMANCE EVALUATION OF EXPORT WOOD FURNITURE IN RELATION TO STRENGTH AND END-USE APPLICATIONS USING ESTABLISHED TEST STANDARD
SERIAL NUMBER	PD 35/99 REV.4 (I)
COMMITTEE	FOREST INDUSTRY
SUBMITTED BY	GOVERNMENT OF THE PHILIPPINES
ORIGINAL	ENGLISH

#### SUMMARY

This project will determine and evaluate the strength and performance of export wood furniture such as chairs, tables, stools, cabinet doors and drawers by the application of loads or forces simulating normal functional use, as well as acceptable mis-use, according to a graded scale of severity following established standards. The test standard that will be followed is the British Standard (BS 4875) which specifies performance requirements for domestic and contract furniture and/or office and educational furniture. Testing and evaluation will cover the static, fatigue and impact strength of wood furniture under high levels and rapid rates of loading that occur occasionally and under repeated movement or application of load occurring during daily use. Determinations will include the initial damage, damage propagation and ability to withstand acceptable mis-use and demonstration of sufficient residual strength. Designs that would improve the strength and stability of furniture will be identified and disseminated to manufacturers and organizations such as the Chamber of Furniture Industries of the Philippines. The project outputs will include recommendations for joint construction methods to help upgrade strength, performance and quality of wood furniture. Testing results, specific evaluation data and other relevant information to help upgrade furniture products should contribute to the modernization of the furniture industry in the Philippines.

EXECUTING AGENCY	FOREST PRODUCTS RESEARCH AND DEVELOPMENT INSTITUTE (FPRDI)	
DURATION	18 MONTHS	
APPROXIMATE STARTING DATE	UPON APPROVAL	
PROPOSED BUDGET AND OTHER FUNDING SOURCES	Source	Contribution in (US\$)
	ITTO	139,999
	Gov't of Philippines	227,900
	TOTAL	367,899

## **PART I. CONTEXT**

### **A. Relevance to ITTO**

#### **1. Compliance with ITTA Objectives**

The project is consistent with the following objectives of ITTA 1994:

- d) To enhance the capacity of members to implement a strategy for achieving exports of tropical timber and timber products from sustainably managed sources by the year 2000;
- e) To promote the expansion and diversification of international trade in tropical timber from sustainable sources by improving the structural conditions in international markets, by taking into account, on the one hand, a long-term increase in consumption and continuity of supplies, and on the other, prices which reflect the cost of sustainable forest management and which are remunerative and equitable for members, and the improvement of market access;
- f) To promote and support research and development with a view to improving forest management and efficiency of wood utilization as well as increasing the capacity to conserve and enhance other forest values in timber producing tropical forests; and
- g) To promote increased and further processing of tropical timber from sustainable sources in producing member countries with the view of promoting their industrialization and thereby increasing their employment opportunities and export earnings.

#### **2. Compliance with ITTO Criteria**

The project is consistent with the criteria established by ITTO.

- a) Be related to the production and utilization of industrial tropical timber;
- b) Should yield benefits to the tropical timber economy and be relevant to producing as well as consuming members;
- c) Be related to the maintenance and expansion of the international trade;
- d) Should offer reasonable prospects for positive economic returns in relation to costs; and

- e) Should make maximum use of research institution and, to the greatest extent possible, avoid duplication of efforts.

### 3. Linkage/Relationship to the ITTO Libreville Action Plan

The project is related and strongly linked to the ITTO Libreville Action Plan which was prepared in response to the new International Tropical Timber Agreement, 1994 (ITTA, 1994), which entered into force on 1 January 1997. The new Action Plan elaborates a strategy for advancing ITTO objectives, operational activities and statistical work as set forth in the ITTA, 1994.

The project is in support and in compliance with the new Action Plan considering that the standardization of tests for furniture would support marketing methods in the furniture industry sector. Having a uniform and standard tests would not only help and enhance marketing methods but it will also support market opportunities for furniture products. That is to state that the importers and users of furniture are provided with the assurance that they are buying a product that is assured of quality, strength and performance. The buying public can categorically state that the problem of pre-mature failure of their furniture is practically minimized if not totally eliminated. Similarly, the introduction of some design improvements particularly in joint construction would practically support and enhance market opportunities considering that the strength and durability of the furniture will be significantly improved.

## B. Relevance to National Policies

### 1. Institutional and Legal Framework

The Forest Products Research and Development Institute (FPRDI) is a research and development arm on forest products utilization of the Department of Science and Technology (DOST) of the Philippines. Its mandate is to conduct basic and applied research to help the wood and wood-using industries to disseminate information and technologies on forest products to end-users, and to provide technical services and training to various clientele. FPRDI will be the implementing agency of the project and will provide the testing machines/equipment, the laboratory and cost of electric power and utilities amounting to US \$ 227,900. The ITTO will assign/designate a representative to the Project Monitoring and Evaluation Committee to conduct monitoring and review of the project. It will also provide the necessary funds amounting to US \$ 142,281 to cover the costs for incentives and technical services for project personnel, duty travel, consumable items, capital items, miscellaneous and other cost components of the project.

## **PART II. THE PROJECT**

### **1. Origin**

Before the Twentieth Session of the International Tropical Timber Council and Eighteenth Session of the Permanent Committee on Forest Industry, the FPRDI submitted to ITTO a Project Proposal PD 14/96 (I) entitled "Technological Inputs for Upgrading and Modernization of the Furniture Industry in the Philippines" for evaluation by the Panel of Experts for Technical Appraisal of Project Proposals. As reflected in pages 15 and 16 of the Project Briefs of PCI (XXVIII) /2, dated 13 March 1996, the Expert Panel made some relevant comments and recommendations for the improvement of the project. The panel concluded that a re-formulation of the proposal is essential and it will assess the re-formulated proposal before it can be commended to the committee for appraisal.

In due regard to the comments and recommendations of the Panel, FPRDI contemplated and decided to submit this Project Proposal which is more specific problem oriented, similarly geared to upgrading of furniture, and more quantifiable output than the first project proposal. Besides, the major objectives and the component activities of the first project proposal PD 14/96 (I) is at present being undertaken in the regular S & T activities of the proponent agency (FPRDI), thus we consider it more rational and important to submit this project proposal than revising PD 14/96 (I).

### **2. Project Objectives**

#### **2.1 Development Objective**

To generate data and information on the strength and performance of furniture from tropical timber by employing established test standards. Promote the standardization of performance tests for wood furniture to enhance their competitiveness in the global market. Recommend innovative designs to improve their strength and performance in service.

#### **2.2 Specific Objectives**

To test and evaluate the static, fatigue, and impact strength of export wood furniture under high levels and rapid rates of loading that occur occasionally, and under repeated movement or applications of load occurring during daily use.

To determine the initial damage and damage propagation and ability to withstand acceptable mis-use and demonstration of sufficient residual strength. Recommend design improvement to upgrade the performance and quality of furniture products for export.

### **3. Project Justification**

#### **3.1 Problems to be Addressed**

Furniture is one of the major exports of the Philippines, earning about

US \$ 200 million annually and accounting 1% of the world export of furniture. It grew faster than the world average at 23% in the later part of 1980 and started to decline in the 1990's to about 0.7% in market share. In 1997, export of wood furniture amounted to only US \$ 124.44 million. The decline in export earnings is attributed to the limited supply of timber species traditionally used for furniture and to poor and inadequate performance of furniture in actual service, resulting to the pre-mature failure and low product quality. The latter problem can be attributed to the inadequate mechanization of the industry and the lack of actual strength and performance testing of the manufactured product. Actually, in the Philippines, furniture of any type are marketed without passing any kind of test particularly on their strength and stability. Both the manufacturers and buyer/end-users have no idea or information on how long and how stable a dining chair, a sala set, a table drawer, a cabinet door and other types of wood furniture would last in actual service. There is no specific guarantee or information that a piece of furniture could withstand the repeated operations, movement, and applications of loads occurring during daily use.

The project is primarily aimed at providing specific data and relevant information on the above-mentioned problems/issues and to help upgrade furniture products and contribute to the modernization of the industry.

#### **3.2 Characteristics of the region where the project will be located.**

The project will be located in the Forest Products Research and Development Institute at Los Baños, Laguna, Philippines. Los Baños is a science community in which some 8 national government institutions/agencies including the University of the Philippines and 2 international institutes/centers are located. It is situated 65 kilometers south of Manila and the weather condition is normally fair from December to May and rainy from June to November.

It is a semi-urban community with shopping malls and some small to medium sized variety stores. About 60 percent of the population in Los Baños are professionals and working with the government.

### **3.3 Other relevant aspects of the pre-project situation**

The proposed project has no pre-requisite pre-project.

### **3.4 Intended situation after project completion**

After the completion of the project, it can be categorically stated that various types of furniture from Philippine timbers have been tested and evaluated on their strength and stability simulating normal functional use, as well as acceptable mis-use following established test standard. That the various types of wood furniture with their corresponding sets of designs utilizing specific species of tropical timber had been found to have satisfactorily passed the required strength level corresponding to the specific type of use. It can also be known and categorically stated that some furniture manufactured using some specific designs and types of joint constructions using similar timber species did not pass the strength and stability requirements corresponding to the specific type of use.

Ultimately the Chamber of Furniture Industries of the Philippines (CFIP), the biggest organization of furniture manufacturers in the country with more than 500 members in its list would be greatly delighted. They would be able to test samples of their furniture and be able to know immediately whether it passes the strength and performance levels specified by the standard or not. In such situation, furniture makers would be marketing or exporting pieces of furniture that will really perform satisfactorily for any intended end-use applications. An era of smooth and improved trade relations between the manufacturers and the buyers/end-users in the wood furniture business would exist.

The FPRDI Management had a dialogued with the President and Members of the Board of CFIP recently. The significance and objectives of the project were presented and discussed. After a thorough discussions, the CFIP was impressed of the project goals/objectives and expected output and indicated their support to the project proposal.

In this project proposal, the FPRDI and the furniture industry will try to build a stronger relationship to help promote the strength and capability of furniture industry sector into the global market. The FPRDI will make available the testing facilities to the industry sector and will provide the necessary technical assistance to improve and upgrade their furniture. It will assist the members of

the CFIP in the problems they might encounter in future processing and testing of their products.

With these scenario, it is expected that the relationship will be fully reinforced for the benefit of furniture industry in the Philippines.

### 3.5 Target Beneficiaries

The beneficiaries of the project are the producers of wood furniture which includes the small, medium and big scale producers numbering to about 3000 (inclusive of those registered and unregistered firms with the Board of Investments of the Philippines). Small scale producers are those firms or companies with a capitalization of ₱ 0.5 to ₱ 5.0 million and with an employees of 10 to 99. Medium scale are those companies with ₱ 5 to ₱ 20 million capitalization and with 100 to 199 employees. Large scales are those companies with more than ₱ 20 million capital and with more than 200 employees. Similarly, the buyers and end-users of wood furniture will greatly benefit from the project. Ultimately, tropical timber trade will be significantly enhanced by the output on the project.

### 3.6 Project Strategy

#### 3.6.1 Reasons for Selection

The Forest Products Research and Development Institute (FPRDI) was created in 1957 with the mandate to conduct basic and applied research to respond to the needs and problems encountered by the wood and other forest-based industries in the Philippines. Specifically, the FPRDI has a dynamic R & D and S & T program addressed to support the furniture sector in the Philippines. Research output are published in semi-technical and technical journals, bulletins, leaflets and distributed to furniture manufacturers and exporters for information. The issuance of research publications are augmented by the usual conduct of training and demonstration seminar, workshops and fora in the 14 regions of the country in which the audience are furniture manufacturers, exporters and users. FPRDI likewise conduct in-plant advisory and consultancy services and undertake cooperative projects with its clientele. It also cater to the day-to-day walk-in inquiries/requests coming from wood industry sector. The reason why FPRDI extend technical support services to the furniture sector is for the sector to upgrade its manpower capability, facilities, product quality and its competitiveness in the world market. During the last 41 years, the Institute continuously improved its structure and have play an important role to the development of the wood industry in the country. Considering the

existing facilities and structure, and the experience accumulated during the years, it can be better utilized for implementing the project to achieve the set objectives and ultimate goal.

### 3.6.2 Lessons Drawn from Past Evaluation

This is a project proposal addressed to find solution to the problem of furniture buyers and end-users on the pre-mature failure or inadequate performance of furniture items in actual service. It will provide furniture producers a reference and information on whether their product would withstand the actual loads and cope with the functional use it will encounter in actual service, thereby enhancing their competitiveness in the world market.

### 3.6.3 Technical and Scientific Aspects

Through the years, FPRDI concentrated its efforts on the development of new products, processes and technologies to improve the utilization of both timber and non-timber forest products for the benefit of the timber trade and the public in general. Recently, it started a program to upgrade its laboratory facilities by sourcing for grants-in-aid facility and was able to acquire some furniture testing equipment which will be used in performing testing activities of manufactured furniture. This further developed and improved the efficiency and capability of the Institute in doing research and development work on forest products utilization.

In this project, the test standard that will be followed in testing the strength and performance/stability of the individual unit of furniture is the British Standard, BS 4875 Strength and Stability of Furniture part 1, 2, 5, 6, 7 and 8. It will be supplemented by BS 6250, BS 5459 and BS 5873 which specifies performance requirements for domestic and contract furniture and for office and educational furniture using method that are very similar to those in this standard.

The British Standard is one of the known standards in Europe and in the world used for testing the strength and stability of furniture. It has developed a number of standards for testing several types of furniture and at the same time providing specific safety requirements for each type of use. Specifically, for testing chairs, settees, high chairs, tables and cabinets, BS4875 part 1, 2 and 3 and BS 5799 are use for testing strength and stability. For testing office tables and desks and office chairs, BS 5459 is used. For cots, BS 1753; for beds, BS 1187; for strength and stability of educational chairs and tables, BS 5873; although ISO TC 136 SC7 can also be used, but this is also based from BS 4875.



Secondly, in this particular project, the testing machines/equipment that will be used were procured from the Furniture Industry Research Association (FIRA) of United Kingdom. FIRA is well-known for its work and services on furniture testing and test facilities for materials and structures. It uses the British Standard in performing all tests for all types of wooden, metal and plastic furniture.

#### **3.6.4 Economic Aspects**

The project output will benefit the whole furniture industry in the country considering that its primary objective is directed towards ascertaining that furniture products that will be sold in the market have passed the strength and stability requirements specified by accepted standards. This would not only enhance the quality and performance of wooden furniture but it will likewise improve the selling price and competitiveness in the world market. Ultimately, the wood furniture industry would be upgraded/improved economically and technically in status and capability.

#### **3.6.5 Environmental Aspects**

It is assured that the implementation of the project would not cause unfavourable environmental impact in the area or locality.

#### **3.6.6 Social Aspects**

The implementation of the project together with the technical and economic benefits that will be derived would generate social impact both to the producers and end-users of furniture. Considering that about 85 percent of the world population are users of furniture, the said population would be proud and satisfied with the performance of the furniture they are using. Considering further that smooth trading of furniture products would be experience by manufacturers, they will be encourage to grant some economic incentives to its workers. Resulting to a social upliftment in society.

#### **3.6.7 Managerial Aspects**

The implementation of the project will be managed by a Project Leader whose CV is appended. He will administer and manage all project activities to meet set objectives. He shall evolve plans/programs for the smooth implementation and completion of the project. The Project Leader will be responsible to the Project Monitoring and Evaluation Committee and shall prepare and submit reports to ITTO. He shall control the disbursements of project funds and supervise the

procurement of supplies and materials. He will be assisted by an Assistant Project Leader who will coordinate the activities and shall prepare and maintain records of data and information gathered by the project. Based on the duration of activities to be undertaken, the project will last for 18 months.

### **3.7 Reasons for ITTO Support**

#### **3.7.1 ITTO Aspects**

As stated in Part 1 of this document, this project is consistent with ITTO policies, objectives as well as the basic priorities of the ITTO Action Plan. The output that will be derived from the project will be beneficial not only to the Philippines but also to other ITTO member countries that are processing and utilizing tropical timber for furniture production. The Philippines is seeking financial assistance from ITTO to implement the project and to come up with the expected output.

#### **3.7.2 Relation to Relevant Actions Supported by Other Donors**

There are no other potential donors for the implementation of the project, only ITTO has been approached for appropriate financial assistance.

### **3.8 Risks**

Considering that the resources and other inputs required for the implementation of the project will be provided by FPRDI and ITTO, the potential risks that may affect the success of the project are few. To mention some are:

- a) The breakdown of the testing machines and that it would require a big amount of funds to repair and make it operational; and
- b) The availability of an international expert on furniture testing and standards.

From the economic sector view point, potential risks may also cropped-up that the additional cost for testing the prototype furniture might be an economic factor especially for the small scale manufacturers. Secondly, they might not be ready to face the actual facts that they will be producing furniture just for the purpose of being tested and they will not earn appropriate sum of money from these items or products.

#### **4. Outputs and Activities**

##### **4.1 Specific Objective 1**

To test and evaluate the static, fatigue and impact strength and stability of wood furniture under high levels and rapid rates of loading that occur occasionally and during daily use following established tests standard.

###### **Output 1**

Data and information on the static, fatigue and impact strength and performance of the individual prototype chairs, tables, stools, cabinet doors and table drawers from tropical timber generated and known.

###### **Activity 1.1**

Identification, inspection and classification of wooden furniture prior to testing. Preparation of necessary attachments, clamping devices pads and accessories used for testing.

###### **Activity 1.2**

Testing of prototype furniture using electro-pneumatic testing machines/equipment following standard test procedures.

##### **4.2 Specific Objective 2**

To determine the damage and damage propagation and ability to withstand acceptable mis-use and demonstration of sufficient residual strength. Recommend design improvement to upgrade the performance and quality of furniture.

###### **Output 2**

Types of furniture damage identified. The extent of damage propagation known and evaluated for specific kind of furniture. Designs that would improve strength and stability of furniture identified and recommended/disseminated to manufacturers.

### **Activity 2.1**

Determination and evaluation of damage and damage propagation in individual furniture tested. Establish the amount of load or force and test level applied when damage starts and failure occurrence.

### **Activity 2.2**

Preparation and recommendation of improved design on joint construction and on the furniture structure.

## **5. Logical Framework Matrix**

The logical framework matrix is appended.

## **6. Work Plan**

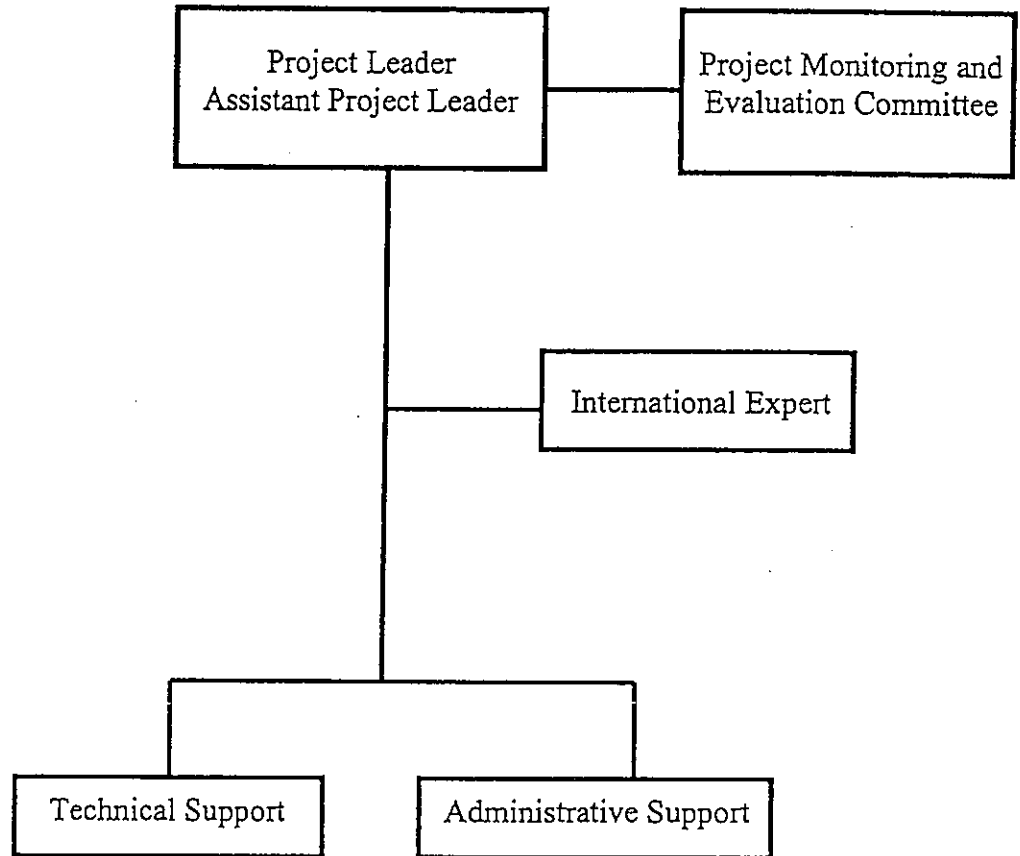
The work plan is appended.

## **7. Institutional Arrangement for Execution and Operation**

### **7.1 Management Structure**

The implementing agency of the project will be the Forest Products Research and Development Institute of the Department of Science and Technology. The Project Management Structure will comprise the Project Leader and the Assistant Project Leader who will be responsible to the administrative and technical implementation of the project. They will be assisted by an International Expert on furniture testing and by technical and administrative support staff. The Monitoring and Evaluation Committee composed of the Head of the Implementing Agency, an ITTO Representative, and a Representative from the Department of Environment and Natural Resources (DENR) representing the Philippine government will monitor and evaluate the progress of project implementation.

The Management Structure will be as follows:



## 7.2 Key Staff

The Staff will include the Project Leader, an International Expert on Furniture Testing and Standards and a National Expert on Furniture Production, who will be the Assistant Project Leader.

The CV of the Project Leader and the Terms of Reference for the International Expert and the National Furniture Expert are appended.

## 8. Prior Obligations and Pre-requisites

The FPRDI being the implementing agency of the project and DENR being the representative of the government will be responsible for

preliminary activities particularly in the signing of the Project Implementation Agreement.

#### **9. Possible Future Actions**

Upon project completion FPRDI will prepare and submit a report to ITTO that will indicate all outputs or achievements derived from the project. It will also prepare a technical report that will present some details on the strength and performance of all types of furniture items tested particularly their design, the types of joint construction used, their intended end-use applications and the species of tropical timber used. Even after the completion of the project, FPRDI will continue to conduct tests and evaluation work to the furniture manufacturers in the Philippines and even to those from other ITTO member countries that do not have some testing facilities. It will also provide test services and training to furniture manufacturers to improve product quality and meet international standards and thereby enhance competitiveness.

### **PART III. MONITORING, REPORTING AND EVALUATION**

#### **1. Arrangement for Reporting**

The project final report and the semi-annual progress reports will be prepared in accordance with the provisions of the ITTO Manual. The documents will be submitted following the standard format for progress and final reports as prescribed in the ITTO Manual for Project Formulation.

#### **2. ITTO Monitoring and Evaluation**

The project will be subject to monitoring and evaluation by the Project Monitoring and Evaluation Committee (PMEC) at once every 6 months. The dates of any such monitoring, review and evaluation will be agreed between ITTO and Project Management.

### **PART IV. BUDGET**

The revised project total budget by financing source is presented in Table 1. The consolidated yearly budget for ITTO contribution is presented in Table 2; and the consolidated yearly budget for the National Contribution is presented in Table 3. Table 4,

Table 1.

**PROJECT BUDGET BY FINANCING SOURCE**  
(in U.S.\$)

FINANCING SOURCE	ITTO	NATIONAL
<b>10. PROJECT PERSONNEL</b>		
11. National Expert		
1 Project Leader – US\$ 800/month, 18 months	14,400	3,000
1 Assistant Project Leader Furniture Expert – US\$ 500/month, 18 months	9,000	5,400
12. Technical/Administrative Support Personnel (18 months)		
1 Research Assistant – US\$ 350/month	6,300	
1 Machine Operator – US\$ 300/month	5,400	
1 Computer Operator – US\$ 300/month	5,400	
1 Project Accountant – US\$ 400/month	7,200	
15. International Expert		
1 International Expert on Furniture Testing Standards – US\$ 10,000/month, 1.5 months	15,000	
19. Component Total	62,700	
<b>20. SUB-CONTRACTS</b>		
None		
<b>30. DUTY TRAVEL</b>		
31. National DSA	7,000	
32. International DSA	3,000	
33. National Airfares	2,500	
34. International Airfares	3,500	
35. Land Transport (overall)	4,500	
39. Component Total	20,500	
<b>40. CAPITAL ITEMS</b>		
41. Vehicle	-	5,000
42. Capital Equipment/Furniture Testing Machines	12,000	210,500
49. Component Total	12,000	215,500
<b>50. CONSUMABLE ITEMS</b>		
51. Raw Materials	7,000	
52. Spares	4,500	
53. Utilities	-	4,000
54. Office Supplies	5,000	
55. Fuel and Lubricants	2,000	
59. Component Total	18,500	4,000
<b>60. MISCELLANEOUS</b>		
61. Sundry	8,500	
62. Contingencies	6,000	
69. Component Total	14,500	
<b>70. ITTO MONITORING, EVALUATION AND ADMINISTRATION</b>		
71. Monitoring and Evaluation	4,500	
72. Administrative Costs (5.5 % of Project Costs after item 71.)	7,299	
79. Component Total	11,799	
<b>99. GRAND TOTAL</b>	<b>139,999</b>	<b>227,900</b>

Table 2.

CONSOLIDATED YEARLY BUDGET (US\$)  
ITTO CONTRIBUTION

BUDGET COMPONENTS	TOTAL	YEAR I	YEAR II
10. Project Personnel	62,700	40,000	22,700
20. Sub-Contract	-	-	-
30. Duty Travel	20,500	13,667	6,833
40. Capital Items	12,000	8,000	4,000
50. Consumable Items	18,500	12,334	6,166
60. Miscellaneous	14,500	9,667	4,833
70. ITTO Adm. Monitoring & Evaluation	11,799	9,388	2,411
99. GRAND TOTAL	139,999	93,056	46,943

Table 3.

CONSOLIDATED YEARLY BUDGET (US\$)  
NATIONAL CONTRIBUTION

BUDGET COMPONENTS	TOTAL	YEAR 1	YEAR 2
10. Project Personnel	8,400	6,000	2,400
20. Sub-Contract	-	-	-
30. Duty Travel	-	-	-
40. Capital Items	215,500	215,500	-
50. Consumable Items	4,000	3,000	1,000
60. Miscellaneous	-	-	-
70. ITTO Adm. Monitoring & Evaluation	-	-	-
99. GRAND TOTAL	227,900	224,500	3,400



**TABLE 4. ITEMIZED BUDGET FOR CAPITAL AND CONSUMABLE ITEMS**

**A. ITTO Contribution**

1. Capital Items:		
One unit, Impact Pendulum Hammer		US\$ 5,000.00
One unit, Arm Sideways Test Rig		<u>US\$ 7,000.00</u>
	<b>Total</b>	<b>US\$ 12,000.00</b>
2. Consumable Items:		
Raw Materials: wood, metal fittings, Tubes/rubber hose		US\$ 7,000.00
Spares: Tires for service vehicle, batteries, fuses		US\$ 4,500.00
Office Supplies: Diskettes, computer paper, lead paper, Bond papers, acetate, films, B-boards, toners, colored transparencies, illustration boards		<u>US\$ 5,000.00</u>
Fuel and Lubricants: Diesel fuel, oil,		<u>US\$ 2,000.00</u>
	<b>Total</b>	<b>US\$ 18,500.00</b>

**B. FPRDI/NATIONAL Contribution**

1. Capital Items (Furniture Testing Machines):		
One unit Impact Tester		US\$ 29,000.00
One unit Static and Fatigue Tester		US\$ 94,500.00
One unit Single Cylinder General Purpose Tester		US\$ 68,400.00
One unit Pivot Door Tester		US\$ 12,000.00
One unit Drawer Slamming Tester		<u>US\$ 11,600.00</u>
	<b>Total</b>	<b>US\$ 215,500.00</b>
2. Utilities:		
Electric Power		US\$ 3,000.00
Water		<u>US\$ 1,000.00</u>
	<b>Total</b>	<b>US\$ 4,000.00</b>

**PROJECT BUDGET BY ACTIVITY**

OUTPUT/ACTIVITIES	BUDGET COMPONENTS (US \$)						GRAND TOTAL
	Project Personnel	Duty Travel	Consumable Items	Capital Items	Miscellaneous	ITTO Mom. Eval. Ad	
Output 1 – Data and information on Strength and performance of furniture generated.							
Activity 1.1 Identification inspection and classification of wood furniture.	10,000	5,000	2,000	2,000	3,000	3,500	25,500
Activity 1.2 Testing of individual furniture items.	20,600	2,000	8,000	4,000	4,500	3,500	42,600
<b>Output 1 Sub-Total</b>	<b>30,600</b>	<b>7,000</b>	<b>10,000</b>	<b>6,000</b>	<b>7,500</b>	<b>7,000</b>	<b>68,100</b>
Output 2 – Furniture damage determination and evaluation completed. Load/forces and test levels established for each end-use application.							
Activity 2.1 Determination and evaluation of damage propagation. Establishment of load /force capacity and test levels for furniture.	20,000	4,000	4,500	3,000	3,500	4,081	39,081
Activity 2.2 Preparation and recommendation of improve furniture design.	12,100	9,500	4,000	3,000	3,500	3,000	35,100
<b>Output 2 Sub-Total</b>	<b>32,100</b>	<b>13,500</b>	<b>8,500</b>	<b>6,000</b>	<b>7,000</b>	<b>7,081</b>	<b>74,181</b>
<b>GRAND TOTAL</b>	<b>62,700</b>	<b>20,500</b>	<b>18,500</b>	<b>12,000</b>	<b>14,500</b>	<b>14,081</b>	<b>142,281</b>

## LOGICAL FRAMEWORK MATRIX

PROJECT ELEMENTS	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>Development Objectives:</u></p> <p>To determine and evaluate the strength and performance of export wood furniture such as chairs, tables, stools, cabinet doors and drawers by the application of loads or forces simulating normal functional use, as well as acceptable mis-use, according to graded scale of severity following established test standard. To recommend improved designs and joint construction methods to upgrade strength, quality and performance of wood furniture.</p> <p><u>Specific Objectives:</u></p> <p>1. To test and evaluate the static, fatigue and impact strength of wood furniture under high levels and rapid rates of loading that occur occasionally and under repeated movement and application of load occurring during daily use.</p> <p>2. To determine the daily damage and damage propagation and capacity to withstand acceptable mis-use and demonstration of residual strength. Recommend design improvement to upgrade performance and quality of furniture.</p>	<p>Generated vital information on the strength and performance of wooden furniture of various types by the application of loads or forces simulating normal functional use following established test standard.</p> <p>Recommended design improvements to upgrade strength, quality and performance of wooden furniture.</p> <p>The static, fatigue and impact strength of wood furniture determined when subjected to high levels and rapid rates of loading that occur occasionally and during daily use.</p> <p>The initial damage and damage propagation and the capacity of furniture to withstand acceptable mis-use determined.</p> <p>Design improvement to upgrade strength, quality and performance of furniture recommended.</p>	<p>Wood furniture manufacturers became aware/informed that data and vital information on the strength and performance of wood furniture when subjected to various loads/forces following established test standards are already available.</p> <p>Test results prepared, published and disseminated to clientele.</p> <p>Progress Reports and Completion Report</p> <p>Progress Reports and Completion Report</p>	<p>A strong teamwork among project personnel exists in the project implementation.</p> <p>All input requirements are available on time and as scheduled.</p> <p>There are no breakdowns in the machines used in conducting testing activities.</p> <p style="text-align: center;">- do -</p>

Cont... LOGICAL FRAMEWORK MATRIX

PROJECT ELEMENTS	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>Outputs</u></p> <p>1. Data and information on the static, fatigue and impact strength and performance of individual prototype chairs, tables, stools, cabinet doors and table drawers from wood generated and known to furniture manufacturers, buyers and users.</p> <p>2. Types of furniture damage identified. The extend of damage propagation for specific type/kind of furniture evaluated. Designs that would improved strength and stability of furniture identified and recommended to manufacturers/producers.</p>	<p>Results of tests and evaluation on various types of wood furniture subjected to static, fatigue and impact loadings properly recorded and analyzed and will be used as a reference/basis for the preparation of the final report.</p> <p>Extent of damage and damage Propagation in all types of furniture tested properly kept, recorded and analyzed.</p> <p>Improved designs of furniture prepared for reference and possible adoption by clientele.</p>	<p>Report of National and International Experts.</p> <p>Progress and final reports of project prepared and disseminated to furniture manufacturers.</p> <p>Report of National and International Experts.</p> <p>Final report of the project prepared and disseminated to furniture manufacturers.</p>	

# WORKPLAN

Activities	Monthly Schedule																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Activity 1.1 Identification, inspection and classification of wood furniture for testing.																		
Activity 1.2 Testing of individual furniture items, following test standard.																		
Activity 2.1 Determination and evaluation of damage and damage propagation. Establishment of load/force capacity and test levels for furniture.																		
Activity 2.2 Preparation and recommendation of improve designs.																		

## TERMS OF REFERENCES

### For International Expert on Furniture Testing

Bachelors Degree in either Mechanical, Electrical, Industrial and Forest Engineering with a Master's Degree in Forest Industries and with 5 years experience in conducting strength testing of wood furniture using accepted test standards. The duties and responsibilities of the expert will include:

- Coordinate with Project Leader and National Expert on the conduct of the project activities.
- Familiarize, demonstrate and train project technical personnel on the methods/procedures employed in performing strength and stability tests on chairs, tables, stools, cabinet doors, drawers and related furniture components following established test standard.
- Provide technical assistance to project personnel to ensure the achievement of expected objectives and outputs of the project.
- Evaluate test results, prepared and submit pertinent report to Project Management.

### For National Expert

A BS or MS Degree in any of the Engineering Sciences with 5 to 10 years experience in the wood industry, particularly in furniture manufacture and trade. The duties and responsibilities of the expert will include:

- Assist Project Management in the efficient and effective conduct of project activities.
- Coordinate project activities with the members of the Chamber of Furniture Industries of the Philippines (CFIP).
- Prepare a program/schedule of test for furniture items from member firms or companies.
- Prepare and submit periodic reports on the results of project testing activities.
- Recommend measures to further improve the dissemination of project results to the furniture producers and users.

**SUMMARY OF MODIFICATIONS/ACTIONS  
ON THE EXPERT PANEL RECOMMENDATIONS**

**Recommendation i:** Clarify and make consistent the development objective and specific objective in terms of the target market and type of furniture.

**Modification:** The primary target market is the export market and the types of furniture are those intended for export.

**Recommendation ii:** Provide more information on the Philippine export markets and fully describe the reason for the selection of the British Test Standard. Is the proposal targeting the Europe market? Is the British Standard accepted in all of the Philippine furniture export markets?

**Modification:** The major importers of Philippine wooden furniture are United States of America, Japan, United Kingdom and Australia. The main items are chairs, office tables, kitchen furniture, and bedroom furniture. The British Standard for furniture testing is one of the oldest established test standards. Aside from being well known, it is the most updated standard on wooden furniture testing. U.K. has the Furniture Industry Research Association (FIRA) which actually fabricate test machines specifically for furniture. The British standard is acceptable to the Philippine furniture export markets.

**Recommendation iii:** The section on National Policy Reforms is not relevant and should be eliminated.

**Action:** This portion has been deleted.

**Recommendation iv:** The project formulator should attempt to secure some support or formal collaboration from the Chamber of Furniture Industries (CFIP) and incorporate or more fully describe the expected relationships with furniture industry in terms of the sustainability of the project and future testing.

**Actions:** There was a strong linkage and technical cooperation between the project proponent (FPRDI) and the Chamber of Furniture Industries (CFIP) of the Philippines during the past 25 years. Collaboration and cooperation between FPRDI and CFIP is particularly anchored on the technical services/assistance being extended by FPRDI to the members of the CFIP through out the Philippines. These services are in general being requested by the Chamber and also by individual members. Besides the CFIP will be involved in the implementation of the project by using their products during actual testing. A written commitment from CFIP is underway regarding their participation in the project. It is expected that the relationship between FPRDI and CFIP will be further strengthened by the approval and implementation of the project proposal considering that the specific activities that will be undertaken are on the evaluation of the performance of

wood furniture in relation to end-use applications using established standards. It will not only give assurance to furniture makers that their products passed standard tests in relation to performance but it will likewise proposed some improvements in the design of furniture products. It is expected that there will be stronger relationship and sustainability of such relationship between FPRDI and the furniture industry considering that the expected output of the project are for the benefit of the industry.

**Recommendation v:** The panel strongly recommended a significant reduction in the salaries of project personnel.

**Modification:** The project budget under ITTO Counterpart was reduced from US \$ 156,681.00 to US \$ 142,281.00. Item No. 11, National Expert in Table 1, the Technical Assistant was deleted. What remains is only the Project Leader and Assistant Project Leader so that the budget for National Experts was reduced from US \$ 37,800.00 to US \$ 23,400.00. We could not reduce the salaries of hired technical and administrative support personnel in Item No. 12 since this is the minimum wage existing for each position in the country.

**NOTE:**

For the latest revisions made in response to the Experts Panel recommendations i, ii, iii, iv and v of the Project Proposal, the modifications made are printed in bold letters on pages 2, 3, 5, 7 and 14 for reference.