付属資料 4-1

長期専門家派遣実績

2004年9月現在

	派遣年度	氏　名	指導分野	派遣期間
1	2000（H12）	志水 一允	ﾁｰﾌ・ｱﾄﾞﾊﾞｲｻﾞｰ	2000.04.30~2002.09.29
2		国森 恵子	業務調整	2000.04.30~2005.03.30
3		浦上 弘幸	木材特性	2000.09.20~2002.09.19
4		瀬戸山幸一	木材化工	2000.05.15~2002.05.14
5		峯村 伸哉	木材工学	2000.05.15~2002.05.14
				計：5名
6	2002（H14）	林　良興	ﾁｰﾌ・ｱﾄﾞﾊﾞｲｻﾞｰ	2002.10.21~2005.03.30
7		中井　孝	木材特性	2002.10.08~2005.03.30
8		黒須博司	木材化工	2002.05.09~2005.03.30
9		池田　敦	木材工学	2002.05.09~2005.03.30
				計：4名

付属資料 4-2

短期専門家派遣実績

2004 年 9 月現在

	派遣年度	氏　名	指導分野及び内容	派遣期間
1	2000 (H12)	平川泰彦	木材特性 試験林での人工林木材の採取、試験材の調製法他	2000.11.11~2000.12.05
2		平田利美	木材工学 人工林木材の熱的特性評価	2001.04.10~2001.06.09
3	2001 (H13)	富村洋一	木材特性 木材化学特性の解明	2001.09.03~2001.09.28
4		井上雅文	木材化工 木材の表面硬化とその評価	2001.07.03~2001.08.15
5		原田寿郎	木材工学 木材の難燃処理及び評価法	2001.09.03~2001.09.28
6		桃原郁夫	木材工学 人工林木材生物劣化特性試験・評価手法	2001.09.03~2001.09.28
7		井上明生	木材工学 ホルムアルデヒド放散量評価法	2001.10.09~2001.11.30
8		塔村真一郎	木材化工 木材の液化	2002.01.07~2002.02.04
9	2002 (H14)	秦野泰典	木材化工 異種材料との複合化	2002.06.06~2002.07.04
10		長尾博文	木材特性 立木の力学的非破壊試験法	2002.10.08~2002.11.16
11		松村順司	木材特性 針葉樹と広葉樹造林木の材質試験	2002.10.21~2002.11.30
12		小林　功	木材工学 木材乾燥の理論と実務	2003.02.17~2003.04.05
13		宮武　敦	木材工学 ﾌｨﾝｶﾞｰｼﾞｮｲﾝﾄによる木材の接着接合	2003.03.31~2003.05.01
14	2003 (H15)	黒田尚宏	木材特性 高周波加熱・減圧乾燥技術	2003.08.24~2003.10.18
15		伊藤貴文	木材化工 木材の寸法安定化とその評価	2003.09.10~2003.09.30
16		鈴木憲太郎	木材工学 防腐・防虫処理とその性能評価	2003.10.08~2003.10.31

	派遣年度	氏　名	指導分野及び内容	派遣期間
17	2003（H15）	飯田生穂	木材特性 人工林木材の材質・物理特性の評価	2003.10.14~2003.11.11
18		宮武　敦	木材工学 ﾌｨﾝｶﾞｰｼﾞｮｲﾝﾄによる木材の接着接合	2004.02.15~2004.02.28
19		林　知行	木材工学 接着耐久性の評価及び予測	2004.03.01~2004.03.27
20		平川泰彦	木材特性 人工林木材の各種特性評価法	2004.03.22~2004.04.17
21		瀬戸山幸一	木材化工 木材繊維とポリプロピレン等との複合化	2004.03.22~2004.04.17
22	2004（H16）	奥山　剛	木材特性 これからの人工林木材特性研究の必要性	2004.08.08~2004.08.18
23		岡本　忠	木材化工 木材とプラスチックとの複合化に関する研究	2004.08.18~2004.08.28
24		渋沢龍也	木材工学 最終用途を考慮した木材加工研究の展望	2004.11.04~2004.11.13
25		櫻井尚武	木材特性 人工林木材の特性研究と技術開発の展望	2004.11.21~2004.11.27

2000（H12）年度：計2名

2001（H13）年度：計6名

2002（H14）年度：計5名

2003（H15）年度：計8名

2004（H16）年度：4名予定

付属資料 4-3

研修員受入実績

２００４年９月現在

	年度	氏 名	研修分野及び内容	研修期間	研修先
1	2000 (H12)	呂建雄	木材特性 木材中の液体通路の動的観察他	2001/01/10~2001/07/10	森林総合研究所 京都府立大
2		秦特夫	木材化工 ポリマーと木材とのミクロな相互作用の検討他	2001/03/26~2001/09/23	森林総合研究所
3		扈艶紅	木材化工 液化溶媒の選定手法他	2001/03/26~2001/06/26	森林総合研究所
4	2001 (H13)	費本華	木材特性 ﾃﾞﾝｼｰﾄﾒｰﾀｰによる測定手法他	2001/05/07~2001/08/07	森林総合研究所
5		王朝暉	木材特性 人工林材の材質特性の評価	2002/03/25~2002/07/06	森林総合研究所
6		周永東	木材工学 用途別の適正乾燥ｽｹｼﾞｭｰﾙ他	2001/06/18~2001/12/09	森林総合研究所
7		傅　峰	木材工学 接着剤の物性評価手法の取得他	2001/08/08~2002/02/02	森林総合研究所
8	2002 (H14)	黄洛華	木材特性 ｺｳﾖｳｻﾞﾝとﾎﾟﾌﾟﾗの精油成分と主成分の化学構造解明	2002/06/25~2002/12/20	森林総合研究所
9		龍 玲	木材工学 木製品からのﾎﾙﾑｱﾙﾃﾞﾋﾄﾞの放散機構とその抑制	2002/06/25~2002/12/20	森林総合研究所 北海道林産試験場
10		□ 嘉琪	木材工学 木材製品の防腐・防カビ・防蟻試験方法	2002/06/25~2002/10/25	森林総合研究所
11		劉君良	木材化工 木材表面硬化とその評価	2003/03/30~2003/07/01	森林総合研究所 京都大学
12		李改雲	木材化工 木材の液化物の利用法	2003/03/30~2003/09/27	森林総合研究所
13	2003 (H15)	郭文静	木材化工 木材繊維とﾎﾟﾘﾌﾟﾛﾋﾟﾚﾝ等との複合化	2003/09/02~2004/02/28	森林総合研究所 近畿大学
14		李春生	木材化工 木材の染色性と染色木材の耐光性	2003/09/02~2004/02/28	森林総合研究所 北海道林産試験場
15		閻昊鵬	木材特性 人工林木材の化学特性評価	2004/01/12~2004/04/10	森林総合研究所
16		殷亞方	木材特性 造林木の材質の非破壊的評価	2004/02/29~2004/05/21	森林総合研究所
17		李暁玲	木材工学 高周波加熱・減圧乾燥	2004/03/28~2004/09/26	森林総合研究所

	年度	氏 名	研修分野及び内容	研修期間	研修先
18	2003 (H15)	彭立民	木材特性 フインガージョイント接合試験	2004/03/28~2004/09/26	森林総合研究所
19	2004 (H16)	周　宇	木材化工 木材の染色と染色木材の耐光性研究	2004/06/01~2004/08/31	森林総合研究所 京都府立大学
20		趙有科	木材特性 人工林木材の材質・物理的特性の評価	2004/06/01~2004/10/01	森林総合研究所 京都府立大学
21		高瑞清	木材工学 人工林木材乾燥のための高周波減圧乾燥法と他の乾燥法との比較検討	2004/07/19~2004/09/18	森林総合研究所

2000（H12）年度：3 名
2001（H13）年度：4 名
2002（H14）年度：5 名
2003（H15）年度：6 名
2004（H16）年度：3 名

機　材　費　投　入　実　績

単価：日本円　（　）内は人民元

	H11 年度 （1999 年）	H12 年度 （2000 年）	H13 年度 （2001 年）	H14 年度 （2002 年）	H15 年度 （2003 年）	H16 年度 （2004 年）	合　計
供与機材	193,619,961	119,690,888 （含現地調達 181,369 元）	84,168,410 （含現地調達628,040元）	83,107,705 （含現地調達870,998 元）	37,853,674 （現地調達 119,560 元）	15 年度に前倒し	518,440,638
携行機材	478,000	4,507,769	2,916,344	4,879,945	3,139,067 （含現地調達 11,550 元）	864,300	16,785,425
合　計	194,097,961	124,198,657	87,084,754	87,987,650	32,993,847		535,226,063

2004 年 8 月現在到着

注意：日本の会計年度は 4 月から翌年の 3 月まで

中国人工林木材研究計画　供与機材リスト　分野　a;一般管理、b;木工機械、ｃ；共用分析,　d;特性、e;化学、ｆ；物理

通番号	年度	各年番号	機材名	分野	メーカー名	型式	金額	備考
104	2	1	試料採取用車	a	いすず	UBS-26G	294	
1	1	1	車両	a	トヨタ	ハイエース	195	
138	2	35	液晶プロジェクター	a	パナソニック	Ｐｔ－Ｌ５５７	90	２年度現地調達
135	2	32	コピー機	a			40	２年度現地調達
3	1	3	デジタルカメラ	a	ミノルタ	ＥＸ－Ｚ１５Ｖ２	28	
2	1	2	カメラ	a	ニコン	Ｆ７０Ｄパノラマ	27	
7	1	7	自動二面鉋盤	b	下平製作所	ＤＴＢ－５００	600	
14	1	14	パネルソー	b	石津製作所	ＩＳＷＣ－２５００－ＥＪＨＦ	591	
19	1	19	万能木工機	b	田辺鉄工所	ＫＵ－１８Ｄ	320	
11	1	11	リップソー	b	アミテック	ＮＲＧ－３０	312	
18	1	18	フォークリフト	b	コマツ	ＦＤ３０Ｔ－１２	304	
222	6	44	大型帯鋸盤	b	宮川工機	MBS-800	249	
5	1	5	自動一面鉋盤	b	飯田工業	ＳＸ－５３４	229	
20	1	20	自動帯鋸盤目立機	b	宮川工機	ＭＸＤ－８	229	
21	1	21	超硬工具研削盤：丸鋸研磨機	b	庄田鉄工	ＳＧ－１１３Ａ	225	
219	6	41	超仕上げかんな盤	b	アミテック	RVA-251	200	
12	1	12	クロスカットソー	b	小林機械	ＫＭ－５Ｃ－６００	196	
223	6	45	万能卓上帯鋸盤　３台	b	Ryowa	BSW-200	170.4	
4	1	4	木工帯鋸盤	b	伴鉄工所	ＢＳ－６６０	157	
10	1	10	集塵機	b	ムラコシ	ＭＹ－１５０ＸＮ	143	
22	1	22	刃物研削ラップ盤：刃物研磨機	b	丸仲鐵工所	ＧＬＥ－５０２ｍ	134	
6	1	6	高速手押し鉋盤	b	庄田鉄工	ＨＰ－１５２	125	
220	6	42	特注挽き割りガイド	b	RYOBI	MBS-800専用	125	
8	1	8	ワイドテーブル昇降盤	b	永和工業	ＣＢ－１４	118	
9	1	9	軸昇降傾斜盤	b	永和工業	ＵＴＡ１６	114	
15	1	15	自動一面鉋盤：ミニフォル	b	飯田工業	ＢＰ－１２２	36	
221	6	43	小型バンドソー	b	RYOBI	BS-51N	22.4	
218	6	40	パレットトラック	b	コレック	NBL-15-69	13.6	
16	1	16	卓上ボール盤	b	日立工械	Ｂ　１３　Ｓ	13	
17	1	17	電動工具	b	日立工械		13	
13	1	13	チェーンソー	b	日立工械	ＣＳ　４５　Ｅ２	11	
112	2	9	走査電子顕微鏡（イオンコータ含む）	c	日本電子	ＪＳＭ－５５００ＬＶ	2375	
140	3	2	万能木材材料試験機	c	ミネビア	AL-50kNB	2010	荷重ー変位ﾃﾞｰﾀﾛｶﾞﾛｰﾄﾞｾﾙ・治具セット木材材料試験機
108	2	5	ガスクロ一質量分析装置（ＧＣ－ＭＳ）	c	島津	ＧＣＭＳ－ＱＰ５０５０Ａ	1420	
76	1	76	高速液体クロマトグラフ	c	島津製作所	ＬＣ－ＶＰ	1075	
23	1	23	液体クロマトグラフィー（ＬＣ）	c	協和精密	糖分析システム特注	837	
172	5	2	スペアパーツ（GC-MS）	c	島津製作所	アクセサリセット	630	
65	1	65	接触角測定装置	c	協和界面科学		549	
26	1	26	多光源分光測色計	c	スガ試験機	ＭＳＣ－Ｐ、ウインドウズ対	464	
27	1	27	紫外・可視分光光度計	c	島津製作所	ＵＶ－２５００ＰＣ（Ｓ）	423	
107	2	4	ガスクロマトグラフィ（ＧＣ）	c	島津	ＧＣ－１７ＡＦＦ	350	
111	2	8	ＦＴＩＲ用試料調整器	c	日本分光		88	
114	2	11	濃度計（パソコン、ソフト、治具含む）	d	コニカメディカル、千穂田精工		950	
115	2	12	軟Ｘ線写真撮影装置	d	ソフテックス特注		689	
50	1	50	非破壊式強度評価機	d	エーアンドディ、富士物産		575	
49	1	49	恒温恒湿器	d	タバイエスペック	ＣＲＨ－２２０	398	

139	3	1	真空蒸着装置	d	日本電子	JEE-420	305	
113	2	10	繊維長測定システム	d	オリンパス		304	
24	1	24	遠心粉砕機（Ｍｉｌｌ）	d	日本精機	ＺＭ－１００	276	
110	2	7	凍結乾燥器	d	東京理化	ＶＦＤ－２０８，ＰＳＬ－１０	162	
57	1	57	電位差滴定装置	d	メトローム	７７６／８	161	
177	5	7	レジストグラフ	d	Walesch	IML-REGI	150.1	
193	6	15	Facopp	d	Facopp		145.1	
171	5	1	振動ボールミル	d	入り江商会	VS-1	135	５年度前倒し
217	6	39	冷却トラップ装置	d	旭テクノグラス	CLT-０５０	130.2	
179	6	1	フラクトメータ	d	Walesch		107.8	５年度
35	1	35	カラーテレビカメラシステム	d	オリンパス	ｃｓ－９００	100	
53	1	53	ソックスレー型抽出装置	d	シバタ	ＳＰＣ、ＷＢ－６Ｃなど	100	
28	1	28	純水製造器	d	ヤマト科学	ＷＳ２００	93	
33	1	33	光学顕微鏡	d	オリンパス	ＢＸ－５０－３２	93	
36	1	36	偏光顕微鏡	d	オリンパス	ＢＸ５０－３１Ｐ	93	
32	1	32	滑走式ミクロトーム及び ナイフホルダー固定器	d	大和光機	ＴＵ－２１３・Ｃ－２４	88	
34	1	34	光学顕微鏡写真撮影装置	d	オリンパス	ＰＭ－３０－１	88	
41	1	41	成長錐１０mm径、 ５０・４０・３０ｃｍ	d	Ｈａｇｌｏｆ		87	
180	6	2	超音波洗浄装置	d	Fine	W-115SH	81.5	
58	1	58	超音波洗浄器	d	Ｆｉｎｅ	Ｗ－１１５ＳＨ、ヒーター付	77	
56	1	56	遠心分離機	d	クボタ	５４００型	71	
109	2	6	マッフル炉	d	ヤマト	ＦＰ３２	67	
37	1	37	実体顕微鏡	d	オリンパス	ＳＺＸ－９－３１２２	64	
51	1	51	ロータリーエバポレーター	d	シバタ	Ｒ－１１４－Ａ、Ｂ－４８１	63	
106	2	3	反応用ミクロオートクレーブ （恒温槽とセット）	d	ナックオートクレーブ、タイ	特注，ＤＴＵ－１Ｃ	62	
164	4	9	スチルビデオモニター一式	d	ＪＶＣ	BR-S800E,UP-2330P	60	ﾋﾞﾃﾞｵﾀｲﾌﾟredorder, ｶﾗｰﾋﾞﾃﾞｵﾌﾟﾘﾝﾀｰ,Lens(3)
39	1	39	暗室設備	d	Ｆｕｊｉ		52	
60	1	60	木粉製造機（ウイリー）	d	池本理化	Ｂ型	52	
25	1	25	篩振とう器	d	井内	ＡＳ２００ＤＩＧＩＴ	47	
38	1	38	実体顕用写真撮影装置	d	オリンパス	ＰＭ－１０ＳＰ－３５	46	
182	6	4	X線フィルム	d	Fuji	IX-FR	46	
45	1	45	冷凍庫	d	サンヨー	ＭＤＦ－Ｕ５３６	45	
47	1	47	恒温器	d	ヤマト科学	ＤＮ－６１０	45	
55	1	55	電子はかり	d	島津製作所	ＢＷ３２０Ｈ、ＢＷ３２００Ｈ	40	
48	1	48	デジタルゲージ	d	Ｓｏｎｙ　Ｐｒｅ.	ＤＧ－１００ＢＰ、 ＤＺ－５０１	38	
63	1	63	赤外線水分計	d	Ｋｅｔｔ	ＦＤ－１００	38	
215	6	37	ニチペット	d	NICHIRYO		31.3	
46	1	46	冷蔵庫	d	ヤマト科学	ＦＫＧ－３７０Ｆ３	28	
197	6	19	電子天秤、浮力法用	d	ヤマト	GR-300	28	
54	1	54	ｐＨメーター	d	東亜電波工業	ＨＭ－３０Ｇ	25	
59	1	59	乾燥機	d	ヤマト科学	ＤＫ－４００	21	
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184	6	6	電子天秤	d	島津	AY220	18.8	
40	1	40	成長錐５mm径、 ３０ｃｍ，４０ｃｍ	d	Ｈａｇｌｏｆ		18	
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185	6	7	試料溶解装置	d	ヤマト	2510J-DTH	14.1	
105	2	2	オイルバス	d	ｓｈｉｂａｔａ	Ｂ－４８５	14	携行機材
183	6	5	木材水分計	d	ケット	HM-530	12	
216	6	38	HPLC用カラムセット	d	東ソー		11.9	
42	1	42	デジマチックキャリパ	d	ミツトヨ	ＣＤ－ＳＣ	11	
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186	6	8	繊維長測定パーツ	d	WACOM	GD-0608-R	8	
52	1	52	ウォーターバス	d	ＴＧＫ	ＦＷＢ－２４Ｓ	6	
117	2	14	角型ポット（軟Ｘ線写真用）	d	井内盛栄堂	３３型	6	
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21	軽部正彦、宮武敦、原田真樹、平松靖、長尾博文、加藤英雄、井道裕史、藤田和彦、渡辺浩、殷亜方	架橋後13年経過した木造トラス橋の調査計画とその概要	第54回日本木材学会大会研究発表要旨集			2004	1-3-a
22	渋沢龍也、軽部正彦、平松靖、宮武敦、杉本健一、林知行、殷亜方	築後116年経過した古民家の調査－静的加力時の柱の傾斜について－	第54回日本木材学会大会研究発表要旨集			2004	1-3-a
23	山田竜彦、扈艶紅、小野拡邦	Condensation reaction of degraded lignocellulose during wood liquefaction in the presence of polyhydric alcohols	日本接着学会誌	37	471-478	2001	2-1-a
24	何 江、呉書泓	木材的液化及其在高分子材料中的应用	木材工业	16(2)	9-11,18	2002	2-1-a
25	山田竜彦、扈艶紅、荒谷雅子、小野拡邦	ポリオール系木材液化及びES処理で分解したセルロース由来物の縮合反応	第52回日本木材学会大会研究発表要旨集		583	2002	2-1-a

26	李改雲、秦特夫、池田敦	Preparation and Characterization of Phenolated Wood Using Sulfuric Acid as a Catalyst I: Liquefaction Behavior of Plantation Wood	Chinese Forestry Science & Technology	1(4)	63-66	2002	2-1-a
27	李改雲、秦特夫、池田敦	Preparation and Characterization of Phenolated Wood Using Sulfuric Acid as a Catalyst II: FT-IR and GPC characterization	Chinese Forestry Science & Technology	2(2)	43-49	2003	2-1-a
28	李改雲、秦特夫、塔村真一郎	Preparation of phenolated wood-based PF adhesives	2004 Beijing International Bonding Technology Symposium		受理	2004	2-1-b
29	塔村真一郎、李改雲、秦特夫	Material recycle of waste wood for the wood-based isocyanate adhesives	2004 7th Pacific Rim Bio-Based Composite Symposium		受理	2004	2-1-b
30	呉玉章、松井宏昭、片岡 厚	コウヨウザンへのフェノール樹脂注入性の改善	日本木材加工技術協会第19回年次大会講演要旨集		60-61	2001	2-2-a
31	呉玉章、松井宏昭、片岡 厚	コウヨウザンの樹脂処理による材質の改善(Ⅱ) ー注入性及び樹脂の分布ー	第52回日本木材学会大会研究発表要旨集		586	2002	2-2-a
32	□玉章、Zhang Jiurong、松井宏昭、片岡 厚	Impregnation of China Fir plantation wood with phenol formaldehyde	IUFRO All division 5 meeting (Poster)		192	2003	2-2-a
33	□玉章、黒須博司、伊藤貴文	辊压预处理改善树脂浸注均匀性的研究	中国林学会楊樹専業委員会第7届学術研討会　楊樹工業用林材加工利用与栽培論文集		1-5	2003	2-2-a
34	□玉章、松井宏昭、片岡 厚	酚醛树脂对人工林杉木木材的浸注性及其改善的研究	林业科学	39(6)	136-140	2003	2-2-a
35	呉玉章、黒須博司、伊藤貴文	ローラープレスによる含浸樹脂分布の均一性の改善	日本木材加工技術協会第21回年次大会講演要旨集		28-29	2003	2-2-a
36	□玉章、黒須博司、伊藤貴文	辊压预处理改善树脂浸注均匀性的研究	东北林业大学学报		投稿済		2-2-a
37	呉玉章、黒須博司、伊藤貴文	グリオキザール樹脂による中国人工林木材の寸法安定性の改善	第54回日本木材学会大会研究発表要旨集		受理	2004	2-2-a
38	李 堅、江澤慧、劉君良	水溶性低分子酚醛树脂合成	木材工业	15(4)	19-21	2001	2-2-b
39	劉君良、江澤慧	酚醛树脂处理杨树木材物理力学性能测试	林业科学	38(4)	176-180	2002	2-2-b

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41	劉君良	杨树、 柳杉木材辊压法压缩变形特性分析	中国林学会木材科学分会第九次学術検討会論文集		577-582	2003	2-2-b
42	劉君良、王玉秋	酚醛树脂处理杨木、杉木尺寸稳定性分析	中国林学会楊樹専業委員会第7届学術研討会 楊樹工業用林材加工利用与栽培論文集		74-78	2003	2-2-b
43	劉君良、黒須博司	Analysis of compressively deformed poplar wood treated with PF resin by ESCA and FTIR	The 8th IUMRS International Conference on Advanaced Materials		1-4	2003	2-2-b
44	劉君良、江澤慧、費本華	酚醛树脂处理表面密实化木材尺寸稳定性分析	木材工业		印刷中		2-2-b
45	秦 特夫	木粉加入量对木／塑复合材料性能影响的研究	木材工业	16(5)	17-20	2002	2-3-a
46	秦 特夫	Effect of wood particle size on the properties of wood/polypropylene composites Ⅰ: mechanical properties	Chinese Forestry Science & Technology	1(1)	100-104	2002	2-3-a
47	藤井智之、秦 特夫	木材とポリプロピレン複合材料の微細構造	森林総合研究所研究報告	1(1)	115-122	2002	2-3-a
48	秦特夫、李改雲、秦野恭典	Dynamic mechanical properties of wood powder/poly-propylene composites	Chinese Forestry Science & Technology	2(1)	52-55	2003	2-3-a
49	王 正、郭文静、瀬戸山幸一、胥□	Effect of wood variables on the properties of wood fiber-polypropylene composites	Chinese Forestry Science & Technology	1(4)	43-50	2002	2-3-b
50	郭文静	塑料合金特性及其对木纤维复合材料性能影响的研究	学位論文(修士)		1-73	2003	2-3-b
51	郭文静	The situation of wood/plastic composite development in China	木質プラスチック複合体研究会第5回公開講演会講演集		1-6	2003	2-3-b
52	趙行志、王 正、郭文静、張双保	Advances in recycled wood-plastic composite -A new environment friedly building materials	林産工業	30 No.16 5	37-40	2003	2-3-c
53	王 正、趙行志、郭文静	Primary study on process factors and performances of recycled plastics/wood fiber	北京林业大学学报		受理		2-3-c

54	峯村伸哉	木材的变色	木材工业	16(2)	5-8	2002	2-4-a
55	周　宇、王金林、李春生	Ⅰ-214 杨木单板染色工艺的研究	中国林学会楊樹専業委員会第7届学術研討会　楊樹工業用林材加工利用与栽培論文集		37-42	2003	2-4-b
56	周　宇、王金林、李春生、黒須博司	Ⅰ-214 杨木浸提与染色单板的氙光变色研究	中国林学会木材科学分会第九次学術検討会論文集		195-205	2003	2-4-b
57	周永東、李暁玲	人工林杨木和杉木的干燥特性与干燥工艺	林业科学	18	4-6	2004	3-1-a
58	周永東、李暁玲	人工林杉木和杨木高温干燥工艺的研究	第九次全国木材干燥学术讨论会论文集	24	283-287	2003	3-1-b
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60	呉玉章	硼化合物处理人工林木材的燃烧性能	林业科学		投稿済		3-2-b
61	呉玉章	磷酸铵盐与硼化合物处理人工林木材的燃烧性能比较	林业科学		投稿済		3-2-b
62	呉玉章、原田寿郎	磷酸铵盐处理人工林木材的燃烧性能	林业科学		受理		3-2-b
63	林知行、傳峰、宮武敦、加藤英雄	構造用LVLの野外暴露試験Ⅱ:9年後の強度特性	第52回日本木材学会大会研究発表要旨集		123	2002	3-4-b
64	林知行、宮武敦、傳峰、加藤英雄、軽部正彦、原田真樹	Outdoor exposure tests of structural laminated veneer lumber (II) evaluation of the strength properties after nine years	Journal of Wood Science		投稿済		3-4-b
65	林知行、宮武敦、傳峰	高湿度条件下で15年間保存されたスギLVLの曲げ強度特性	木材工業		６月に投稿予定		3-4-b
66	井上明生、塔村真一郎、千葉保人、Fu Feng	小型チャンバ法による単板及び合板からの揮発性有機化合物(VOC)放散量の測定	日本木材加工技術協会第20回年次大会要旨		24- 25	2002	3-4-b

67	井上明生、宮本康太、龍玲	市販のメラミン・ユリア共縮合樹脂接着剤による合板の暴露試験と接着耐久性予測	第53回木材学会大会要旨		632	2003	3-4-b
68	塔村真一郎、井上明生、宮本康太、千葉保人、龍玲	デシケータ法を利用した木質建材からの放散アセトアルデヒドの定量法	日本接着学会誌	39(5)	22-25	2003	3-5-a
69	龍玲、陸熙嫻、井上明生	干燥器法测定木制品甲醛释放量的研究	林业科学		受理		3-5-a
70	松本久美子、龍玲、秋津裕志、朝倉靖弘、桂英二	デシケータ法によるアセトアルデヒド放散量測定の検討	日本木材学会北海道支部公演集	No.34	23-25	2002	3-5-a
71	朝倉靖弘、松本久美子、西宮耕栄、龍玲、秋津裕志	家具からのホルムアルデヒド放散量の測定と低減手法の検討	日本木材学会北海道支部公演集	No.34	26-28	2002	3-5-b
72	志水一允、呂建雄、葉克林	Utilization of plantation wood in China	Proc. IS. Eco-Enviromenntal Conservation & 21st Century's Forestry Management		238-242	2001	総説等
73	呂建雄、葉克林、志水一允	Studies on Chinese Plantation Timber	第112回日本林学会講演要旨		400-401	2001	総説等
74	志水一允	中国人工林木材研究計画	農林業協力専門家通信	23(3)	29-40	2002	総説等
75	葉　克林	加入WTO与我国木材工业	木材工业	16(1)	6-9、12	2002	総説等
76	呂建雄	紧紧围绕国家目标、加强开展人工林木材研究	人造板通讯	No.10/11	3-5	2002	総説等
77	林良興	中国の林業とグリーンスピリッツ	グリーンスピリッツ・ニュース	No.13	1-2	2004	総説等

刊行論文数比較表

誌　　名	1998		1999		2000		2001		2002		2003	
	木工所	他機関	木工所	他機関	木工所	他機関	木工所	他機関	木工所	他機関	木工所	他機関
単行本	1											
核技術					1							
林産化学与工業		1	1		1	1		1		1		
木材工業(北京)	1	1		2	3	7	4	7	9	9	3	1
林産化工通訊(南京)		1										
林産工業(北京)										5		1
林業科学(北京)	2		5	2	3		6	4	4	7	4	4
林業科学研究(北京)				1	3	1			2	3	1	1
世界林業研究(北京)								1	6	1	1	1
Chin. For. Sci & Techno.								創刊→	5	1	6	1
東北林業大学学報(ハルビン)			1	1	1	3		7		12		3
北京林業大学学報(北京)				1		1		1		2	1	2
南京林業大学学報(南京)		1		1		3		2		7		1
山東林業科技				1								
浙江林業科技				1				1				
福建林学院学報		1				2				1		2
中南林学院学報(湖南)				1				1		1		1
林業科技開発(南京)				1		1		1		1		1
	4	5	7	12	12	19	10	26	26	51	16	19
林産工業(台湾)						1		1		4		
台湾林業科学		2		2				1		3		
中華林学(季刊)(台湾)						1		1				
	4	7	7	14	12	21	10	29	26	58		

付属資料 5-3

中国人工林木材研究　目中方対口　家　称　整

2004.06.15

序 号	单　位	姓　名	聘 任　　称	称等	任　时
1	材性室	秦特夫	研究	正 高	2000.08
2	材性室	有科	副研究	副 高	2000.08
3	材性室	任海青	副研究	副 高	2001.08
4	材性室	李改云	研究实	初	2002.06
5	材性室	殷　方	助理研究	中	2002.07
6	材性室	刘君良	研究	正 高	2003.12
7	干燥室	周永	副研究	副 高	2000.08
8	干燥室	李　玲	高　工程师	副 高	2003.12
9	防　室	吴玉章	副研究	副 高	2000.08
10		建雄	研究	正 高	2000.08
11		昊	高　工程师	副 高	2003.12
12	人造板	傅　峰	研究	正 高	2000.08
13	人造板	玲	副研究	副 高	2001.08
14		本	研究	正 高	2003.12

中国人工林木材研究　目中方対口　家　得　士、博士学位者

2004.06.15

序 号	位	姓　名	时		
1	博　士	王朝	2001.09		
2	博　士	周　宇	2003.08		
3	博　士	王　正	2001.08		
4	士	郭文静	2003.08		

中国人工林木材研究　目中方対口　家　士、博士生　师

2004.06.15

序 号	位	姓　名	聘 任 时		
1	博士生　师	王　正	2001.12		
2	博士生　师	建雄	2002.12		
3	博士生　师	傅　峰	2002.12		
1	士生　师	刘君良	2002.12		
2	士生　师	本	2002.12		
3	士生　师	有科	2002.12		
4	士生　师	任海青	2002.12		
5	士生　师	高瑞清	2003.12		

中国人工林木材研究　目中方对口　家在　博士生

2004.06.15

序 号	位	姓　名	时		
1	博　士	周永	2004.09		
2	博　士	玲	2004.09		
3	博　士	郭文静	2004.09		
4	博　士	李改云	2004.09		
5	博　士	彭立民	2004.09		

中国人工林木材研究　目中方对口　家培育的博士生

2004.06.15

序号	师姓名	士、博士生姓名	研究方向	时
1	江　慧	于文吉（博士）	竹材特性与加工利用	2001 年
		王朝　（博士）	竹材特性与加工利用	2001 年
		余　雁（博士）	林木育种与木材改性	2003 年
		王　戈（博士）	林木育种与木材改性	2003 年
		覃道春（博士）	木材性　与改良	2004 年
		虞　强（博士）	木材性　与改良	2004 年
		升（博士）	林木培育与木材性　差异	2005 年
		忠（博士）	竹藤培育与加工利用	2005 年
		刘杏娥（博士）	林木培育与木材性　差异	2005 年
		周海　（博士）		2006 年
		黄安民（博士）		2006 年
		王小青（博士）		2004 年新招
		李改云（博士）		2004 年新招
2	姜笑梅	殷　方（博士）	木材性　与培育	2002 年
		刘　丽（博士）	木材解剖学	2005 年
		周永　（博士）		2004 年新招
3	王　正	王志玲（博士）	新型木基　合材料工	2005 年
		桂　（博士）	合材料	2006 年
		高　黎（博士）		2004 年新招
4	建雄	超（博士）		2004 年新招
5	傅　峰	彭立民（博士）		2004 年新招
		克阳（博士）		2004 年新招

中国人工林木材研究　目中方对口　家培育的　士生

2004.06.15

序号	师姓名	士生姓名	研究方向	时
1	姜笑梅	侯新毅（　士）		2004 年 7 月
		王莉娟（　士）		2005 年 7 月
2	王　正	胥　　（　士）	新型木基　合材料工	2002 年
		郭文静（　士）	木材加工与人造板工	2003 年
		常　亮（　士）	新型木基　合材料工	2005 年
3	建雄	林志　（　士）	木材与流体　系	2004 年
		江京　（　士）	木材　量　价	2005 年
		蒋佳荔（　士）	木材物理与干燥	2006 年
4	傅　峰	傅　　（　士）	木　　合材料	2003 年
		刘　淼（　士）	木　　合材料	2005 年
		玉萍（　士）	木　与非木　　合材料	2006 年
		林　英（　士）		2005 年 7 月
5	秦特夫	蓓（　士）	木材的加工与利用	2004 年
		姜　峰（　士）		2004 年新招
6	殷　方	瞿　超（　士）	与北林大　合培	2005 年 7 月
7	刘君良	王雅梅（　士）		2004 年 7 月
		王小青（　士）		2004 年 7 月
		刘　　（　士）		2004 年新招
		柴宇博（　士）		2004 年新招
8	任海青	郭　　（　士）		2004 年新招
9	有科	秦　莉（　士）		2004 年新招
10	本	勇（　士）		2004 年新招
		波（　士）		2004 年新招

中国人工林木材研究　目中方对口　家博　指　的博士后

2004.06.15

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「第 11 次 5 ヵ年計画」国家科学技術難関攻略計画プロジェクト

中国人工林木材利用技術に関する研究

プロジェクト要請書

プロジェクト名：中国人工林木材利用技術
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2004 年 8 月

一、 プロジェクトの概況

天然鉱物資源が日増しに減少するに伴い、世界各国では生物材料の応用範囲の開発と開拓に努めるようになってきた。このような環境に対して効率的に調和できる材料が鉱物資源に取って代わる日が来ることが期待されている。

重要な木質生物質材料として、人工林木材は、再生可能で、生態環境に有利であるという二つの性質を持っている。従って、人工林木材利用の技術研究を強化し、人工林木材をソリッドウッドとして効率的に利用すること、生物質材料を資源化して部分的に現在の石油化学エネルギーによる化学製品や関連材料利用の化学製品、さらに関連材料の利用を代替すること、そしてその応用領域と範囲を広く開拓することは、人類社会の生存と発展を妨げる資源、エネルギー、環境などの重大な科学技術的課題の解決に向けて、非常に重要な意義を持つ。

本プロジェクトは、「第 10 次 5 ヵ年計画」 期間に展開された中国の人工林木材の特性、物理、化学処理などの基本的な性質に関する研究を基礎として、人工林木材利用に対する研究を一層進展させる。本プロジェクトは、コウヨウザン、ポプラ、ユーカリなどの主要用材樹種を研究対象として、利用価値を増加させることおよび木材の化学的資源化による利用という二つの段階から、複数の学問分野の応用による人工林木材の効率的利用技術に関する難関攻略を展開しようとするものである。主な研究内容は 2 項目の課題（人工林のソリッドウッドの付加価値技術利用、人工林木材のバイオマス資源化利用技術）と、9 項目の活動（構造用規格材の試験と等級区分方法、構造用集成材に関する試験と等級区分方法、構造用規格材の防火・耐火性能およびその評価手法、木材の防腐処理効果および検査試験方法、主要な広葉樹造林木の機械加工性能の評価、木質生物質材料の変換プロセスと方法、木材液化生成物の利用プロセスおよび方法、木材プラスチック複合材料の複合化技術、木質材料の機能化利用）に分けられ、人工林木材の利用技術について系統的な研究と開発を展開するものである。人工林木材の付加価値利用とバイオマス資源化利用などの領域の研究を展開し、その応用範囲を拡大し、人工林木材の経済的利用価値を増加し、人工林木材に対する認識と市場競争力を高め、最終的に人工林木材を天然林木材に替えさせることによって、中国の、更には全世界の生態環境バランスを回復させ、持続可能な循環型経済社会の形成に対して貢献することを実現しなければならない。

二、 プロジェクトの意義と必要性

化石エネルギー資源の枯渇と金属材料の不足という厳しい現実に直面する現在、循環型経済、エコ・エコノミーを基本思想とし、持続的発展戦略を堅持し、人類の自然資源と生態環境の保全から出発して再生可能で巨大な生物質資源の潜在能力を存分に有効利用し、生物質エネルギーを石油化学エネルギーの代替とし、生物質材料を金属とその他の材料の代替とすることが全世界で求められている。生物質資源の利用は、21 世紀に最も注目を集

める重要テーマで、人類の生存と発展に関わることが予見される。

一種の重要な生物材料として、人工林木材は再生可能性と生態環境親和性の二つの性質を持つ。国家林業局による六大重点林業建設プロジェクトの実施と五大転換の実現という林業戦略方針の実施に従い、我が国の木材資源構造は、天然林中心から人工林中心にシフトするという根本的な転換が生じている。現在、中国ではすでに造成された人工林面積は4,667 万 ha で、世界一位となっている。人工林総蓄積は約 10 億□となり、森林総蓄積の10%を占める。また、すでに開始している「重点地域の早生多収穫用材林を中心とする林業産業基地建設プロジェクト」計画では、15 年で 718 億人民元が投入され、全中国で 1,333 万 ha の早生多収穫用材林が建造された。2015 年までには国内向けに 1.4～1.5 億□の木材を提供できると予想される。その時人工林木材は、木材全供給の約 50%を維持できると見られる。それによって、人工林の木材生産と有効利用は、中国の生存と発展に関わる資源やエネルギー、環境などの重大な科学技術問題を解決し、我が国の効率的な循環型経済社会の確立を促進し、持続可能な社会発展の実現に、極めて重要な意義を持っている。

上述したように、中国の人工林木材利用技術の研究の展開は、科学技術の開発、循環型経済社会の建設、地球規模の環境保全などの多方面から見ると、非常に重要で差し迫った問題であり、21 世紀におけるわが国の木材の需供矛盾の解決、天然林資源の保護、WTO 加盟後の経済のグローバルゼーションへの適応を図るための戦略的需要でもある。

三、 関連領域における国内外の技術の現状と発展趨勢

1. 人工林から得られるソリッドウッドの付加価値利用技術に関する研究

早生人工林木材の材質は一般的に柔らかく、密度が低く、材質の変異が大きく、耐腐朽性が低く、現在はまだ利用上での付加価値が低い。いかにその利用価値を高めるかという問題は、世界の林業と木材工業界の関心を集めている研究領域である。

予測資料によると、木造家屋、屋外用木材、家具材、内装用材などのソリッドウッドは、中国で大規模な市場性と潜在力を持つ。従って、人工林木材からのエンジニアードウッド製品（Engineered Wood Products）の研究開発、構造用規格材の防火・耐火性とその評価手法、木材防腐処理効果および試験検査方法、主要な広葉樹造林木の機械加工性能評価手法の研究を展開することは、人工林のソリッドウッドの用途を広げるために、更に主要な人工林樹種の木材の利用価値向上を実現するために極めて重要な役割を持つのである。

木材と木質複合材料で建築された木造家屋は、アメリカ、カナダ、日本などの先進国で普及している。北米地域では毎年約 100 万棟の木造家屋が新築されており、85%の多層住宅と 95%の低層住宅で軽量型木造建築が採用され、その他 50%の公共建築で木造建築方式が採用されている。

50～60 年代から、天然林針葉樹種が木材資源の中心となっているアメリカ、カナダは、木材を使用した無欠点小試験体の試験結果、木材の欠点の分類、目測による等級区分など

の方法に基づき、数十年にわたって、多くの地域の多樹種をサンプリングして、異なるサイズの規格材の異なる強度の性質などで等級区分試験を行ない、規格材の目測による等級区分と強度試験の方法を確立した。コンピューターの急速な発展に伴い、規格材の強度試験と目測による等級区分方法を結合し､北米では 80 年代に一連の完備された木材の機械強度等級区分（MSR）技術と設備が形成された。オーストラリアとニュージーランドの規格 NZS 3603 や AS/NZS や 4063 も、詳しい規格材の機械強度等級区分と木造構造設計方法を提供した。日本は北米の規格材体系を基礎として、相応する強度試験と目測による等級区分方法を確立し、ヨーロッパと ISO の基準を結び付けて、逐次的に独自の木造用規格材と集成材の指標評価体系を打ち出した。

急速に成長した人工林木材の木造建築への応用領域は、まさに中国の木材工業の新たな成長点であり発展方向であるが、現在の中国では相応の規格材の強度試験と等級区分方法が不足しているため､正確な基本データが獲得できず､2003 年に新たに実施された国家『木造設計規範』GB50005-2003 では、依然として無欠点小試験体の試験データを用いて木造の強度の設計を行っている。そのため、我が国の木造用規格材と集成材の強度試験と等級区分方法の研究を行ない、独自の性能試験方法、基準、評価体系を早急に確立しなければならない。また、木材の防火・耐火性能は建物の安全性や人体に対する危害性に直接関係しているため、木材を構造材として使用する場合、構造用規格材の防火・耐火性能およびその評価手法の研究は、重要な現実的意義を持っている。

木材の防腐処理は、使用寿命の延長、木材資源の節約の重要なプロセスである。木材の防腐処理量はアメリカで毎年約 1,800 万～2,000 万□、我が国ではおよそ 60 万□となっている。今までのところ、我が国ではまだ全国的なあるいは地域的な防腐木材製品の品質検査監督機構を確立しておらず、木材防腐製品に対する品質検査と監督を行なうことに対して､この方面の意識がない企業も見うけられる｡国内防腐木材の品質はまだ一様でなく、コスト節約、時間節約と、外観の色を薄くするために、防腐剤の使用濃度が低くなり、使用薬剤の量が低くなりがちである。浸透しにくい木材樹種に対しては、圧力あるいは時間が所定の基準に達せず、浸透度がどうしても低くなってしまう。防腐剤や防腐材料の品質検査の実施は非常に急がれる問題である。

アメリカは木材機械加工性能の研究では世界をリードしている。大量の試験と研究に基づき､木材と木質複合材料の機械加工研究の基準である ASTM 標準を確立しているが､そのうち 04.10 巻 D1666 は、木材と木質複合材料の機械加工の性能試験に関する基準である。ASTM は、木材の重要な特徴は機械加工が非常に便利であることとしているが、異なる樹種の切削性の特徴の違いは大きく、そのため系統的な研究方法が必要となる。木材の用途上の適性評価については、その中でも表面加工の特徴は極めて重要な判定要素である。我が国の学者はかつて国内の主要な天然林木材の解剖的構造に対して系統的な研究や記載を行ない、その加工性能に対して一般的な性質について記載した。現在国内の木材機械加工性

能に対する試験と評価の進行は新しい課題であり、まだ相応する評価基準がない。そのため、木材の機械加工性能の研究を展開し、国家の関連規準の制定を促進しなければならない。

2. 人工林木材の資源化利用技術に関する研究

現在、多くの材料の生産源は鉱物資源である。しかし鉱物資源の過度の消耗は、生態環境に挽回できない損害を及ぼす恐れがあり、また、鉱物資源は人類の需要に従って採取すれば採取するほど減少する可能性がある。

推計によると、2070 年には全世界で金属資源の枯渇が出現し、2100 年には石油、天然ガスなどの化石資源が枯渇するといわれる。そのため、世界で生物質材料の応用範囲の開発と拡大に努め、環境と一層調和する有効な材料で鉱物資源を代替とすることが期待される。

人工林木材は、無尽蔵の、汲めども尽きない重要な木質生物質材料である。そのため、人工林木材の資源化利用研究を強化し、その応用領域と範囲を拡大し、人工林木材の効率的で合理的な利用レベルを高めることは、人類の居住環境の保護に役立ち、また全人類の未来の持続的生存に役立ち、人類社会の持続的発展の戦略構想に合致する事業である。

木質生物質材料の変換プロセスと方法の研究については、木質セルロース資源の高効率かつ高付加価値な化学的利用に関する研究が日増しに人々の広範な興味を引き起こしている。天然セルロースを原料として合成するセルロース系プラスチックは、その加工技術が簡単で、コストが低く、セルロースそのものが無毒であるということから、特に日本で重視されている。セルロースそのものの性能の弱点により、それが単独で得られるフィルムの耐水性と強度が汎用フィルムの要求に達しないため、ほとんどの場合で、その他の天然高分子と共に再生プラスチックを製造する。例えば日本の四国工業技術試験所がセルロースと甲殻類から得た脱アセチルキトサン複合体は、キャスティング技術でフィルムを製造し、汎用フィルム同様の強度を具有し、そして 2 ヵ月後には完全に分解できる。近年、国内外市場のニーズに対応するため、我が国の学者も次々と天然セルロースの農業と生態系整備における大規模な利用プロセスの模索を展開するようになった。例えばセルロース原料を利用して粉砕成型によって一次生分解性食器を製造し、一定の研究データを蓄積した。しかし以前の研究で相応する基礎理論に関する研究が不足しているため、製品の主要な技術に対する掌握が不足しており、製品の製造技術と高度加工レベルが低く、国外と比較してもまだ後れた段階にある。

木材液化物の用途開発と液化方法の研究に関しては、Santana は硫酸を触媒としてフェノールで全樹皮を液化してから樹皮液化生成物とホルマリンをアルカリ性条件で反応させ、熱硬化性フェノール樹脂を調製した。その結果、33%のフェノールは液化樹皮に取って代わることができることが判明した。当該接着剤をプレス合板に使用すると、単板含水率が比較的低い場合、乾式法による試験で商業用フェノール樹脂に相当する性能に到達できた

が、文章ではフェノール樹脂の耐水性に関する試験については述べられていない。

Maldas は、苛性ソーダを触媒としてフェノールで木材を液化し、同様に熱硬化性フェノール樹脂を調製した。その試験では、当該接着剤をプレス合板に使用すると、乾燥状態での性能は良好であったが、「煮沸－乾燥－煮沸」という循環試験では、ひび割れ現象が発生した。高モル比のホルムアルデヒドを加えると、明らかにその接着性を高めることができる。10%MDI を架橋剤として加えた場合、接着強度は乾式法試験、湿式法試験とも日本の基準を上回った。

Ito の特許 08003532 報告によると、木粉は硫酸の触媒作用でフェノールによって液化される。それから pH 値をアルカリ性に調節し、ホルムアルデヒドを加えて樹脂化反応を行ない、イソシアン酸エステルを加えて得られたフェノール樹脂の性質を改良すると、液化木材接着剤の固化速度と接着速度は明らかに向上した、とのことである。

Black は、木材と草本植物を高温下でアルコール、水および水と相容れない有機溶剤の混合溶液で蒸解処理してから相分離作用によって、リグニン、セルロース、可溶性糖類が得られると特許 5730837 で報告している。

木材の液化技術は日本ですでに成熟しつつあるが、液化生成物の利用についてはまだ初歩的段階にあることがわかる。近年、日本の科学者は木材液化生成物の利用について多くの模索作業を行っているが、依然として実験室での開発段階を出ていない。

我が国では、この方面の研究はまだ初歩的段階にあり、液化に関する文献のレビューに関しては散見されるが木材液化研究の進展に関する論文は極めて稀で、木材液化生成物の利用について更なる研究開発が待たれる。

その他、人工林木材と可分解性プラスチックを原料として生分解性木材プラスチック複合材料を製造することは、環境親和性材料の広範な使用を促進する有効なプロセスである。国外の、植物材料と生分解性高分子材料を複合調製する研究も、ここ 2 年ほどで始まったばかりであるが、現在と未来の材料発展の趨勢に非常に適応しているため、開始するやいなや多くの関心を集めた。

2003 年にイギリスで開催された「An International Conference on Eco-Composites Eco Comp 2003」会議では、生分解性複合材料に関する研究報告が会議の重要な構成部分となった。

日本、イタリア、デンマーク、オーストラリアなどでは、現在生分解性高分子材料で木材プラスチック複合材料を製造する研究が展開されている。日本の大学や企業も共同で開発を行ない、高性能ローコストの生分解性複合材料を研究製造している。国外の生分解性植物繊維材料/プラスチック複合材料の研究は開始されたばかりであるが、前途は明るく、未来の材料となる趨勢を示している。

我が国では、ポリ乳酸の合成と材料の性能に関する研究は多いが、ポリ乳酸と植物繊維材料を複合した複合材料に関する研究は空白が続いている。しかしこの新材料の研究開発

は必然的な趨勢で、我が国もできるだけ早期にこの方面の研究に着手するべきである。

四、 プロジェクトの市場ニーズ分析

1. 人工林ソリッドウッドの利用価値向上技術

現在､我が国の人工林保存面積は累計で4,667万haに達し､世界の首位を占めているが、天然林木材と比較すると、生長速度が速く、輪伐期が短く、人工林木材の材性は密度が極めて降下し、強度が減少しているため、その応用範囲が制限されている。従って、人工林木材の利用方式と範囲の拡大は、すでに我が国の木材工業界が直面する重要な問題となっている。本課題は、構造用規格材と集成材の試験と等級区分方法、構造用規格材の防火・耐火性能およびその評価手法、木材防腐処理の効果および試験評価手法、主要な広葉樹造林木の機械加工性能の評価手法などの研究によって、人工林木材の効用の発揮を実現することは、人工林木材資源の高効率使用を推進し、広大な将来性を持つものである。

2. 人工林木材の化学資源化による利用技術に関する研究

ここ数年、持続的発展戦略の要求に適応するため、天然の再生性生物質資源の利用が、研究ターゲットとなっている。本課題の特徴は、人工林木材、木材加工廃材、樹皮、灌木など天然の再生可能な生物質材料を原料としていることで、生物質材料の高付加価値利用を実現し、生分解性、環境親和性を持つ新型ポリマー材の原材料を開発した。生分解性、環境親和性の新型ポリマー材料は、持続可能な発展と環境調和型製品の潮流に順応し、環境圧力の緩和、資源節約、我が国の林産物の市場競争力の向上に対して非常に重要な意義を持つ。本研究で用いられる原材料は、我が国で容易に調達でき、安価なものであることから、技術の実施に充分な原材料の提供が保証されている。従って、この課題の展開は、技術の面においても資源利用の面においても大きな市場性が見込まれる。

五、 プロジェクトの上位目標

コウヨウザン、ポプラ、ユーカリなどの主要な人工林用材樹種木材を研究対象とした、人工林のソリッドウッドの付加価値向上と化学資源化利用など人工林木材の利用における高効率化かつ付加価値の向上を図るための技術研究目標は、我が国の人工林木材の利用レベルを向上させ、木材、特に熱帯広葉材とロシアの針葉材輸入に対する依存度を軽減し、技術の全体レベルを21世紀初頭の国際先進的技術レベルに到達させ､部分的には同時期の国際最先端水準を達成することである。

六、 プロジェクトの主な研究内容と評価指標

（一）主な研究内容

1. 人工林ソリッドウッドの付加価値向上技術に関する研究

本課題は主要な人工林の樹種を研究対象として、構造用規格材と集成材の試験と等級区分方法、構造用規格材の耐火性能とその評価手法、木材の防腐処理効果および試験検査方法、主要な広葉樹造林木の機械加工性能の評価手法などを研究し、最終的には主要な人工林樹種木材の付加価値の向上を実現する。具体的な研究内容は次の通りである。

(1) 構造用規格材の試験と等級区分方法は、主に各種規格材の強度性質の試験方法、信頼性の高い規格材の強度性の非破壊的評価技術の開発、規格材の等級区分の基本的方法の確立、中国の主要な人工林の樹種規格材利用の適性評価を含む。

(2) 構造用集成材の試験と等級区分方法は、主に木質ユニットの試験と等級区分、構造用集成材の試験と等級区分、構造用集成材の非破壊的評価と基本性能の予測を含む。

(3) 構造用規格材の防火・耐火性能およびその評価手法は、人工林構造用規格材のドア・窓枠材や内装部材などの耐火性能およびその評価手法を含む。

(4) 木材の防腐処理効果および試験・評価手法は、主に DDAC、BAC、テブコナゾール（tebuconazole)、プロピコナゾール(propiconazole)などの木材防腐剤などの成分の分析方法を含む。防腐木材の薬品使用可能量および浸透度の分析方法を確定する。

(5) 主要な広葉樹造林木の機械加工性能の評価は、主にサンダリング、成型、ボーリング、ほぞ取り、研削仕上げなどの機械加工性能の試験と評価手法を含む。また、家具材に常用される機械加工性能の比較を行なう。

2. 人工林木材の化学資源化利用技術に関する研究

本課題は主に次の研究内容を展開する。

(1) 木質生物質材料の変換プロセス（Biomass Conversion）および方法。

主に木質セルロースのグラフト重合研究を行ない、セルロースとその他の高分子化合物の組合せ法を改善し、それによって性能のよい新素材を獲得する。改質セルロースを利用して新型高分子材料およびその応用性を研究する。

(2) 木材液化生成物の利用と方法。

主に、木材のアルコール液化生成物によるイソシアン酸エステル樹脂の調製、木材フェノール液化生成物による熱硬化および熱可塑化フェノール樹脂の調製、木質セルロースの有機溶剤分離を含む。

(3) 木材プラスチック複合材料の複合化技術。

主に、木材プラスチック複合体に対するナノメートル材料の性能と加工性能の改良作用を研究し、木粉の高添加量条件での良好な性能を有する新型材料を実現し、ポリ乳酸など

の生分解性プラスチックと再生可能な木繊維を複合して完全に生分解可能な環境調和型木材プラスチック複合材料を調製する。廃棄回収した低密度ポリエチレンとポリスチロールを原料としてその混合特性および木質材料の複合特性を研究し、優良性能の木材プラスチック複合材料を調製する。

(4) 木質材料の機能化利用。

主に、芳香性木材を 2～3 種類選択し、二酸化炭素超臨界流体抽出法を用いて、抽出、分離、鑑定を行ない、そしてこれらの成分にマイクロカプセルなどの技術で木質材料に対する芳香性付与および人体に与える保健機能を研究する。適切な塗装方法により、漂白、染色した木質材料を基材として、木材本体、染色木材、木材染色後の三者の塗装性能や相互作用の規則性を研究する。

（二）具体的な評価指標

第一課題については、規格材の強度性質の試験方法および非破壊的評価体系の提起、集成材の強度性質の試験方法および非破壊的評価体系の提起、初歩的な構造用規格材の防火・耐火性能の評価手法の確立、木材防腐処理の効果および試験検査方法の確立、主要な広葉樹造林木の機械加工性能試験と評価手法の提起である。

第二課題については、2 種類のベンチスケールの木材液化生成物の樹脂化技術の完成と、1 種類のベンチスケールの木質セルロースの有機溶剤による分離技術の完成である。ナノメートル材料を改良剤とする木材プラスチック複合材料の加工工程と材料性能を明確にし、生分解可能な環境調和型木繊維（あるいはパーティクル）/ポリ乳酸複合材料の調製に適する工程と条件を確定し、複合材料の加工工程が生物プラスチック/木繊維（あるいはパーティクル）複合材料の物理的性能に与える影響を研究し、複合工程と手段が複合材料の熱安定性に与える影響を初歩的に確認する。1～2 種類の徐放性芳香型木質材料を開発し、1～2 種類の染色、漂白材木に対する有効な塗装方法を得る。

七、 プロジェクトの主要技術の特徴と新機軸な創造点、コア技術、実施手法

各研究方向の重要問題の解決目標について、9 項目の活動の主要技術の特徴などは次の通りである。

1. 構造用規格材の試験と等級区分方法

主要技術の特徴と新機軸な創造点：

（1）規格材の強度性質の試験方法およびその非破壊的評価技術

（2）規格材の等級区分の基本的方法

（3）初歩的な中国独自の規格材の強度試験と等級区分体系の確立

コア技術：

（1）規格材の曲げ強度、引張り強度、圧縮強度の強度的性質の試験方法およびその非破壊的評価

（2）規格材の等級区分の基本的方法

実施手法：

中国の主要人工林樹種を研究対象として､異った地域の異った寸法の規格材から選択し、等級区分と曲げ強度、軸方向引張り強度、軸方向圧縮強度などの試験をそれぞれ行ない、信頼性の高い強度性質の非破壊的評価技術を確定する。右強度試験の結果に基づき、相応する規格材の等級区分の基本的方法を確立し、最終的には主要人工林樹種規格材利用の適性評価を実現させる。

この技術の確立は、未来の国内の「規格材強度の等級区分試験と評価」規準制定のための基礎となるであろう。

2. 構造用集成材の試験と等級区分方法

主要技術の特徴と新機軸な創造点：

（1）構造用集成材のさまざまな非破壊的評価体系

（2）中国の主要人工林樹種の構造用集成材の性能および価値向上データベース

コア技術：

（1）構造用集成材の効果的な非破壊的評価技術

（2）構造用集成材の使用性能の効果的な予測技術

実施手法：

構造用集成材の、木質ユニットの試験と等級区分方法→構造用集成材の試験と等級区分方法→構造用集成材の使用性能→上記の各種性能の統計分析と修正。

この技術の確立は､『中国の主要人工林樹種構造用集成材の試験と等級区分方法』､『中国の主要人工林樹種の構造用集成材』などの基準制定のための基礎となるであろう。

3. 構造用規格材の耐火性能およびその評価手法

主要技術の特徴と新機軸な創造点：

中国の人工林木材の構造用規格材に適する防火・耐火性能の総合評価体系を初歩的に確立する。

コア技術：

人工林木材の規格材を確定し、防火・耐火処理条件の進行を確定して、人工林木材を構造用材とする場合の安全性を確保する。

実施手法：

耐火加熱試験→実際火災の模擬試験→耐火性能評価

4. 木材の防腐処理効果および試験検査方法

主要技術の特徴と新機軸な創造点：

（1）防腐木材のサンプルの調製、成分の抽出

（2）第四アンモニウム塩(DDAC、 BAC)とトリアゾール(tebuconazole、 propiconazole)成分の高圧液体クロマトグラフィおよび紫外線検出器の検査測定技術

コア技術：

（1）クロマトグラフィ分析過程の各成分の検出器の検査測定技術

（2）防腐木材サンプリング過程の、防腐剤などの成分の高回収率抽出技術

実施手法：

木材防腐剤中の銅などの金属測定には原子吸収法を採用し、 DDAC、BAC、テブコナゾール、プロピコナゾールは、高圧液体クロマトグラフィ(HPLC)法を採用する。そのうち DDAC、BAC はイオンクロマトグラフィを採用する。

この技術の確立は、国内の『木材防腐剤の分析方法』基準制定のための基礎となるであろう。

5. 主要広葉樹造林木の機械加工性能の評価

主要技術の特徴と新機軸な創造点：

我が国の主要人工林広葉樹材の機械加工性能（かんながけ、サンダリング、成型、ボーリング、ほぞ取り、研削仕上げ）に対して系統的で全面的な試験と研究を行ない、家具常用材の機械加工性能の比較を行ない、従来の木材機械加工性能のおおまかな定性に対して明らかな向上をもたらす。

コア技術：

系統的に広葉樹材の機械加工性能に対する全面的な試験と研究（テストプロジェクト、テストサンプルの作製、試験設備、試験条件、加工品質の等級区分、加工性能の総合評定を含む）を行なう。

実施手法：

削切性の能試験と評価→サンダリング性能の試験と評価→成型性能の試験と評価→ボーリング性能の試験と評価→ほぞ取り加工性能の試験と評価→研削仕上げ性能の試験と評価→木材の機械加工性能の総合評定方法

この技術の確立は、広葉樹材の高付加価値無垢材製品の開発利用に必要な理論的根拠と関連の技術情報を提出し、我が国の木材機械加工の性能試験方法と評価基準の確立の根拠を提供するであろう。

6. 木質生物質材料の変換プロセス（Biomass Conversion）および方法

主要技術の特徴と新機軸な創造点：

人工林木材およびその加工廃材、樹皮、灌木など天然の再生可能な生物質材料を原料として、生物質材料の高付加価値利用を実現する。

コア技術：

（1） 生分解性、環境調和型の新型ポリマー材料の原材料開発

（2） 改質セルロース材料を利用した生分解性、環境調和型の新型高分子材料の調製

実施手法：

セルロースのグラフト重合の研究を行ない、セルロースとその他の高分子化合物の組合方法を改善し、それによって性能のよい新材料を獲得する。改質セルロースの新型高分子材料の研究と応用性能の研究を行なう。

この研究成果は、人工林木材という再生可能な資源の応用潜在力を発掘でき、林産加工業の新しい応用手段を開拓し、環境圧力の緩和、資源節約、我が国の林産物市場競争力の向上に対して非常に重要な意義を持つ。

７．木材液化生成物の利用プロセスと方法

主要技術の特徴と新機軸な創造点：

人工林木材生物質材料の研究で、石油資源の代替となる高分子ポリマーを調製し、その研究成果は木質生物質材料が部分的に石油化学資源の代替となるという新しい構想の開拓を実現し、新しい方法を提起するであろう。

コア技術：

（1）触媒の作用により、木粉がフェノール溶剤中で高効率で木材液化生成物を調製する

（2）木材液化生成物で、性能良好な、環境調和型フェノール樹脂を調製する適切な技術

実施手法：

(1)フェノールを試剤とした液化生成物とホルムアルデヒド溶液をアルカリ性触媒の作用下で熱硬化性フェノール樹脂を調製する。ポリオールを試剤とした液化生成物とイソシアン酸エステル反応でイソシアン酸エステル樹脂を調製する。樹脂の接着強度、接着耐久性などの性能指標を評価する。

（2）常圧酢酸法と高沸点アルコール溶剤法で木質繊維化学成分を分離する。

8. 木材プラスチック複合材料の複合化技術

主要技術の特徴と新機軸な創造点：

混合押出し成型技術でナノメートル材料のプラスチックに対する混合性質の改変を行ない、プラスチックと木質材料の複合過程における流動性と複合性を改変し、それによって性能の優れた木材プラスチック複合材料を調製する。生分解性ポリマーと天然の木質材料を複合し、生分解可能な環境調和型木材プラスチック複合材料を調製する。

コア技術：

(1)木材プラスチック複合材料の複合技術におけるナノメートル材料の作用および材料の性能特徴に対する影響を確定する

(2) ポリ乳酸などと木繊維の 2 種類の材料の適切な複合工程の確定

(3) 複合材料の熱安定性の評価

(4) 混合技術で 2 種類のプラスチックの混合改良を行ない、木材プラスチック複合材料を調製する

実施手法：

木材プラスチック複合過程におけるナノメートル材料とプラスチックの混合性質改変により、プラスチックと木質材料の相容性と流動を改善する。生分解可能な環境調和型木繊維（あるいはパーティクル）/ポリ乳酸複合材料を調製して適合工程と条件を確定することにより、複合材料の加工技術の生物プラスチック/木繊維（あるいはパーティクル）複合材料の物理的、力学的性能に対する影響を研究し、複合技術およびプロセスが複合材料の熱安定性に対する影響を究明する。

9. 木質材料の機能化利用

主要技術の特徴と新機軸な創造点：

(1) 芳香性成分の抽出、分離技術

(2) 芳香性成分と木質材料の効果的な徐放性複合技術

(3) 漂白木材、染色木材の塗装性能および光変色

(4) 木材本体、染色木材、染色木材塗装後の三者の塗装性能と相互作用規則性

(5) 塗装材の耐光性に影響する主要因子間の相互作用規則性

(6)ナノメートル材料が漂白木材の塗装および染色木材の塗装に対する耐光性の向上方法

コア技術：

(1) 木材の芳香性成分の抽出技術

(2) 木材の芳香性成分の化学構造の確定

(3) 木材の芳香性成分と木質材料の効果的な徐放性複合技術

(4) 漂白、染色材料の塗装性能

(5) 高耐光性の漂白材と染色材の塗装技術

実施手法：

(1) 木質材料の芳香性の利用

材料採集→芳香性成分の抽出→芳香性成分の抗菌殺虫試験→芳香性成分と効果の分析→芳香性成分と木質材料の複合実験→芳香性成分の木質材料からの徐放性試験

(2) 木質材料の塗装性の利用

木材本体、漂白木材、染色木材の変色試験→赤外線（FTIR）と電子スピン共鳴分光スペクトル(ESR)の測定試験と変色構造の分析→塗装技術の選択→塗装後の分光変色実験

八、 プロジェクトで予想される成果の経済的、社会的、生態的効果に関する分析

中国は、世界の木材およびその製品の生産大国であり、消費大国でもある。しかし森林の総面積は、1 人当たり世界の 1/8 しかなく、国家では 1998 年より天然林保護プロジェクトを行ない、国内の森林の逐年的な伐採減少措置を採っている。国の人口が多く、国家インフラ建設の高速発展という現状において、国内の木材市場の供給不足は深刻になっている。

現在、木材需要の不足に対しては、主に輸入木材で補っている。2003 年の全社会の木材資源は約 2 億 8,310 万□で、そのうち国産は 1 億 6,000 万□（薪炭材を含まない)、輸入は 1 億 2,310 万□で、輸入比重はすでに 45%近くにまで達している。

この 10 年の輸入量は 4 倍に増加し、平均年増加は 15%で、2003 年には我が国の主要林産物の輸入額は 139.45 億ドルに達し、木材およびその製品は、中国の農産物で唯一の大口輸入製品となっている。2003 年、中国の原木輸入は 2,546 万□で、その主な取引国はロシア、マレーシア、ニュージーランド、パプアニューギニア、ガボン、ミャンマー、赤道ギニア、リベリア、コンゴ、オーストラリアなどである。輸入製材は 551 万□で、そのうち広葉樹材は 414 万□で、主な取引国はインドネシア、米国、タイ、ロシア、マレーシア、カナダ、ブラジル、ニュージーランド、ミャンマー、ドイツなどである。

今後、経済発展と生活水準の向上に伴い、木材およびその製品の輸入比重はさらに増加する可能性がある。しかし、世界各国では環境と経済の協調発展を重視しており、特にアジア、アフリカ、南米の熱帯降雨林の急激な減少は関心の的となっており、輸入木材およびその製品に対する過度の依存は、極めて大きな国際政治と環境保全の圧力を招くと見られる。また、支払うべき経済代価も安くないであろう。そのため、長期的に見ると、中国の人工林木材の利用に対する研究を強化し、最終的には天然林利用から人工林利用への転向を実現することは、中国の木材、特に熱帯広葉樹木材の輸入依存の減少に対して明確な戦略意義を具有する。世界の生態環境バランスシステムの維持と回復および森林資源の持続経営に対しても貢献できるであろう。

それと同時に、我が国の人工林面積はすでに 4,667 万 ha となっており、世界の首位にある。人工林蓄積量は約 10 億□で、森林総蓄積量の 10%を占めている。また、すでに開始した「重点地域の早生多収穫用材林を中心とする林業産業基地建設プロジェクト」計画は、15 年内に 718 億人民元を投入し、全国範囲で 1,333 万 ha の早生多収穫用材林を建造し、2015 年までに国内向けに 1.4～1.5 億□の木材提供が可能であると予想される。その時人工林材により木材自給率 50%を維持できるとみられる。人工用材林は、中国の木材需給の対立緩和における効果が日益しに明確になり、人工林木材の生産と有効な利用は、我が国の持続可能な社会発展の実現に対して重要な役割を果たすであろう。

九、プロジェクトの基礎条件

「第 10 次 5 ヵ年計画」期間、中日両国政府は、2000 年 1 月 14 日に協議議事録の署名を行ない、2000 年 3 月 31 日より中日技術協力・「中国人工林木材研究計画」を本格的に始動させた。協力期間は 5 年間である。

このプロジェクトは、主に 3 つの研究領域（人工林木材の特性、人工林木材の化学的処理、人工林木材の物理的処理）と 12 項目の研究活動（木材の特性解明およびその適性評価に関する評価、遺伝および施業の木材材質への影響評価に関する研究、木材特性の早期予測方法に関する研究、木材の液化に関する研究、木材の寸法安定性と表面硬化に関する研究、異種材料との複合化に関する研究、木材の漂白および染色に関する研究、木材の乾燥に関する研究、木材の難燃処理およびその試験・評価手法に関する、木材の防腐・防虫処理およびその試験・評価手法に関する研究、木材の接着加工およびその試験・評価手法に関する研究、ホルムアルデヒド放散抑制のための試験・評価に関する研究）に分けられ、人工林木材の基本的性質に対する一連の系統的基礎研究を展開した。

中日双方の共同努力により、プロジェクトにおける発表論文と発表待ち論文はすでに 60 数篇に達し、所期の成果を得た。その他、21 名の C/P は前後して 3～6 ヵ月の訪日研修を受けた。国際協力事業団[1]（JICA）は約 5 億円相当の機材供与を行った。このプロジェクトの順調な実施により、中国林業科学院において人工林木材に関する基礎研究を独自に行う能力が高められ、中国における人工林木材研究が推進され、本プロジェクトの研究に良好な基礎が打ち出された。

十、プロジェクトの組織体制

本プロジェクトの実施機関は中国林業科学研究院木材工業研究所である。参加機関には中国林業化学研究院林産物化学工業研究所がある。プロジェクトの組織体制は、プロジェクト責任者による責任制を実施しており、科学研究管理部門がプロジェクトの進捗状況を監督する。関連する協力プロジェクトには、要請中の中日政府間技術協力プロジェクト（JICA）・「中国人工林木材付加価値向上技術研究」がある。

[1] 現在、国際協力機構 ――訳注

付属資料 5-5

中国林業科学研究院組織機構図

国　務　院

↓

国家林業局

↓

中国林業科学研究院

↓

林業研究所	（北　京）
木材工業研究所	（北　京）
林業科学技術情報研究所	（北　京）
資源情報研究所	（北　京）
森林生態環境と保護研究所	（北　京）
林産化学工業研究所	（江　蘇）
熱帯林業研究所	（広　東）
亜熱帯林業研究所	（浙　江）
資源昆虫研究所	（雲　南）
熱帯林業実験センター	（広　西）
亜熱帯林業実験センター	（江　西）
華北林業実験センター	（北　京）
砂漠林業実験センター	（内蒙古）
国家林業局ユーカリ研究開発センター	（広　東）
国家林業局桐研究開発センター	（河　南）
国家林業局竹研究開発センター	（浙　江）
北京林業機械研究所	（北　京）
ハルピン林業機械研究所	（黒龍江）
パンダ研究センター	（四　川）
華北林業研究所	（山　西）
黒龍江分院	（黒龍江）

付属資料 5-6

2004.04.01

中国林業科学研究院木材工業研究所機構設置図

中国林業科学研究院

木材工業研究所

- 木材特性研究室（21 名）
- 人造板研究室　（9 名）
- 木材防護研究室（7 名）
- 接着剤研究室　（2 名）
- 設備と自動化研究室（10 名）
- 事務室　　（7 名）
- 科学技術処　　（8 名）
- 財務課　　（6 名）
- 人事教育処、党委員会事務室（15 名）
- 三学会事務室　（3 名）
- ＜木材工業＞編集部（4 名）
- サービスセンター（4 名）
- 国家人造板品質監督検測センター（23 名）
- 木材乾燥と木製品研究発展センター（5 名）
- 木材工業国家工程研究センター中間試験基地（7 名）

（門頭溝に設置）

付属資料 5-7

2004.04.01

中国林業科学研究院

林業新技術研究所木材科学研究室組織機構（案）

林科院首席科学者	（1 名）
JICA プロジェクト事務室	（４名）
マネージ部門	（４名）
非木質材科	（３名）
構造用複合材料	（３名）
構造用木質パネル	（４名）

木材工業研究所の 49 名

木材力学	（３名）
木材特性と加工利用関係	（３名）
木材物理	（３名）
木材加工技術	（3 名）
木材解剖	（３名）
木材特性及び材質育種	（３名）
木材化工	（3 名）
木材乾燥	（３名）
機能性複合材料	（３名）
木材保護と木材改質	（３名）

付属資料 5-8

第 5 回合同委員会出席者名簿

日　　方	中　　方
終了時評価調査団 団長(総括)　　増子　博 独立行政法人国際協力機構国際協力総合研修所 国際協力専門員 団員(木材化学系)　山本幸一 独立行政法人森林総合研究所研究管理官 団員(木材物理系)　平川泰彦 独立行政法人森林総合研究所木材特性研究領域長 団員(計画評価)　　柿田雅胤 独立行政法人国際協力機構地球環境部 森林保全第 1 チーム 団員(評価分析)　　廣内靖世 株式会社　国際開発アソシエイツ パーマネント・エキスパート 通訳　万　紅 北京大來創傑咨□ 有限公司 鍛冶澤千重子 国際協力機構中国事務所 所長助理 林　良興 長期専門家　ﾁｰﾌ･ｱﾄﾞﾊﾞｲｻﾞｰ 国森恵子 長期専門家　業務調整員 中井　孝 長期専門家　木材特性 黒須博司 長期専門家　木材化工 池田　敦 長期専門家　木材工学	金普春 国家林業局国際合作司副司長 阮湘平 国家科学技術部中日技術合作事務センター主任 劉 立軍 国家林業局国際合作司処長 許強興 国家林業局対外合作プロジェクトセンター処長 儲富祥 中国林業科学研究院副院長 終了時評価調査団 団長　張 久栄 中国林業科学研究院前常務副院長 プロジェクトディレクター 団員(計画評価)　張忠田 国家林業局国際合作司副処長 陸 文明 中国林業科学研究院国際合作処処長 葉 克林 中国林業科学研究院木材工業研究所所長 プロジェクトマネージャー 呂建雄 中国林業科学研究院木材工業研究所副所長 プロジェクト事務室主任兼カウンターパート 胡 馨芝 中国林業科学研究院木材工業研究所 プロジェクト事務室 副主任兼通訳 姜 笑梅 木材特性　カウンターパート 秦特夫 木材化工　カウンターパート

付属資料６

質問表回答集計結果

A	日本側長期専門家への質問表回答集計結果(5 回答)
B	中国側ＣＰへの質問表回答集計結果（22 回答、うち 2 が 2 名連名）

A 長期専門家質問表回答集計(回答者 5)

注：質問に対して答えるべき情報をもっていない場合は、無理に回答せず、コメント欄に"I do not have information"と書くよう求めた。これら、及び無回答の場合は na で示した。

Part I

1. Implementation Process

Have the activities been carried out according to the plan? *If the answer is **No**, what are the obstacles, the negative impacts on the achievement of outputs and the measures taken (or to be taken)?*

<Questions for Chief Advisor (1 in total)>

1.1 Monitoring

(1) Has the monitoring report of the Project been submitted in time?	Yes No	Monitoring has regularly been carried out one time for every 6 months, and 6 monitoring reports both in Japanese and Chinese have been issued so far.
(2) Have the problems pointed out in the monitoring process been addressed properly?	Yes No	The problems pointed out have been addressed to counterparts, project manager and joint committee meeting to improve the issues.

1.2 Communication

(1) Has the communication within the Project been appropriate in implementing the activities? If the answer was No, what were the negative impacts on the Project?	Yes No	Communication has been well done trough regular experts meeting (every week), project meeting (one time /month), meeting of leaders (every week), experts and counterparts (at any time), specialty group meeting (at any time) , meeting between experts and group leaders (at any time), and free talking with project officials.
(2) Have you taken any measures to promote communication? If yes, please explain.	Yes No	For an example, I proposed a new management system of project to the joint committee meeting, that is to designate three group leaders for three specialty study field in order to skill up leadership and deepen communication among counterparts and experts. This has been implemented and succeeded.

Part II

1. EFFECTIVENESS of the Project

*If the answer is **Yes**, please state the reasons for your judgment (if any). If the answer is **No**, what are the obstacles, the negative impacts on the achievement of outputs and the measures taken (or to be taken)?*

<Questions for Chief Advisor and the long-term experts (4 in total)>

1.1 Achievement level of Project Purpose

(1) To what extent has the Project Purpose been achieved so far?	Fully(0) **Mostly(4)** Partly(0) Not at all(0)	1. Mostly: Except a few sub-activities which started at later half Most of all the sub-activities have been fulfilled the PDM. 2. Mostly: Almost all subprojects have been implemented according to the initial planning with the expected at least one scientific publication. However a few subprojects needs a little bit more time to publish their research results. 3. Mostly: The draft of the Research Plan for Next Step was made. Other measures have been achieved. 4. Mostly: Half of sub-projects have been finished and made plan for further research
(2) To what extent is the Project Purpose expected to be achieved by the end of the Project?	**Fully(4)** Mostly(0) Partly(0) Not at all(0)	1. Fully: Other than final report conference that will be held in November, all project inputs have been carried out. As outputs a few delaying sub-activities research have been recovering and preparing reports, which will be submitted until the end of the project. 2. Fully: By the end of the project, all subprojects will be able to publish their research results. 3. Fully 4. Fully: Research ability of all counterpart are expected to be improved by the end of the project.
(3) Are the Outputs of the latest PDM appropriate in achieving the Project Purpose?	**Fully(1)** **Mostly(1)** Partly Not at all **na (1)** **Unkonwn(1)**	1. Fully 2. Yes, they are appropriates. 3. Mostly: In the case of research project, it is difficult to evaluate the research ability numerically. However those outputs can reflects part of achievement of the project purpose. 4. na

1.2 Important Assumptions

(1) Have there been any changes in Important Assumptions for achievement of the Project Purpose?	**Yes(2)** **No(2)**	1. Yes: In the Academy of Forestry re-construction of institutes has been carried out. CRIWI, also, started the reform from last December, and trial administration of new institute system has been carrying on. All the counterparts, except one, are nominated to staff of the new institute. 2. Yes: At two subprojects, the counter parts were ordered to study abroad for six months by the Chinese government. 3. No 4. No

(2) If the answer was Yes in (1) above, what were the impacts and the measures taken?		1. However, practically, no significant affection to the project has been observed. 2. During above mentioned period, active researchers were nominated before counter part's departure, following the suggestion made by concerned long－term expert. The nominated researchers continued the job according to the detail research planning which were made by the counter parts following the concerned long－term expert's suggestion.

1.3 Facilitating and hampering factors

(1) Are there any facto	**Yes(3)** **No(1)**	1. Yes: Early scheduled implementation of equipments and machines supply for two times. increase implementation of the number of CP trainees and short term experts 2. Yes: Appropriate short-term experts dispatch to CRIWI. 3. Yes : Dispatch of the short-term experts,C/P training in Japan. Provision of equipments. 4. No
(2) Are there any factors that have negative impacts on the achievement of the Output 1? (If Yes, please explain)	**Yes(3)** **No(1)**	1. Yes: Difference of pay structure: Chinese get premium money from the project fund when they succeed in getting the projects, also, the project's staff can get reward from the fund if they save the cost in operation of the projects. There no research expense in the JICA project system. This difference affects to the priority of counterparts when the implement works. 2. Yes: Every six months, the concerned long－term expert wrote the comment on the progress reports, which were submitted by the counter parts, expecting the response. Very few response was however observed. 3. No 4. Yes: Some equipments provided by JICA showed problem.

2. EFFICIENCY of the Project:

*-If the answer is **Yes,** please state the reasons. If the answer is **No** what are the reasons, the negative impacts on the achievement of outputs and the measures taken (or to be taken)?*

2.1 Achievement of Outputs

＜Questions for Chief Advisor and the respective long-term experts (2 in total for each output)＞

Please answer the questions regarding the Output you are responsible for. For your reference:

Output 1	Basic knowledge in **wood properties** of man-made forest timber is accumulated at the Chinese Academy of Forestry	**Indicators**	For all sub-activities, at least one scientific report (including original papers and presentations at conferences, etc.) will be published.

(a) To what extent has the Output you are responsible for been achieved so far?	**Fully(1)** **Mostly(1)** Partly(0) Not at all(0)	1. Fully. Twenty-two reports have been issued so far.A few sub-activities have never been issued but been preparing the draft reports for publication. 2. Mostly: See attached related document, in which you can see the numbers of the publications in each subprojects.
(b) To what extent is the Output expected to be achieved by the end of the Project?	**Fully(2)** Mostly(0) Partly(0) Not at all(0)	1. Fully: All sub-activities will be able to issue the results of research in journal until the termination of the project 2. Fully: As the end of project is the next March, until then unpublished scientific reports so far would be printed, as some of them are actually drafted already.
(c) Are the planned Activities of the latest PDM appropriate in achieving the Output?	**Yes(2)** No(0)	1. Yes: Generally speaking answer is yes, however, for researchers the most important issue is motivation for research. All subjects of sub-activities in PDM have been set up based on "proposal" of counterparts. Some subjects might have requested much more review of the previous literatures and discussion before setting up the subjects. Because of regulation of experimental forest and materials sub-activity 1-2 met difficulties. 2. Yes: Every planned activity lead to reach the output without doubt.
(d) Is the degree of the achievement appropriate in view of the Inputs provided?	**Yes(2)** No(0)	1. Yes: Well done. 2. Yes: Reasonable results were obtained.

(2)

Output 2	Basic knowledge in **chemical processing** of man-made forest timber is accumulated at the Chinese Academy of Forestry	**Indicators**	For all sub-activities, at least one scientific report (including original papers and presentations at conferences, etc.) will be published.

(a) To what extent has the Output you are responsible for been achieved so far?	Fully(0) **Mostly(2)** Partly(0) Not at all(0)	1. Mostly: Almost al the sub-activities issued reports for the results of research so far, totally 33. Because of change the experimental condition term of operation of sub-activity 2-4 was extended for one year. 2. Mostly: Almost all Subprojects have achieved the Output.
(b) To what extent is the Output expected to be achieved by the end of the Project?	**Fully(2)** Mostly(0) Partly(0) Not at all(0)	1. Fully: Sub-activity 2-4 is now preparing draft report for publication and will be submitted until the end of the project.. 2. Fully: The research report on Subproject left is being written now
(c) Are the planned Activities of the latest PDM appropriate in achieving the Output?	**Yes(2)** No(0)	1. Yes:There are many possibilities from these outputs for developing the value-added utilization of man-made forest timber in China. Thus, the activities in PDM are appropriate. 2. Yes: Planned Activities cover much of the research field on chemical processing of wood.
(d) Is the degree of the achievement appropriate in view of the Inputs provided?	**Yes(2)** No(0)	1. Yes: Totally 33 reports have been issued from this sub-project and new progressing projects based on this sub-activities have been applied to some Chinese funds. 2. Yes

(3)

Output 3	Basic knowledge in physical processing of man-made forest timber is accumulated at the Chinese Academy of Forestry	**Indicators**	For all sub-activities, at least one scientific report (including original papers and presentations at conferences, etc.) will be published.

(a) To what extent has the Output you are responsible for been achieved so far?	Fully(0) **Mostly(2)** Partly(0) Not at all(0)	1. Mostly: Since most of the sub-activities started at the later half of the project, they are still on going. 14 reports have been issued. 2. Mostly: 5 activities have finished in the 12 activities. Others are still working on
(b) To what extent is the Output expected to be achieved by the end of the Project?	**Fully(2)** Mostly(0) Partly(0) Not at all(0)	1. Fully: However, data and results of studies are being accumulated, which will be issued in some journal until the termination of the project. 2. Fully: 2 activities are delayed and their duration have been extended. However both can be finished by the end of this project.
(c) Are the planned Activities of the latest PDM appropriate in achieving the Output?	**Yes(2)** No(0)	1. Yes: All sub-activities will be offering very important basic data for developing the technology of value-added utilization of man-made forest timber in China. 2. Yes
(d) Is the degree of the achievement appropriate in view of the Inputs provided?	**Yes(2)** No(0)	1. Yes: Since the range of sub-activities are too wide, it hopefully needs a more long term expert to supervise, especially, in wood drying and mechanical processing of wood. 2. Yes: Even though it is minimum, the achievement is appropriate against the inputs.

2.2 Japanese Inputs: Have the following Japanese inputs been appropriate to achieve the Outputs?

*-If the answer is **A (appropriate) or MA(mostly appropriate)**, please state the reasons (if any). If the answer is **HA(hardly appropriate)or NA (not appropriate at all)**, what are the reasons, the negative impacts on the achievement of outputs and the measures taken (or to be taken)?*

(1) Long-term experts

<Questions for Chief Advisor (1 in total)>

(a) Timing of the dispatch	**A(1)** MA(0) HA(0) NA(0)	At the beginning, dispatch of the expert in wood property was delayed but recovered by ability and eagerness of the expert after arrival.
(b) Duration of the dispatch	**A(1)** MA(0) HA(0) NA(0)	Until to be accustomed to Chinese working system and to get good communication with counterparts, it takes some time. At least two years are needed.
(c) Number of the experts	A(0) MA(0) **HA(1)** NA(0)	Since the field of Sub-project 1 and 3 are too wide, the expert in charge have to 11 and 12 sub-activities. It needs additional at least one more expert is desirable.
(d) Quality of the experts	**A(1)** MA(0)	As scientist and project leader almost all the experts are well experienced and very eagerness

the experts	HA(0) NA(0)	and very eagerness.
(e) Specialties of the experts	**A(1)** MA(0) HA(0) NA(0)	Refer (c)
(f) Degree of contribution to the achievement of Output	**L(1)** M S	Highly evaluated.

(2) Short-term experts

<Questions for Chief Advisor and the long-term experts (4 in total)>

(a) Timing of the dispatch	**A(1)** **MA(3)** HA(0) NA(0)	1. MA: Because of SARS dispatch of a few short-term experts was interfered and lost timing. 2: A: The timing of dispatch was decided considering on the concerned candidate of the short－term expert's and also the project site conditions. 3. MA: The timing was depending on the total plan of PJ. 4. MA: Because of the spread of SARS in Beijing, the dispatch of short-term expert was postponed.
(b) Duration of the dispatch	**A(2)** **MA(2)** HA(0) NA(0)	1. A: 2. MA: Due to the very busy short－term expert's schedule, in some cases, it was impossible to ask more longer stay. 3. MA: Duration of some person was rather short because of his situation and SARS. 4. A
(c) Number of the experts	**A(4)** MA(0) HA(0) NA(0)	1. A: Additional dispatch by supplemental budget accomplished much better results. 2. A: Enough. 3. A: JICA approved the addition of experts. 4. A
(d) Quality of the experts	**A(4)** MA(0) HA(0) NA(0)	1. A: All experts are well experienced and highly capable 2. A: Excellent. 3. A: The excellent researchers were invited. 4. A: Authority for each field was dispatched
(e) Specialties of the experts	**A(4)** MA(0) HA(0) NA(0)	1. A: Promoted the most appropriate experts to implement the sub-activities 2. A: The most suitable researchers were selected. 3. A: The most appropriate researchers were selected. 4. A
(f) Degree of contribution to the achievement of Output	**L(4)** M(0) S(0)	1. L: Without their contribution many sub-activities couldn't be achieved. 2. L: Might be better to say "high" lather than "large". 3. L: There are 5 scientific reports collaborated with short-term experts. 4. L: Counterparts studied hard and achieved large progress of sub-project under the instruction of authority of the field.

(3) C/P training

<Questions for Chief Advisor and the long-term experts (4 in total)>

(a) Timing of the training	**A(1)** **MA(3)** HA(0) NA(0)	1. MA 2. MA: Well-planned dispatch was observed. In the case of wood drying fields, however, one counter part was added later. The dispatch timing fell in the same period, while another counter part was already dispatched. That may put a lot of load at the concerned laboratory, where

		two counter parts should be trained at the same time. 3. MA: The timing was depending on the total plan of PJ. 4. A
(b) Duration of the training	**A(3)** **MA(1)** HA(0) NA(0)	1. A 2. MA: In some case, six months stay in Japan was too long. Generally speaking, three months stay would be reasonable. 3. A: Duration from 4-6 months was appropriate. 4. A
(c) Number of C/P dispatched	**A(2)** **MA(2)** HA(0) NA(0)	1. A: By supplemental budget almost all ones could be trained. 2. MA: In some sense, it was too many. Judging from the project covered fields, however, it may be needed and accepted. 3. A: Almost all C/P could take the training in Japan. 4. A
(d) Quality of the training	**A(4)** MA(0) HA(0) NA(0)	1. A: Many report have published with names of counterparts in co-author by the teaching of addressed supervisor and organization 2. A: Excellent. 3. A: Excellent. 4. A
(e) Contents and fields	**A(4)** MA(0) HA(0) NA(0)	1. A: We are confident to chose the most appropriate organizations and supervisors. 2. A: Nothing particular for counter part. In wood research fields, as the accuracy of wood specimen controls the results, the carpenter's skill should be more improved together with accumulating the know-how on how to use the donated machinery and equipment. Under present system, it should be pointed out that there is no way to realize this. 3. A: The most appropriate contents and fields were selected. 4. A: We applied suitable organization to accept counterpart
(f) Degree of contribution to the achievement of Output	**L(4)** M (0) S(0)	1. L: Papers have been published from almost all the C/P training results. Two C/P have been to a member of Japan Wood Research Society. 2. L: Although this depends on each counter part, generally speaking we may give the high mark, knowing very few exceptions. 3. L: There are 9 scientific reports collaborated with the supervisors at training institutions in Japan. 4. L: As same as the dispatch of short-term expert. They studied hard and achieved large progress of sub-project.

(3) Machinery and equipment

<Questions for Chief Advisor and the long-term experts (4 in total)>

(a) Quality	**A(2)** **MA(2)** HA(0) NA(0)	1. A: As PDM 2. MA: Nothing particular. 3. A 4. MA: Some equipment have unnecessarily high function
(b) Timing of provision	**A(1)** **MA(3)** HA(0) NA(0)	1. A: Earlier scheduled implementation for two times was very helpful for achievement. Some troubles happened at the beginning of the project but there were a little after being accustomed to the business. There are a few problem in procedure of customs. 2. MA: Basically it was planned with no problems, however actually some equipment were a little bit delayed due to the entry at Chinese customs. 3. MA: Timing is depending on the order of priorities. 4. MA: A part of them were given little late, because of limitation of budget in the beginning

(c) Items	**A(2)** **MA(1)** HA(0) NA(0) **na (1)**	1. A 2. MA: For the small items to conduct the daily experimental job may need to pay more attention. 3. A: Experts cooperated in the provision of new items. 4. na
(d) Specifications	**A(2)** **MA(1)** HA(0) NA(0) **na (1)**	1. A: Differences of National Standard have to be checked for expecting machineries and equipments. 2. MA: As almost all equipment were provided according to the experiences at FFPRI, no particular problems observed. A few of them are too sophisticated. Simple one functioned equipment would be sometimes more easy to use. 3. A 4. na
(e) Quantity	**A(3)** **MA(1)** HA(0) NA(0)	1. A 2. MA: Nothing in particular. 3. A 4. A: Quantities of equipments are enough so far.
(f) Utilization of the provided machinery and equipment	**A(1)** **MA(2)** HA(0) NA(0) **na (1)**	1. They have been well maintained and used for research under the supervision and direction of full-time manager for equipments. 2. MA: Utilized very well. 3. MA: There is a certain problem on the utilization system of common equipments. 4. A: Equipments are used well, when those are needed.
(g) Degree of contribution to the achievement of Output	**L(4)** M(0) S(0)	1. L: Large part of machineries and equipments of the institute are modernized and fulfilled, and utilized for many ways, which have been contributing greatly to research outputs. 2. L: Without these machinery and equipment, any outcome may not exist. 3. L 4. L: Many sub-project couldn't be proceeded without those equipments

2.3 Chinese inputs: Have the following Chinese inputs been appropriate in achieving the Outputs?

*-If the answer is **appropriate(A) or mostly appropriate(MA)**, please state the reasons (if any). If the answer is **hardly appropriate(HA)or not appropriate at all(NA)**, what are the reasons, the negative impacts on the achievement of outputs and the measures taken (or to be taken)?*

(1) Counterpart (CP) personnel

< Questions for Chief Advisor, the long-term experts , and Project Coordinator (5 in total)>

(a) Timing of assignment	**A(1)** **MA(4)** HA(0) NA(0)	1. MA: Some C/P are very busy for the other projects and business, to whom assistant researchers have been recruited in timing. 2. MA: Nothing in particular. 3. MA: C/P was replaced twice for their voluntary retirement(2-1). One C/P was assigned at the final year to assist the progressing of Subproject(2-4). 4. A: They have been assigned properly for the sub-project 5 MA
(b) Duration	**A(3)** **MA(2)** HA(0) NA(0)	1. A 2. MA: Nothing in particular. 3. A 4. A: They have been assigned properly for the sub-project 5. MA

(c) Number of the C/P	**A(2)** **MA(1)** HA(1) NA(0) **na(1)**	1. A: Six C/P have been newly recruited. 2. HA: Too large. Especially the long－term expert on Wood Properties has responsibility on 12 counter parts. This figure was the twice of that at Forest Product Research Project In Malaysia, Sarawak, conducted from 1993 to 1997, where five long－term experts were seconded. 3. MA: But there were 4 C/P who took charge of 2 subprojects. 4. A: The number has been enough for this project. 5. na
(d)Technical level of the C/P	**A(1)** **MA(3)** HA(0) NA(0) **na(1)**	1. MA:Some are senior and some are junior. 2. MA: Some of them were joined this project as post doctors. Many experiences were not expected. Before talking of the technical level, some of them had not the enough principal attitudes to cope with wood. However others have reasonable technical level. 3. MA 4. A: Their technical level are enough to conduct what we want them to do. 5. na
(e)Specialties of the C/P	A(0) **MA(4)** HA(0) NA(0) **na(1)**	1. MA: Academic backgrounds vary C/P by C/P and vary in experience. 2. MA: Nothing in particular. 3. MA 4. MA: Some are assigned for different specialty from theirs. 5. na
(f) Degree of contribution to the achievement of Output	**L(4)** M S **na(1)**	1. L: Eager supervision of long and short-time experts they have been contributing to outputs. 2. L: Every counter part contributed greatly. 3. L:Most of C/P achieved more than 2 research publications or presentations. 4. L: Project can't carry out without counterpart. 5. na

(2) Administrative personnel (administrative staff, accounting staff, interpreters, drivers and other supporting staff)

<Questions for Chief Advisor, the long-term experts , and Project Coordinator (5 in total)>

(a) Timing of assignment	**A(4)** **MA(1)** HA(0) NA(0)	1. MA:Administrative staff especially manager is too busy. I requested to the PJ manager promoting a proxy of the manager in later half of the project and implemented. 2. A: Nothing in particular. 3. A: 4. A: All staffs had been assigned in the beginning of project. 5. A
(b) Duration	**A(5)** MA(0) HA(0) NA(0)	1. A 2. A: Nothing in particular. 3. A: 4. A: They work for project till the end of project. 5. A
(c) Number	**A(4)** **MA(1)** HA(0) NA(0)	1. A: 5 including PJ manager. 2. A: Nothing in particular. 3. A: 4. A: Their duty has been accomplished well so far 5. MA
(d)Technical level	**A(4)** **MA(1)** HA(0)	1. A: The interpreter/assistant coordinator is excellent. 2. A: Excellent.

	NA(0)	3. A: 4. A: Their skill are high enough for this project 5. MA
(e) Specialties	**A(5)** MA(0) HA(0) NA(0)	1. A: They are trying to the best. 2. A: No problems. Especially interpreter's excellent work should be recorded 3. A: 4. A: Their skill are high enough for this project 5. MA
(f) Degree of contribution to the achievement of Output	**L(4)** **M(1)** S(0)	1. L 2: L: Should be recognized their supports were great. 3. L: I guess so because of their devoted cooperation. 4. M 5. L

(3) Land for Project Office and related facilities, buildings and facilities for Project Office, expert rooms, laboratory, administration room, and others.

< Questions for Chief Advisor, the long-term experts , and Project Coordinator (5 in total)>

(a) Timing of the provision	**A(2)** **MA(1)** HA(0) NA(0) **na(2)**	1. A: There took place a few troubles at the beginning of the project by lucking experience for the JICA project. 2. A: No problems. 3. na 4. na 5. MA: Due to the no concrete description in R/D what items should be contained in the office, when experts arrived for their assignment at CRIWI, they found no desks, chairs and basic office equipment although the office space were offered. Under that condition they could not start business immediately.
(b) Quality	**A(1)** **MA(3)** HA(0) NA(0) na(1)	1. MA: Problem of information facilities. 2. MA: The relatively poor internet system caused loss of time. 3. na 4. A: At the beginning, only the room without any desk, chair and shelf were provided, because of lack of understanding of Chinese side or lack of explanation of Japanese side. 5. MA
(c) Utilization	**A(2)** **MA(2)** HA(0) NA(0) na (1)	1. A 2. MA: Small seminar room was needed at fifth floor for discussion with a few counter parts. A stock room for JICA project was needed. 3. na 4. A: There isn't special problem. 5. MA
(d) Management	**A(2)** **MA(1)** HA(0) NA(0) na(2)	1. A 2. MA: An abrupt proposal from the Chinese side was sometimes observed. Rather difficult to make schedule in advance. 3. na 4. A: There isn't special problem. 5. na : Although the Chinese side JICA project office at CRIWI has been established, the person who has the responsibility to make the final decision was not allocated, for which reason, it took long time to get the decision.

(e) Degree of contribution to the achievement of Output	**L(2)** **M(1)** S **na(2)**	1. L 2. L: Without these facilities, the smooth activities would be difficult. 3. na 4. M 5. na

(4) Running expenses

<Questions for Chief Advisor, the long-term experts , and Project Coordinator (5 in total)>

(a) Timing of the provision	A(0) **MA(3)** HA(0) NA(0) **na(2)**	1. MA 2. na 3. na 4. MA: Sometimes it takes time to make Chinese side understand necessity of the cost. 5. MA
(b) Quantity	**A(2)** **MA(1)** HA(0) NA(0) **na(2)**	1. MA: JICA side: strongly requested to make a item of expenditure for research activity. 2. na 3. na 4. A: As far as I know, there was no lack of running expenses 5. MA
(c) Utilization	A(0) **MA(1)** HA(0) NA(0) **na(4)**	1. MA: It is very incentive for the C/P to participate the international congress by supporting of JICA budget. 2. na 3. na 4. na 5. na
(d) Management	A(0) **MA(1)** HA(0) NA(0) **na(3)**	1. MA 2. na 3. na 4. na 5. na
(e) Degree of contribution to the achievement of Output	**L(1)** **M(1)** S(0) **na(3)**	1. L 2. na 3. na 4. M 5. na

2.4 Important Assumptions

<Questions for Chief Advisor (1 in total)>

(1)	Have the C/P stayed with the Project?	Yes No	Two C/P moved to other organization by the private reasons, but succeeding C/P have been recruited appropriately.
(2)	If the answer was **No** in (1) above, what were the impacts and the measures taken?		

2.3 Facilitating and hampering factors

<Questions for Chief Advisor, the long-term experts, and Project Coordinator (5 in total)>

(1)	Are there any factors that have facilitated the achievement of Outputs? (If Yes, please list the major ones)	**Yes(3)** No(1) na (1)	1. Yes: Supplementary budget largely contributed to the increasing number of C/P training and short-term expert dispatch. 2. Yes: Well-preparations for accepting short-term experts to install machines in site were particularly mentioned. 3. Yes: C/P has much will to obtain the good results by giving presentations and writing research papers. 4. No 5. na
(2)	Are there any factors that have negative impacts on the achievement of the Outputs? (If Yes, please list the major ones)	**Yes(4)** No(0) na (1)	1. Yes: Because of no research budget in JICA project, it is hard to give incentive to C/P at a good timing. The order of priority of the JICA project in the C/P tends to be lower than the other project which C/P hold, since they can't get income from the JICA project. 2. Yes: Delayed submission of progress reports and counter parts were indifferent to the comments made by long－term expert. 3. Yes: Some C/P have been very busy for jointing other research projects. (But most of them were overcoming their difficulties by their own methods.) 4. Yes: Some equipments had problem and needed to be repaired or modified. The outbreak of SARS paralyzed the institute for 2 months. And the dispatch of short-term expert had to be postponed. 5. na

3. IMPACT of the Project

<Questions for Chief Advisor and the long-term experts (4 in total)>

3.1 Impact at Overall Goal level

(1) To what extent is the Overall Goal likely to be achieved in 5-10 years after the completion of the Project?	**Fully(2)** **Mostly(2)** Partly(0) Not at all (0)	1. Fully: Developing of China is very quick and deficit of timber resources is very important issue. In the policy of Chinese government, fulfilling the man-made forest resources is at the highest priority. It is expected the new technology for value-added utilization of man-made forest timber. Through the JICA project Chinese C/P have learned many basic knowledge of Japanese high level research wood science and technology, moreover, management of research work, culture and got many friends and acquaintances, which stimulate, especially, younger researchers not only CRIWI's but also University's. Those younger researches must be largely contribute to the innovation of research and developing of technology of man-made forest timber. 2. Fully: Under the condition that the government or the authorities concerned realize the magnificent meaning of utilizing plantation wood, overall goal of this project will be reached within 5-10 years. 3. Mostly: 4. Mostly: Considering the circumstances of the wood Industry and national policy, it is certain that the research like this project will be developed. The many counterparts of this project can be the core of the trend.
(2) Have there been any impacts at overall goal level already? (If the answer is Yes, please explain)	**Yes(3)** **No(1)**	1. Yes: Almost all seminars and workshops by short-term experts have been opened to outside audience including Peking Forestry University. On the Web site of the Post graduate Students Group of Forest Universities conducted by Peking Forest university group has been cited the contents of those seminars. 2. No: 3. Yes: Presentations of research results on plantation wood to various domestic symposium. 4. Yes: There already are the impacts in terms of number of the research publication on man-made forest timber. But I can't conclude that the phenomena is truly the caused by the impact of this project.
(3) Have there been any changes in Important Assumptions for achievement of the Overall Goal? (If the answer is Yes, what would be the impacts and the measures to be taken?)	**Yes(1)** **No(3)**	1. Yes: In the re-construction of the CRIWI, one of the most important purpose is to level up the research ability of the institute to be at front of the world level until 2010. All C/Ps have been promoted to the core staff of the new institute "Research Institute of Forestry for New and High Technology (tentative)". 2. No 3. No 4. No

3.2 Other Impacts: Have you noticed any positive or negative impacts caused by the Project? -*If the answer is "**Yes**", please explain.*

(1)Institutional and policy impact	**Yes(2)** **No(2)**	1. Yes: The research work in CRIWI has been focused on man-made forest timber and will be expanded to value-added utilization of them forever. 2. Yes: Positive impacts were apparently existed when establishing the new Research Institute, where the mission should be made clear. 3. No: 4. No
(2)Economic impact (on China, local communities, private enterprise, etc.)	**Yes(1)** **No(3)**	1. Yes: Private wood industry sectors keenly realize the deficit of natural timber resources and demand for man-made forest timber and those relating basic data and know how of processing technology. 2. No 3. No 4. No
(3)Technical impact (on other researchers, other institutes, etc.)	**Yes(3)** **No(1)**	1. Yes: Refer 3-(3) Totally more than 70 papers dealing with the results of the project, which give incentive and motivation to others. Many scientists, teacher and students from other Institute and Universities com to learn JICA project. In 2004 year budget 4 new projects have been accepted at National and 2 at institutional level budgets. Those are focused onto developing the research of JICA projects. 2. Yes: Through the many presentations showing the results of this project in Chinese academy domain, reasonable impacts were marked. 3. Yes: Cooperative utilization of the equipments. Participation in public lecture meetings by short-experts. 4. No
(4)Environmental impact	**Yes(1)** **No(3)**	1. Yes: Wood industry and forestry sectors and policy makers have well informed on the project through review in journal and seminars and mass media.They recognize the importance of replacing of the timber use from natural timber to man-made forest ones. 2. No: It is too early to give the environment impact at this stage, however, recent planting species and implementations would be re-considered within 10 or so years to put more emphasis on how to use the plantation timber with economically sustainable cycle. 3. No: 4. No
(5)Social impact	**Yes(1)** **No(3)**	1. Yes: Recent people's concerning to the environmental issue and happening disasters, and booming of housing, they are well informed and know importance of issue of man-made timber. 2. No: Once actual economical benefit is recognized, it will give tremendous social impact. But, not now. 3. No 4. No

4. SUSTAINABILITY of the Project

4.1 Intuitional sustainability -*If your answer is "**Yes**", explain how the budget would be secured. If your answer is "**No**", explain the reasons and the required actions*

<Questions for Chief Advisor (1 in total)>

(1) Policy support

(a) Is it likely that current policy supports for the activities of the Academy likely to continue?	Yes No	Enrichment and utilization of man-made forest timber are ranked among the 6 important National forest project. Conversion and utilization of timber from natural resources to man-made ones is stated in the "Strategy for the Forestry until 200 years" ,which recognized formerly in 2003. In the 10th National yeas developing plan of forestry this issue is also recognized.

(2) Assignment of CP Personnel

(a) Is it likely that the C/P personnel trained through the Project remain with Academy?	Yes No	All C/Ps are promoted to staff of the new "Research Institute for Forestry New and High technology".
(b) Is it likely that the C/P personnel trained through the Project be posted in appropriate position to sustain the project effect?	Yes No	Do above.

(3) Institutional and management capacity of Institute

(a) Does the Academy have enough institutional and management capacity to continue the related activities after the end of the Project?	Yes No	CRIWI is unique national institute for research of wood science and technology. After reform of the institute it will be focusing on the research of basic wood science and technology as a non-profitable body, and all financial support will be given by the State Government.

(4) Coordination with other organizations

(a) Is it likely that the coordination with relevant organizations (ministries and agencies, private industries, universities and research institutes, etc.) be ensured after the end of the Project?	Yes No	Do above (3)-a.

4.2 Financial sustainability -*If your answer is "**Yes**", explain how the budget would be secured. If your answer is "**No**", explain the reasons and the required actions.*

<Questions for Chief Advisor (1 in total)>

Is it likely that the budget necessary to carry out the relevant research activities be secured (including salaries of staff, operation and maintenance costs, material costs, etc.) after the termination of the Project?	Yes No	Do above (3)-a.

4.3 Technical sustainability -*If the answer is **Yes,** please state the reasons for your judgment. If the answer is **No**, what are the reasons and the measures that need to be taken.*

<Questions for Chief Advisor and the long-term experts (4 in total)>

(1) Technical capacity : Has the C/P acquired enough skills and knowledge to sustain the effect of the Project? (For example, will they be able to plan and conduct the relevant research by themselves?)	**Yes(3)** **No(1)**	1. Yes: Sixteen C/P hold Dr. degree and most of the others are Ms.Graduate school (Dr. & Ms.) and Post Dr. fellow system have been set up as an annex of CRIWI. Many C/Ps hold posts of supervisor for the Graduate school. 2. No: The younger generation counter parts need to think more by themselves what is the research work, what would they like to add the new findings in the world, before talking the technical matters. The objectives of the research work should be firstly made clear. The selection of specimens and testing methods should be regarded for realizing the research objectives. 2. Yes: It depends on the capacity of C/P. Experts usually made useful comments to C/P on their PJ Progress Report for this purpose. But not perfect Yes. 3. Yes: They already planed the further research by themselves. But in some case, counter part doesn't conduct experiment by oneself. And the plan they made can be far from actual.
(2) Utilization and dissemination of technologies : Is it possible that the Academy will utilize and disseminate the technologies transferred? *If your answer is **Yes**, explain the strategies*	**Yes(4)** No(0)	1. Yes: Several C/Ps participate as committee members and organizers of wood research society and association, and editors of journals of wood science & technology, and wood industry. C/Ps often make lecture and teach at Universities, industry sectors associations. 2. Yes: Making more presentations in the scientific world such as wood research societies meetings, seminars, and so on, with publishing the results obtained. 3. Yes: The presentation of research results to domestic symposium and meeting. Progressing the basic research results to developing step. 4. Yes: There already are many joint research project between CRIWI and other research institute or universities.
(3) Utilization of machinery and equipment: Would the provided machinery and equipment be utilized	**Yes(3)** No	1. Yes: In generally speaking, equipments are tend to be enclose by individual researcher who acquired. In order to use the equipments effectively and efficiently, except some special ones, most of equipments are managed by unified system under the direction and supervision of the superintendent. 2. Yes: All machinery and equipment provided were used during the project, and technical transfer how to use these were successfully implemented. The problems remained will be the management of

effectively and efficiently after termination of the Project (especially in terms of technical capacity of operation and management, needs, etc.)?		them including the good maintenance and open and fair usage. 3. Yes: It is necessary to keep the systems of cooperative utilization, management and maintenance in JICA PJ. 4. ?: It seems that the researcher likely to possess the information and equipment. Although some of them learned how the equipments are managed and are used commonly in Japan. Japanese experts suggested Chinese side to establish the system for managing equipment as a property of the institute. But we can't force them to do.

5. Others

<Questions for Chief Advisor and the long-term experts (4 in total)>

5.1 Recommendation

Do you have any recommendations for the improvement of the Project in the remaining period? If **Yes**, please list the major ones.	**Yes(3)** **No(1)**	1. Need of succeeding phase project. 1st phase project have mainly focused on the accumulation of basic knowledge and data of man-made forest timber which is expected to use for interior material, furniture and fiber uses. However, to accomplish the use of man-made forest timber to meet environmental friendly and sustainability, cascade uses of timber all over its lifecycle, from structural use to terminal use for energy, are inevitable. This cycle will be completed by carbon dioxide fixation through reforestation. In succeeding phase project, basic knowledge and data should be accumulated for the evaluation of structural use and conversion of biomass for energy saving. Also, need to constant budget and system to maintain equipments and machinery. 2. Seek co-operation each other. 3. Effort of the deeper discussion of experimental results for writing the Final report and the coming PJ Symposium in November.

5.2 Lessons learned

Are there any lessons learned which can be applied to similar projects? If **Yes**, please list the major ones.	**Yes(4)** No(0)	1. It is important to get following information about counterpart institute in previous survey of project forming so as to make administration of expecting project smooth and for better communication; pay structure, system of application for budget, number of project implemented, administrational system of budget, number of project being kept by every counterpart, possible proportion of work time sharing fro the project of every C/P etc. 2. Yes: Preliminary deep study will be essentials. To understand Chinese attitude and find out what is the truth may the keys. It may take long time to realize them. 3. Yes: Precise and detailed inspection of the various situation in C/P institution for better operation of PJ 4. Yes: It is difficult to breakthrough the difference between two countries in short time. As for the research, there also are many differences. Even though we had many information about China or Chinese people, we confused against the behavior of them.

5.3 Any other comments

1. As the system of JICA project, all expenditure for research activity including man power, research material, daily article of consumption, transportation etc., is expended by local cost of counterpart organization and not by JICA. However, shortage/luck of counterpart's budget often makes the project operation difficult, and meets to deadlocks. If it is possible to support by the budgetary measure of ear marked budget for research (a special item of expenditure for research) other than JICA's local cost, the project will be performed much more smoothly. I would like strongly comments that JICA will set up a special item of expenditure for research.
2. Forestry and Forest products Research Institute and Staff should be greatly appreciated for their continuous support and contribution from before construction of the project and to end, by advising and coordinating for all, dispatch experts and acceptance of counterparts etc. Without their dedication the achievement of project would have greatly been diminished.

Ｂ カウンターパートへの質問表回答集計（有効回答 22、うち 2 は 2 名連名）

注：質問に対して答えるべき情報をもっていない場合は、無理に回答せず、コメント欄に”I do not have information”と書くよう求めた。回答集計欄の”n.a”はこれを意味する。コメントが重複している場合があったが、そのまま示した。

1. RELEVANCE of the Project

Please answer the following questions and state the reasons for your judgment as well.

<Questions for Project Manager (1 in total)>

1.1 Overall Goal: “Research on timber from man-made forests is promoted in China”

(1)	**Relevance with the needs of China** : Does the Overall Goal still agree with the needs of China?	Yes No	The development of man-made forests in China is still in progress in large scale so that to better understand and to finally utilize the timber is a long term task of the Research Institute of Wood Industry, Chinese Academy of Forestry.
(2)	**Relevance with the national policies** : Is the Overall Goal of the Project still consistent with the national development plan and the relevant national policies of China?	Yes No	China has declared that source of industrial timber will change from natural forests to man-made forests and the State Council has issued and implemented the forestation program aiming at planting 13.3 million ha of industrial man-made forests in China up to year 2015. On the other hand, a number of several favorite forestry policies have been issued. The Overall Goal of the project will facilitate national development and relevant national policies.

1.2 Project Purpose: ”Chinese Academy of Forestry develops its ability to carry out the basic research on man-made forest timber”

(1)	**Relevance with the needs of target group** : Is the Project Purpose still consistent with the organizational needs of Research Institute of Wood Industry as well as the Academy?	Yes No	To serve national development needs, Chinese Academy of Forestry, as the leading forestry research organization in China, is facing great challenge of providing fundamental knowledge through basic research on timber from man-made forest, which is one of the key research areas of the academy. Therefore to further develop its ability of carrying out basic research on man-made forest timber consists with the mission of the academy.

2. EFFECTIVENESS of the Project

*If the answer is **Yes**, please state the reasons for your judgment (if any). If the answer is **No**, what are the obstacles, the negative impacts on the achievement of outputs and the measures taken (or to be taken)?*

2.1 Achievement level of Project Purpose

<Questions for Project Manager and other C/P (22 in total)>

(1)To what extent has the Project Purpose been achieved so far?	**Fully(7)** **Mostly(15)** Partly(0) Not at all(0)	Comments for "Fully" 1. Almost all of the research instruments in the institute have been replaced, and Chinese scientists have learned much from Japanese experts 2. The research condition has been improved and many new research ways have been introduced by the Project. I think the research ability of our academy has been improved by the Project. Comments for "Mostly" 1. The Project has achieved a number of research achievements. Most of the C/P are trained in Japan and work closely with experts. A number of research equipment is provided. 2. A lot of new methods and technologies have been learned from the project 3. Chinese scientists have learned much from Japanese experts and Japanese Institute. 4. The equipments and apparatus were installed in CAF, and the CP of CRIWI were trained in FFPRI and TBIC and university in Japan, all these had improved the research ability of CRIWI 5. A lot of new methods and technologies have been learnt from the project. 6. The equipments and apparatus were installed in CAF, and the CP of CRIWI were trained in FFPRI, all these had improved the research ability of CRIWI. 7. Now the jica project contents by most Chinese experts are almost the same as what they do in the near future. 8. Now almost all the sub-project have finished.

(2) To what extent is the Project Purpose expected to be achieved by the end of the Project?	**Fully(9)** **Mostly(12)** Partly(0) Not at all(0) **na(1)**	Comments for "Fully" 1. Basing on the achievement that had finished, I think the project can be achieved fully Comments for "Mostly" 1. There is no end of capacity development in research fields. Especially, new research needs come up along with social, economic and environment development so that the institute needs develop its capacity forever. 2. After five years research training Chinese scientists will be able to do the similar research by themselves in the future 2. The project purpose expected will be achieved in the months 3. Chinese scientists will be able to do the similar research by themselves in the future. 4. The cooperation between Japan and China will improve the research ability greatly for CRIWI, and the level of project management. 5. The project purpose expected will be achieved for new materials . 6. The cooperation between Japan and China will improve the research ability greatly for CRIWI, and the project management. 7. The Jpan-China cooperation makes CRIWI research be stronger in China and the world.
(3) Are the Outputs of the latest PDM appropriate in achieving the Project Purpose?	**Fully(10)** **Mostly(11)** Partly(0) Not at all(0) **na(1)**	Comments for "Fully" 1. To fulfill the Project objectives, fundamental knowledge (including characteristics, chemical treatment and physical treatment) of timber from man-made forests must be accumulated through research and experiments. Comments for "Mostly" 1. The outputs are suitable for the project purpose 2. Through the achievement published in journals, the influence of this project had reach the purpose, improve the research meathods and expand CRIWI's influence in the world. 3. The Outputs are suitable for the project purpose. 4. Through the achievement published in magazine, the influence of this project had reach the purpose, improve the research and expand CRIWI's influence 5. Publication is the most important as the project Outputs. I think the outputs of the latest PDM are appropriate in achieving the Project Purpose now.

2.2 Important Assumptions

<Questions for Project Manager (1 in total)>

(1)	Have the budget, system, etc,of the Academy for research changed significantly?	Yes No	
(2)	If the answer was Yes in (1) above, what were the impacts and the measures taken?		

2.3 Facilitating and hampering factors

<Questions for Project Manager and other C/P (22 in total)>

(1) Are there any factors that have facilitated the achievement (If Yes, please explain)	**Yes(16)** **No(3)** **na(3)**	Comments for "Yes" 1. Strong support from Japanese government, from Chinese government and from scientists of both of Japan and China. Especially scientists of the both countries implemented the team work with different culture and work experience. 2. We also conduct some national research project in relate to this JICA study purpose 3. Advanced instruments and equipments, research methods and ideas from long-term and short-term experts 4. The work is supported by key foundation research project of China. The work of experts both long-term and short-term from Japan is effective 5. Good cooperation of the two Governments and the hard work of the experts are the key factor to facilitate the project. 6. Advanced instruments and equipments, good ideas from Japanese experts. 7. JICA long-term and short-term experts facilitated the achievement of Output. 8. JICA long-term and short-term experts facilitated the achievement of output 9. We also conduct some national research project in relate to this JICA study purpose. 10. We also conduct some national research project in relate to this JICA study purpose. 11. The National Forestry administration and CAF, and CRIWI give effectively management 12. The work is supported by key foundation research project of China.The work of expects both long term and short term from Japan is effective. 13. The 948 projects and 863 projects of National plans 14. The emphasis of the National Forestry administration and CAF, and CRIWI. 15. The communication between Japanese and Chinese experts. Talking… 16. The policy of protection natural forestry have facilitated to the achievement of output 1
(2) Are there any factors that have negative impacts on the achievement (If Yes, please explain)	**Yes(6)** **No(15)** **na(1)**	Comments for "Yes" 1. Lack of special research grant to each sub-projects. Adjustment of C/P.Communication between scientists. 2. Some other tasks occupied the part time for JICA subproject research 3. Some other tasks occupied the part time for JICA subproject research. 4. Sometimes, the communication between two sides can not be commendably communicated 5. Sometimes, the communication between two sides is not so good. 6. The small test chamber had been repaired two times and the experiment was influenced a little. Comments for "No" 1. CRIWI has done his best to support the project 2. CRIWI has done his best to support the project.

3. EFFICIENCY of the Project:

*-If the answer is **Yes,** please state the reasons. If the answer is **No** what are the reasons, the negative impacts on the achievement of outputs and the measures taken (or to be taken)?*

3.1 Achievement of Outputs

(1) <Questions for Project Manager and C/P responsible for Output 1 (9 in total)>

Output 1	Basic knowledge in **wood properties** of man-made forest timber is accumulated at the Chinese Academy of Forestry	**Indicators**	For all sub-activities, at least one scientific report (including original papers and presentations at conferences, etc.) will be published.

(a)To what extent has the Output you are responsible for been achieved so far?	**Fully(2)** **Mostly(7)** Partly(0) Not at all(0)	Comments for "Fully" 1. For all sub-activities, three scientific papers have been published 2. Totally ten scientific reports (including original papers and presentations at conferences, etc.)has be published. Comments for "Mostly" 1. There are 8 sub-activities under Output 1 and at least 10 papers and one manual are planned to be published. In fact, 22 papers have been published. 2. A lot of new methods and technologies have been learn such as the research of mill wood lignin, essential oil and carbohydrate composition from the project. 3. I have made a preliminary study of lignans. One component of lignan from Chinese fir was isolated and identificated. 4. Only one experiment has not been done because of lack of samples. 5. For sub-project 1-2-a, one presentation at 53rd annual meeting of the Japan wood research society was published. Another two papers are being written. 6. For sub-project 1-2-b, one presentation at 53rd annual meeting of the Japan wood research society was published. Another paper in Chinese has been sent to journal. The journal accepted it and asked me revision. 7. One paper was published in the Proceeding of the 8th World Conference on Timber Engineering WCTE 2004; another paper is submitting to 14th International Symposium on Nondestructive testing of Wood, 2005.

(b) To what extent is the Output expected to be achieved by the end of the Project?	**Fully(4)** Mostly(4) Partly(0) Not at all(0) **na(1)**	Comments for "Fully" 1. There is more than half a year left by the end of the Project so that more papers are expected to be published. 2. New project related to wood physical properties will be submitted to the government for funding 3. By the end of this year, the entire project original plan will be completed. Comments for "Mostly" 1. The project purpose (research for wood chemical components, hemicellulose, crystallinity, lignin, essential oil and the phenol substance) expected will be achieved in the months. 2. Only one experiment has not been done because of lack of samples.
(c) Are the planned Activities of the latest PDM appropriate in achieving the Output?	**Yes(9)** No(0)	Comments for "Yes" 1. Taking into account human resources, financial resources and time resources, the planned activities are enough in achieving the Output. 2. Dr. Zhao Youke's training in Japan was added to achieve more results 3. The work is smooth due to the help from experts, Training of C/P in Japan. 4. Chinese and Japanese experts worked hard, and CRIWI has given great support to the achievement.
(d) Is the degree of the achievement appropriate in view of the Inputs provided?	**Yes(9)** No(0)	Comments for "Yes" 1. All of sub-activities under the Output have published papers. 2. More than ten papers have been reported because of the hard work from experts, and the strong support from CRIWI and related government 3. The inputs are suitable for the project.

(2) <Questions for Project Manager and C/P responsible for Output 2 (8 in total)>

Output 2	Basic knowledge in **chemical processing** of man-made forest timber is accumulated at the Chinese Academy of Forestry	**Indicators**	For all sub-activities, at least one scientific report (including original papers and presentations at conferences, etc.) will be published.

(a)To what extent has the Output you are responsible for been achieved so far?	**Fully(4)** **Mostly(4)** Partly(0) Not at all(0)	Comments for "Fully" 1. We had published one article in China Wood Industry, and gave a presentation of the other one at national wood drying conference. 2. Three scientific reports for each responsible subproject are published or will be published. 3. Three scientific reports for each responsible subproject are published or will be published. Totally there are 6 papers are published or are going to be published. 4. Three scientific reports for each responsible subproject are published or will be published Comments for "Mostly" 1. There are 9 sub-activities under Output 1 and at least 11 papers and one manual are planned to be published. In fact, 31 papers have been published. 2. Four papers were published in the Japan annual meeting and local conference, and one paper published in the Chinese journal. 3. A lot of new methods and technologies have been learn such as the research of mill wood lignin, essential oil and carbohydrate composition from the project.
(b)To what extent is the Output expected to be achieved by the end of the Project?	**Fully(6)** **Mostly(2)** Partly(0) Not at all(0)	Comments for "Fully" 1. There is more than half a year left by the end of the Project so that more papers are expected to be published. 2. By the end of last year, the entire project original plan will be complete 3. All the activities had been finished, and the achievements had been published Comments for "Mostly" 1. The project purpose (research for wood/polypropylene composites) expected will be achieved for new materials .
(c)Are the planned Activities of the latest PDM appropriate in achieving the Output?	**Yes(8)** No(0)	Comments for "Yes" 1. Taking into account human resources, financial resources and time resources, the planned activities are enough in achieving the Output. 2. After the sub-project was finished, the scientific report and papers had been written in time. 3. All the activities had finished 4. The work is smooth due to the help from experts. Training of C/P in Japan.
(d) Is the degree of the achievement appropriate in view of the Inputs provided?	**Yes(8)** No(0)	Comments for "Yes" 1. All of sub-activities under the Output have published papers. 2. The technology of wood liquefaction and its utilization has been discussed and studied. 3. All the activities had finished 4. The inputs are suitable for the project

(3) <Questions for Project Manager and C/P responsible for Output 3 (8 in total)>

Output 3	Basic knowledge in physical processing of man-made forest timber is accumulated at the Chinese Academy of Forestry	**Indicators**	For all sub-activities, at least one scientific report (including original papers and presentations at conferences, etc.) will be published.

(a)To what extent has the Output you are responsible for been achieved so far?	**Fully(5)** **Mostly(3)** Partly(0) Not at all(0)	Comments for "Fully" 1. One article had published in China Wood Industry, and the other one was a presentation at national wood drying conference. 2. Through this project, the technology research of RF/V drying for plantation wood reach to a high level in our institute. 3. According to the research plan, all the experiments planned by the project have already been finished. 4. A article had published in the Abstracts of 54th Annual Meeting of the Japan Wood Research Society 5. Four research papers have been published. One research paper will be published. Comments for "Mostly" 1. There are 12 sub-activities under Output 1 and at least 16 papers and one manual are planned to be published. In fact, 16 papers have been published. 2. One paper published in the Chinese journal and another two papers is submitting to Chinese journal. 3. Busy with the final experiment and data analyzing because our subprojects will be finished at the end of next March.
(b)To what extent is the Output expected to be achieved by the end of the Project?	**Fully(7)** **Mostly(1)** Partly(0) Not at all(0)	Comments for "Fully" 1. There is more than half a year left by the end of the Project and more of the sub-activities commenced in the second year or later. More papers are expected to be published. 2. Both of the activities had finished, and the achievements had published. 3. By the end of the project, we grasped the RF/V drying characters and technologies for Poplar and Chinese fir, and present achievements by two research papers. 4. By the end of last year, the entire project original plan will be completed 5. According to the research plan, all the experiments planned by the project have already been finished. 6. Now almost all of the activity have been finished Comments for "Mostly" 1. Papers are drafted now.
(c)Are the planned Activities of the latest PDM appropriate in achieving the Output? (For example, are there any activities that had to be added?)	**Yes(6)** **No(2)**	Comments for "Yes" 1. Taking into account human resources, financial resources and time resources, the planned activities are enough in achieving the Output. 2. Both of the activities had finished 3. The planned Activities of the latest PDM are appropriate in achieving the Output. Comments for "No" 1. I n the view of a researcher in the field of wood preservation, isolation and standardization of the indigenous fungal or bacterial strains which are for determination of wood preservative effectiveness should be involved in the project as a part of basic study on wood preservation. As a matter of fact, China has not yet established up the complete pool of state-specified standard stains for wood preservative determination. But obviously, studies concerning on this aspect have to be started in the next term cooperation if any. 2. Few activities have not finished completely.

(d) Is the degree of the achievement appropriate in view of the Inputs provided?	**Yes(8)** No(0)	Comments for "Yes" 1. All of sub-activities under the Output have published papers. 2. Both of the activities had finished. 3. The achievement is appropriate in view of the inputs no matter in personnel or in equipment. 4. The degree of the achievement is almost appropriate in view of the Inputs provided.

3.2 Japanese Inputs: Have the following Japanese inputs been appropriate to achieve the Outputs?

*-If the answer is **A (appropriate) or MA(mostly appropriate)**, please state the reasons (if any). If the answer is **HA(hardly appropriate)or NA (not appropriate at all)**, what are the reasons, the negative impacts on the achievement of outputs and the measures taken (or to be taken)?*

<Questions for Project Manager and C/P (22 in total)>

(1) Long-term experts

(a) Timing of the dispatch	**A(18)** **MA(4)** HA(0) NA(0)	Comments for "Appropriate" 1. The dispatch consists with PDM and PO. 2. Experts were dispatched at the beginning of the project 3. Experts were dispatched at the beginning of the project **4.** Timing is very appropriate, and also covered the research period. 5. Timing is appropriate, it has covered the research period 6. Long-term experts reach to work in time 7. Experts' time is arranged better for this project
(b) Duration of the dispatch	**A(19)** **MA(3)** HA(0) NA(0)	Comments for "Appropriate" 1. The dispatch consists with PDM and PO. 2. It's enough 3. Change the Long-term experts one time according to project duration, both consider the research work consistent and multi-communicate. 4. Experts' time at CRIWI covers the project 5 years
(c) Number of the experts	**A(16)** **MA(4)** **HA(2)** NA(0)	Comments for "Appropriate" 1. The dispatch consists with PDM and PO. 2. It's enough 3. Make sure the project goes smoothly Comments for "Mostly Appropriate" 1. More experts should be here, now the experts can't cover some research content. Comments for "Hardly Appropriate" 1. The experts can't cover all of the research fields, we hope to get help from more research fields 2. The experts can't cover all of the research fields.
(d) Quality of the experts	**A(6)** **MA(15)** HA(0) NA(0) Others(1)	Comments for "Appropriate" 1. Most of he experts are senior scientists or professors. 2. They were well-known scientiss 3. They are the excellent experts in their respective research filed. Comments for "Mostly Appropriate" 4. Most of them are well-known scientists 1. Because they can give rationalization proposals during research work.

		2. More experts should be here, now the experts can't cover some research content. Other comments 1. Some experts' oral English is not excellent.
(e) Specialties of the experts	**A(16)** **MA(6)** HA(0) NA(0)	Comments for "Appropriate" 1. Most of he experts are senior scientists or professors. 2. Most of them have been working in the related areas for long time 3. They worked hard and were knowledgable. 4. They are full of experience in their research site Comments for "Mostly Appropriate" 1. More experts should be here, now the experts can't cover some research content.
(f) Degree of contribution to the achievement of Output	**L(19)** **M(3)** S(0)	Comments for "Large" 1. The experts work closely with C/P in whole procedure such as sub-activities planning, monitoring, new equipment installation, testing material collecting, experiment, data analysis and drafting papers. 2. They have worked very hard and are very responsible 3. They have given Chinese scientists good examples and good idea 4. More experts should be here, now the experts can't cover some research content.

(2) Short-term experts

(a) Timing of the dispatch	**A(14)** **MA(8)** HA(0) NA(0)	Comments for "Appropriate" 1. The dispatch consists with PDM and PO. 2. They were dispatched in the right time 3. They were dispatched in the middle of the project. Comments for "Mostly Appropriate" 1. More Short-term experts should be at CRIWI to do experiments with Chinese experts together.
(b) Duration of the dispatch	**A(12)** **MA(10)** HA(0) NA(0)	Comments for "Appropriate" 1. The dispatch consists with PDM and PO. 2. It's appropriate 3. It's enough Comments for "Mostly Appropriate" 1. More Short-term experts should be at CRIWI to do experiments with Chinese experts together.
(c) Number of the experts	**A(15)** **MA(6)** **HA(1)** NA(0)	Comments for "Appropriate" 1. The dispatch consists with PDM and PO. 2. It's appropriate 3. It's enough Comments for "Mostly Appropriate" 1. More Short-term experts should be at CRIWI to do experiments with Chinese experts together. Comments for "Hardly Appropriate" 1. In some fields such as mechanical property
(d) Quality of the experts	**A(17)** **MA(5)**	Comments for "Appropriate" 1. Most of he experts are senior scientists or professors.

	HA(0) NA(0)	2. Very good responsibility 3. They were well-known scientists 4. Very good responsibility 5. Very good responsibility <u>Comments for "Mostly Appropriate"</u> 1. More Short-term experts should be at CRIWI to do experiments with Chinese experts together.
(e) Specialties of the experts	**A(18)** **MA(4)** HA(0) NA(0)	<u>Comments for "Appropriate"</u> 1. Most of the experts are experienced and very knowledgeable in their fields. 2. Sharp specific background and practice ability 3. They are very experienced 4. They worked hard and were knowledgable 5. Sharp specific background and practice ability <u>Comments for "Mostly Appropriate"</u> 1. Sharp specific background and practice ability 2. More Short-term experts should be at CRIWI to do experiments with Chinese experts together.
(f) Degree of contribution to the achievement of Output	**L(16)** **M(6)** S(0)	<u>Comments for "Large"</u> 1. The experts work closely with C/P mainly in research frontier experiment and new equipment use. They transferred up-to-date research methodology into the Project. 2. They have given Chinese scientists good ideas on how to do the research work 3. They have given Chinese scientists good examples and good ideas

(3) C/P training

(a) Timing of the training	**A(13)** **MA(8)** HA(0) NA(0) **na(1)**	<u>Comments for "Appropriate"</u> 1. Right starting from the beginning of the subproject <u>Comments for "Mostly Appropriate"</u> 1. The dispatch consists with PDM and PO. It will be better to train C/P before relevant sub-activity commences. 2. More C/Ps should be trained in Japan, 3-months duration is better than 6-months duration.
(b) Duration of the training	**A(14)** **MA(6)** HA(0) **NA(1)** **na(1)**	<u>Comments for "Appropriate"</u> 1. The dispatch consists with PDM and PO. 2. Six month is good enough <u>Comments for "Mostly Appropriate"</u> 1. More C/Ps should be trained in Japan, 3-months duration is better than 6-months duration. <u>Comments for "Not Appropriate"</u> 1. Some training duration is too short.
(c) Number of C/P dispatched	**A(12)** **MA(9)** HA(0) NA(0) **na (1)**	<u>Comments for "Appropriate"</u> 1. The dispatch consists with PDM and PO. 2. 2 C/P were dispatched <u>Comments for "Mostly Appropriate"</u> 1. More C/Ps should be trained in Japan, 3-months duration is better than

		6-months duration.
(d) Quality of the training	**A(14)** **MA(7)** HA(0) NA(0) **na (1)**	Comments for "Appropriate" 1. The training helps C/P to understand research methodology, Japanese culture and Japanese scientists so that they could work with and learn from the experts smoothly. 2. We have learned the advanced research methods and new research contents in Japan Comments for "Mostly Appropriate" 1. More C/Ps should be trained in Japan, 3-months duration is better than 6-months duration.
(e) Contents and fields	**A(9)** **MA(12)** HA(0) NA(0) **na (1)**	Comments for "Appropriate" 1. The training makes C/P possible to work in relevant labs with relevant Japanese scientists and to visit relevant universities and factories. At least one C/P in almost all of Sub-activities was trained in Japan. 2. Same as the planned in subproject
(f) Degree of contribution to the achievement of Output	**L(19)** **M (2)** S(0) **na (1)**	Comments for "Large" 1. All C/P trained in Japan come back to work for the Project and use what they have learnt in their research procedure. 2. Some papers are published based on the experimental results in Japan 3. More C/Ps should be trained in Japan, 3-months duration is better than 6-months duration.

(4) Machinery and equipment

(a) Quality	**A(8)** **MA(14)** HA(0) NA(0)	Comments for "Appropriate" 1. All of the equipments are used for the Project without big problem. 2. They are very useful 3. They are very useful Comments for "Mostly Appropriate" 1. IML-resistograph equipment still has some problem after repairing in original factory 4. IML-resistograph equipment still has some problem after repairing in original factory 5. The equipment quality is better and capability is also steady. 6. Almost most of machinery and equipment are high quality
(b) Timing of provision	**A(5)** **MA(17)** HA(0) NA(0)	Comments for "Appropriate" 1. Once the machine arrived, they had been put into use as soon as possible 2. Once the machine arrived, they had been put into use as soon as possible. Comments for "Mostly Appropriate" 1. The provision consists with PDM and PO. It will be better to provide equipment before relevant sub-activity commences. 2. Late than the estimated time 3. Some is a little late for the project 4. Some is a little late for the project 5. Some is a little late for the project 6. Late than the estimated time 7. Some of the didn't get in time as schedule.

		8. Some of them are delayed
(c) Items	**A(11)** **MA(11)** HA(0) NA(0)	<u>Comments for "Appropriate"</u> 1. All of the equipments are used by sub-activities to different extents. <u>Comments for "Mostly Appropriate"</u> 1. They are not enough.
(d) Specifications	**A(10)** **MA(12)** HA(0) NA(0)	<u>Comments for " Appropriate"</u> 1. The specifications of the equipment are suitable for sub-activities of the project 2. Very good 3. Very good. <u>Comments for "Mostly Appropriate"</u> 1. Almost most of machinery and equipment covered research contents.
(e) Quantity	**A(8)** **MA(14)** HA(0) NA(0)	<u>Comments for " Appropriate"</u> 1. All of sub-activities could use new equipment in experiment work. <u>Comments for "Mostly Appropriate"</u> 1. Not enough 2. They are not enough
(f) Utilization of the provided machinery and equipment	**A(6)** **MA(16)** HA(0) NA(0)	<u>Comments for "Mostly Appropriate"</u> 1. To train more scientists how to use high performance instrument is still needed. 2. The EZ Machine has not been used very well. 3. Some of machinery and equipment need to be used more in all research contents.
(g) Degree of contribution to the achievement of Output	**L(19)** **M(2)** S(0)	<u>Comments for "Large"</u> 1. Research work needs not only new creative ideas but also new experiment means. Without this equipment, the Project output would never be achieved. 2. They have given great support to the project 3. They have given great support to the project.

3.3 Facilitating and hampering factors

(1) Are there any factors that have facilitated the achievement of Outputs? (If Yes, please list the major ones)	**Yes(13)** **No(5)** **na(4)**	Comments for "Yes" 1. JICA, experts both in Project and Japan, Chinese government department have provided active support in planning, experts and equipment dispatch, C/P training, and funding etc. 2. Both Japanese and Chinese experts set up all procedures and try their work capacity to conduct each project activity. Advanced equipments become the very important tools to explore the study and promote project to go forward. 3. Experienced Japanese experts, high quality instruments, strong support from Chinese and Japanese government 4. There are training project for C/P in Japan 5. The hard work and well experienced Japanese experts is a factor that facilitated the project. 6. Knowledgable experts, high quality instruments, good ideas from Japanese experts 7. Both Japanese and Chinese experts set up all procedures and try their work capacity to conduct each project activity; Advanced equipments become the very important tools to explore the study and promote project to go forward. 8. The experts work very hard in CAF, China 9. There are training project for C/P in Japan 10. National projects such as 948 and 863 projects supported the JICA research work. 11. The experts work hard here 12. Most experts of Japan and China work hard here
(2) Are there any factors that have negative impacts on the achievement of the Outputs? (If Yes, please list the major ones)	**Yes(5)** **No(17)**	Comments for "Yes" 1. Equipment declaring in Chinese Customs takes much time. 2. The sub-project leaders had some changes before the project was finished. 3. Once the equipments had some problem, the repairing is not so good in time. For example, the boiler's problem cost about 2 months for repairing. 4. The Japanese standards for some machinery and equipment are different from Chinese ones 5. The small test chamber had been repaired two times and the experiment was influenced a little.

4. IMPACT of the Project

<Questions for Project Manager and C/P responsible for Output 1 (9 in total)>

4.1 Impact at Overall Goal level

(1) To what extent is the Overall Goal likely to be achieved in 5-10 years after the completion of the Project?	**Fully(4)** **Mostly(17)** Partly(0) Not at all(0) **na (1)**	Comments for "Fully" 1. The research work in the institute has been focused on timber from man-made forests and will be continued in future. 2. The basic research ability of our institute will be benefit from the Project. The research ideas and work ways introduced from the project are more important than the research results. Comments for "Mostly" 1. Some of the research work will be carried out in deeply 2. Firstly, it will improve the research ability on wood properties of man-made forest timber. Secondly, it will stimulate the utilization of man-made forest timber, in China 1. Firstly, it will improve the utilization of man-made forest timber, secondly, it will improve the management of tree growing. 2. Some of the research work will be carried out in deeply. 3. The 2nd and 3rd fields.
(2) Have there been any impacts at overall goal level already?	**Yes(7)** No(0) **na (15)**	Comments for "Yes" 1. Since the Project commenced, the number of research report and post-gratitude thesis on timber from man-made forests increased. 2. Many new technics of research have been used in our works and our ability to carry out the basic research is improved. 3. The related government has been aware of the great importance of wisely utilizing plantation timber in China through the implementation of this joint project 4. Most of the researchers in the same or similar research field know that there is a JICA cooperation project in CRIWI or in China. 5. Most of the researchers in the similar research field know that there is a JICA cooperation project in CRIWI.. 6. Chinese experts will be continues to focus on their research in the future. 7. Many articles have been published basing on the result of the project.
(3) Have there been any changes in Important Assumptions for achievement of the Overall Goal?	Yes(0) **No(19)** **na (3)**	

4.2 Other Impacts: Have you noticed any positive or negative impacts caused by the Project? -*If the answer is "**Yes**", please explain.*

(1)Institutional and policy impact	**Yes(9)** No(0) **na (13)**	Comments for "Yes" 1. During the re-structuring of the institute, Chinese government paid high attention on the Project so that the core part of the institute is decided to remain into a new non-profit research institute. 2. To strengthen the national basic research and utilization field on Chinese plantation 3. Related government has invested much more on the research and industrialization of man-made forest timber. 4. Center government has invested much on the research and industrialization of man-made forest timber. 5. Improving the research ability of researchers and increasing a lot of useful equipment in CRIWI. 6. Positive impacts 7. To strengthen the national basic research and utilization field on Chinese plantation. 8. To strengthen the national basic research and utilization field on Chinese plantation 9. A little bit more.
(2)Economic impact **(**on China, local communities, private enterprise, etc.)	**Yes(8)** No(0) **na (14)**	Comments for "Yes" 1. Wood processing industries started to use timber from mad-made forests in large scale to replace timber from natural forests and feel more confident that they could rely on the new resource to continue production. 2. Some scientific data and technologies resulting from JICA project have been conveyed or applied into local enterprise and communities 3. Improving research ability so that more researchers could provide technical service for private enterprise 4. Improving research ability so that more researchers could provide technical service for private enterprise. 5. Some scientific data and technologies resulting from JICA project have been conveyed or applied into local enterprise and communities. 6. It is well known that man-made timber has become a dominant raw material in China wood industry with the implementation of natural forest conservation program, so this project has surely a positive impact on the aspect of economy, technology, environment and society. 7. Elementary research will make CRIWI and other companies of China are stronger in the future.
(3)Technical impact (on other researchers, other institutes, etc.)	**Yes(18)** No(0) **na(4)**	Comments for "Yes" 1. There are a lot of teachers and students from universities to visit the project every year. They shared a lot experience and research achievement in the fields. 2. Some new idea and evaluation method or technology is affecting the research work with CRIWI and other institute 3. Other related researchers and institutes in China have become more active on the studies of plantation wood. 4. Our Institute and researchers have become No.1 in the research field of man-made forest timber. 5. Use the JICA mechanical machine to test the tension strength for researchers from Beijing Forest University. 6. Use the JICA mechanical machine to test the tension strength for researchers from Beijing Forest University 7. Some new idea and evaluation method or technology are affecting the

		research work in CRIWI and other institute. 8. Because the studies of this program were accomplished successfully, the research results must bring positive impacts on the other researchers and institutes. 9. Most of the researchers in the similar research field know that there is a JICA cooperation project in CRIWI. And they want to cooperate with us. 10. Some of the equipment (such as contact angle meter) were welcomed by other researchers and other institutes. 11. Some of the equipment (such as contact angle meter) were welcomed by other researchers and other institutes 12. Some of the equipment (such as contact angle meter) were welcomed by other researchers and other institutes. 13. Most of the researchers in the similar research field know that there is a JICA cooperation project in CRIWI. 14. Because of this new JICA RFV drying test facility, some other researchers or institutes, e.g. Beijing Forestry University, plans to proceed with related researches in the near future. 15. It is well known that man-made timber has become a dominant raw material in China wood industry with the implementation of natural forest conservation program, so this project has surely a positive impact on the aspect of economy, technology, environment and society. 16. Other scientists from CRIWI, CAF, universities know advanced machinery and equipment here, some graduated students have already done their researched by these machinery and equipment. 17. Though the project, many other researchers communicate with us to talk about some information about man-made wood.
(4)Environmental impact	**Yes(7)** No(0) **na(15)**	Comments for "Yes" 1. Wood products manufacturers and policy makers are well informed about the Project. They understand the importance of utilizing timber from man-made forests regarding environment protection in China. 2. To develop the continuous utilization of forest. 3. Stimulation on the utilization of plantation timber is very positive to the protection of natural grown forest. 4. Make more researchers realize the importance of man-made forest and utilization for reducing to cut natural forest. 5. Make more researchers realize the importance of man-made forest and utilization for reducing to cut natural forest. 6. It is well known that man-made timber has become a dominant raw material in China wood industry with the implementation of natural forest conservation program, so this project has surely a positive impact on the aspect of economy, technology, environment and society. 7. Some working and research environment at CRIWI are changed better and better by the Project.
(5)Social impact	**Yes(8)** No(0) **na (14)**	Comments for "Yes" 1. The public is well informed about the Project and understand the right choice of use products from renewable resources such as mane-made forests to sustainable develop Chinese economy. 2. More people in China have known the project of JICA from Japan 3. More utilization of renewable plantation timber is very positive to the establishment of sustainable society 4. Many researchers in China know the JICA project on man-made forest wood. 5. Many researchers in China know the JICA project on man-made forest wood.

		6. More people in China have known the project of JICA from Japan. 7. It is well known that man-made timber has become a dominant raw material in China wood industry with the implementation of natural forest conservation program, so this project has surely a positive impact on the aspect of economy, technology, environment and society. 8. More people in the Forestry field know this Project collaboration

4. SUSTAINABILITY of the Project

5.1 Institutional Sustainability-*If the answer is* ***Yes,*** *please state the reasons for your judgment. If the answer is* ***No****, what are the reasons and the required actions?*

<Questions for Project Manager (1 in total)>

(1) Policy support

(a) Are current policy supports for the activities of the Institute likely to continue?	Yes No	Almost all of national research program stresses the importance of utilizing timber from man-made forests and policy support is expected to continue.

(2) Assignment of CP Personnel

(a) Would the C/P personnel trained through the Project remain with the Institute??	Yes No	The C/Ps trained through the Project is most important resource and the institute takes necessary actions to remain them with the institute.
(b) Would the C/P personnel trained through the Project be posted in appropriate position to sustain the project effect?	Yes No	The C/Ps trained through the Project is most important resource and they are promoted to certain post to sustain and expend the Project effect.

(3) Institutional and management capacity of the Institute

(a) Does the Institute have enough institutional and management capacity to continue the related activities after the end of the Project?	Yes No	The institutional and management capacity of the institute is strengthened through the Project and the institute is and will be further improving its capacity after the end of the Project by establishing its self-study mechanism.

(4) Coordination with other organizations

(a) Would the coordination with relevant organizations (ministries and agencies, private industries, universities and research institutes, etc.) be ensured after the end of the Project?	Yes No	Since the institute is the leading research organization in wood science and technology, it must continue and strengthen coordination with other relevant organizations, especially in carrying out national research programs.

5.2 Financial sustainability -*If your answer is "****Yes****", explain how the budget would be secured. If your answer is "****No****", explain the reasons and the required actions.*

<Questions for Project Manager (1 in total)>

Would the budget necessary to carry out the relevant research activities be secured (including salaries of staff, operation and maintenance costs, material costs, etc.) after the termination of the Project?	Yes No	Based on national social and economy development policy and national science and technology reforming policy, non-profit research institutes are expected to get more operational funding and scientists are expected to further increase their income. On the other hand, national R/D input is expected to increase.

5.3 Technical sustainability -*If the answer is* ***Yes,*** *please state the reasons for your judgment. If the answer is* ***No****, what are the reasons and the measures that need to be taken.*

<Questions for Project Manager and C/P (22 in total)>

(1) Technical capacity : Has the C/P acquired enough skills and knowledge to sustain the effect of the Project? (For example, will they be able to plan and conduct the relevant research by themselves?)	**Yes(22)** No(0)	Comments for "Yes" 1. Most of the C/P have become senior scientists in the institute and are in charge of at least research fields. They are able to draft research proposals and organize other scientists to carry out research work. 2. The researchers in CRIWI are writing the national project proposals based on the experiences and work results form JICA project. 3. The proposals related to the plantation wood studies will be submitted to continue the current research work. 4. Most of C/P with their specialty have undertaken and will do their best according to the plans. 5. By the training experience from JICA project, we have got the knowledge of analysis way of lignans chemistry and we wish to do much comprehensive research work of lignans in the future. 6. They will be able to plan and conduct the relevant research by themselves. 7. I studied X-ray technique for wood density analysis from Dr. Hirakawa. 8. I studied X-ray technique for wood density analysis from Dr. Hirakawa, studied mechanical tests from Dr. Nakai, Dr. Nagao, Dr. Miyadaki and Dr. Okuyama, studied wood quality analysis from Dr. Matsumura 9. The researchers in CRIWI are writing the national project proposals based on the experiences and work results form JICA project. 10. The skills and knowledge of C/P has been promoted during this program, which will help them to plan and conduct the relevant research. 11. The researchers in CRIWI are writing the national project proposals based on the experiences and work results form JICA project. 12. After the training and research works of this project, researchers can gain many knowledge in this field, and also relevant research workers can get instruction. 13. Most of C/P with their specialty have undertaken and will do their best according to the plans 14. I have got the training of research skill and now can complete a project independently in most case. 15. I have got the training of research skill and now can complete a project independently in most case 16. After the training and research works of this project, many knowledge had been gotten in planning and conducting relevant research works. 17. All the C/Ps are skilled ones in the related research field in Academy, they are able to plan and conduct the relevant researches by themselves. 18. The topics which are involved in this project are significant to Chinese experts. 19. Already drafted a subproposal focus on structural gluelam based on the results of 3.4AB subproject in the Project. Chinese experts

		will be continues to focus on their expending research in the future. 20. It need further project to sustain the effect of the project. 21. I have got the training of research skill and now can complete a project well independently in most case.

(2) Utilization and dissemination of technologies : Is it possible that the Academy will utilize and disseminate the technologies transferred? *If your answer is **Yes**, explain the strategies*	**Yes(19)** No(0) **na(3)**	Comments for "Yes" 1. To disseminate research achievement is one of the tasks of the academy. The academy encourages scientists to publish research achievement not only in China but also in foreign counties. 2. To conduct cooperation projects with other national institutes or provincial/local research organizations. The useful result or technologies and ideas can be disseminated to promote research level. 3. The institute will co-operate with companies or enterprises to industrialize the research achievements and technologies. 4. The Academy will co-operate with companies or enterprises to industrialize the research achievements and technologies 5. By publishing some paper, directing some students and taking some part in some forest meeting. 6. By publishing some paper, directing some students and taking part in some academic meetings 7. To conduct cooperation projects with other national institutes or provincial/local research organizations. The useful result or technologies and ideas can be disseminated to promote research level. 8. If the technology is developed, it can be spread through the technology cooperation. 9. The result or technologies and ideas can be disseminated to promote research level. 10. The utilization and dissemination of technologies can improve the productivity in timber processing factories , and increase the people's income in forest area. 11. It will need some time to get that result and before that, there will be further research. 12. It will need some time to get that result and before that, there will be further research. 13. It will need some time to get that result and before that, there will be further research. 14. The utilization and dissemination of technologies can improve the productivity in factories, and improve the people's living level in forest area. 15. Even though RVF drying method is new, it has great potential to be utilized and disseminated to industries on some special need fields in China, e.g. for some expensive species and some very-difficult-to-dry species, after successful follow-up deep researches. 16. The topics which are involved in this project are significant to Chinese experts. 17. Already drafted a subproposal focus on structural gluelam based on the results of 3.4AB subproject in the Project. Chinese experts will be continues to focus on their expending research in the future. 18. I think these technologies just will be used to for our society.

(3) Utilization of machinery and equipment: Would the provided machinery and equipment be utilized effectively and efficiently after termination of the Project (especially in terms of technical capacity of operation and management, needs, etc.)?	**Yes(21)** No **na (1)**	Comments for "Yes" 1. The institute will arrange fixed budget and capable persons in charge of operation and maintenance to make the provided equipment run effectively and efficiently. 2. The advanced machinery and equipment provided by JICA project should be assembled as an open laboratory to meet research need of both our academy and other research organizations in China. 3. The Academy will published the list of all the machinery and equipment and welcome any researcher in China to effectively utilize them. 4. There are many projects to be done so that there are so many chances to use those machinery and equipment that will be maintained well by specialty persons. 5. As the people in the position of the management of the facilities, I can say many researchers grasp the skills to operate the equipment, and use it as the helpful weapon in research work.. also, many new comers and graduate students are benefit from the facilities. 6. The Academy will published the list of all the machinery and equipment and welcome any researcher in our country to utilize them. 7. Using frequency of Mechanical test machine were the most high, perhaps several ten thousand specimens have been tested in the machine. 8. Using frequency of Mechanical test machine were the most high, perhaps several ten thousand specimens has been tested in the machine. 9. The advanced machinery and equipment provided by JICA project should be assembled as a open laboratory to meet research need of both our academy and other research organizations in China. 10. The operation and management of machinery and equipment has been mastered during this program. 11. The advanced machinery and equipment provided by JICA project should be assembled as an open laboratory to meet research need of both our academy and other research organizations in China 12. It can be used in the further and other research project. 13. There are many projects to be done so that there are so many chance to use those machinery and equipment that will be maintained well by specialty persons. 14. The DMA, DSC and flow tester and so on are will be used in future. 15. The DMA, DSC and flow tester and so on are will be used in future. 16. The DMA, DSC and flow tester and so on are will be used in future. 17. It can be used in the further research project. 18. Because of the potential of this method that mentioned above, this equipment will surely be utilized in follow-up deep researches. 19. Already drafted a subproposal focus on structural gluelam based on the results of 3.4AB subproject in the Project. Chinese experts will be continues to focus on their expending research in the future. 20. The machinery and equipment will be used in the future. 21. The small test chamber and other instruments can be used for other research in the future.

6. Others

<Questions for Project Manager and C/P (22 in total)>

6.1 Recommendation

Do you have any recommendations for the improvement of the Project in the remaining period? If **Yes**, please list the major ones.	**Yes(10)** **No(12)**	1. To encourage C/Ps systematically to analyze all of the collected data and draft high quality papers to be published as many as possible. And to make up plan of management and maintenance of the provided equipment. 2. To reinforce data analysis and result arrangement; to improve the study level of original paper. 3. A brochure on wood properties of two species studied will be prepared and published. 4. In order to better utilize the man-made forest, future research should add more full size timber study. 5. Application for equipments and C/P training might be joined by more researchers 6. Application for equipments and C/P training might be joined by more researchers. 7. To reinforce data analysis and result arrangement; to improve the study level of original paper. 8. Test on large-sized Chinese plantation woods, e.g. 100x100mm square lumber with or without pith. 9. More communication between Chinese and Japanese experts is expected. 10. Japanese experts are better to be working in CRIWI research division (Only 1 or 2 Jica offices are OK at CRIWI), Just as C/P in Japan, opinions and working style need to be exchanging more in some fields.

6.2 Lessons learned

Are there any lessons learned which can be applied to similar projects? If **Yes**, please list the major ones.	**Yes(2)** **No(20)**	1. Training C/P and equipment delivery should be carried out as early as possible for similar research projects. 2. Special research grant is needed for each sub-activity, which could come from both of JICA and Chinese government departments. 3. All of the machinery and equipment are better installed in the 1st and 2nd years, other 3 years, spare parts and research work are mainly contents.

6.3 Any other comments

- I personally appreciate the strong support from both of Japanese government and Chinese government, the understanding of Japanese experts and assistance from Chinese Academy of forestry and all of the Project staff. Sincere gratitude goes to Madam JIANG Zehui, President of the Academy, who provides right directions and just-in-time guidelines for this Project. I am also would like to thank Madam ZHANG Jiurong, Project Director, who leads the Project team move forward towards the Project objectives and always encourage the Project team to study hard and to learn from Japanese scientists.
- I joined the JICA project for more than 2 years. Beside I must finish the subproject I communicated with many JICA experts, famous researchers. That might be helpful to all my life. They acted as a special attitude of scientific work beside useful knowledge. I appreciate the attitude. I learn from many JICA experts, especially study wood quality from Dr. Hirakawa, Dr. Matsumura, study mechanical tests from Dr. Nakai, Dr. Miyadaki and Dr. Okuyama. JICA

project improved my level of wood science very much.

- This is just the beginning of RFV drying research in Chinese Academy of Forestry, a lot of deep researches need to be done from now on, hopefully to have further support from JICA in the in the near future.
- 1st and 2nd years, machinery and equipment finished be installed and C/P trained. So Jica coordinator, some long-term experts and technician from Japan companies are very important at CRIWI;3 years Later, Jica coordinator, some long-term experts and more short-term experts from Japan are important.


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