

メキシコ合衆国
プラスチック成形技術人材育成プロジェクト
中間レビュー調査報告書

平成 26 年 1 月
(2014 年)

独立行政法人国際協力機構
産業開発・公共政策部

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序 文

JICA はメキシコ合衆国の民間セクター開発において、中小企業育成・裾野産業育成や産業技術及び産業基盤分野で 1990 年代後半以降、継続的に支援してきました。

メキシコ合衆国政府は経済自由化路線を踏襲しつつも、裾野産業を中心とした中小企業振興・競争力強化のための支援を行っており、特に輸出指向型産業である自動車、電子・電気産業における部品の国内調達率向上が重要とされていますが、国内裾野産業の技術レベルが一定の水準に達していない分野もあるために輸入品に頼る状況が構造化されていました。

このような状況下、メキシコ合衆国政府はわが国に自動車部品や電子・電気部品を製造する裾野産業支援として、プラスチック成形加工技術の向上をめざす技術協力を要請しました。これを受けて、JICA は 2010 年 10 月から 4 年間の予定で「プラスチック成形技術人材育成プロジェクト」を開始しました。

本プロジェクト開始後約 2 年にあたり、本プロジェクトの進捗状況や現状を把握、評価し、同国のプロジェクト関係者や派遣専門家に対して適切な助言と指導を行うため、2012 年 10 月に中間レビュー調査団を派遣しました。調査団は、メキシコ合衆国側メンバーを加え構成した合同評価調査チームとして過去 2 年間の投入実績、活動の達成度を確認し、メキシコ合衆国側政府関係者との協議及びプロジェクト・サイトでの現場調査実施を通じてプロジェクトの運営や事業内容等に対して必要な提言を行いました。

当報告書が本プロジェクトの今後の促進に役立つとともに、この技術協力が両国の友好・親善の一層の発展に寄与することを期待します。

終わりに、この調査にご協力とご支援を頂いた関係者の皆様に対し、心からの感謝の意を表します。

平成 26 年 1 月

独立行政法人国際協力機構
産業開発・公共政策部長 植嶋 卓巳

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略 語 表

略 語	正式表記	日本語・意味
AEI	(英) Iztapalapa Entrepreneurs' Association (西) Asociación de Empresarios de Iztapalapa	イスタパラパ起業家協会
AMEXCID	(英) Mexican Agency for International Development Cooperation (西) Agencia Mexicana de Cooperación Internacional para el Desarrollo	メキシコ国外務省国際開発協 力庁
ANIPAC	(英) National Association of Plastic Industry (西) Asociación Nacional de Industrias del Plástico A.C.	メキシコプラスチック製品製 造業協会
CANACINTRA	(英) National Chamber of Transformation Industry (西) Cámara Nacional de la Industria de Transformación	メキシコ全国製造業会議所
CBTIS	(英) Technological Industrial and Service High School Center (西) Centro de Bachillerato Tecnológico Industrial y de Servicios	工業技術高等学校 (工業高校)
CETIS	(英) Technological Industrial and Service Studies Center (西) Centro de Estudios Tecnológicos Industrial y de Servicios	工業技術高等学校 (工業高校)
CNAD	(英) National Center for Actualization of Industrial Technical Education (西) Centro Nacional de Actualización Docente	メキシコ職業技術活性化セン ター
C/P	Counterpart	カウンターパート
CVT (Tamaulipas)	(英) Tamaulipas Council of Public Private Partnership (西) Consejo de Vinculación de Tamaulipas	タマウリパス連携議会
CVT (Tijuana)	(英) Tijuana Educational Linkage Committee (西) Comité de Vinculación Educativa de Tijuana	ティファナ市教育連携委員会
DGETI	(英) Directorate General of Industrial Technological Education (西) Dirección General de Educación Tecnológica Industrial	産業技術教育局 (連邦公共教 育省)
EPA	(英) Economic Partnership Agreement (西) -	経済連携協定
GDP	(英) Gross Domestic Product	国内総生産

IDB	(英) Inter-American Development Bank (西) -	米州開発銀行
JETRO	(英) Japan External Trade Organization (西) -	日本貿易振興機構
M/M	Minutes of Meeting	ミニッツ (協議議事録)
ODA	(英) Official Development Assistance (西) -	政府開発援助
OECD	(英) Organization for Economic Cooperation and Development	経済協力開発機構
OJT	(英) On-the-Job Training	実務研修
PDM	(英) Project Design Matrix (西) -	プロジェクト・デザイン・マ トリックス
PO	(英) Plan of Operation (西) -	活動計画表
PPK	(英) Pilot Project of Kaizen (西) Proyecto Piloto Kaizen	パイロット・プロジェクト・ カイゼン
SEDECO	(英) Secretariat of Economic Development (西) Secretaría de Desarrollo Económico	バハ・カリフォルニア州経済 開発省
SEP	(英) Secretary of Public Education (西) Secretaría de Educación Pública	連邦公共教育省
SRE	(英) Secretary of Foreign Affairs (西) Secretaría de Relaciones Exteriores	外務省

中間レビュー調査結果要約表

1. 案件の概要	
国名：メキシコ合衆国	案件名：プラスチック成形技術人材育成プロジェクト
分野：民間セクター開発	協力形態：技術協力プロジェクト
所轄部署：産業開発・公共政策部	協力金額（2012年3月）：1億8,300万5,000円
協力期間 (実績)	2010年10月～2014年9月（4年間）
	先方関係機関：メキシコ連邦政府公共教育省産業技術教育局 (DGETI)、メキシコ職業技術活性化センター (CNAD) 日本側協力機関：無
<p>1-1 協力の背景と概要</p> <p>メキシコ合衆国（以下、「メキシコ」と記す）は、国民1人当たりGDPが9,935米ドル（2008年）のOECD加盟国でありながら、国内にさまざまな開発問題を抱えており、経済格差是正と貧困削減が大きな課題となっている。</p> <p>特に、メキシコのプラスチック成形関連企業総数は3,500社（登録企業数）で、他分野の産業と同じく中小零細企業が多く、これらの企業レベルの向上が重要課題となっている。同産業界の労働力は、①技術者・エンジニア、②中間技術者・スーパーバイザー（職工長やライン長）③単純労働者・機械のオペレーターの3つに分けた場合、②中間技術者・スーパーバイザーの育成が遅れており、社内実務研修（OJT）や社外研修を行っているものの、その育成は不十分であることから産業界としては一定の技術レベルをもつ中間技術者をコンスタントに確保したいという強い要望があると認識している。</p> <p>この中間技術者を継続して一定量供給できる技術教育機関である工業高校にはプラスチック成形技術コースがなく、また同技術を教える教員も育成されていない。このような状況下、メキシコ政府は、工業高校にプラスチック成形技術コースを新設し、そこで必要となる教員を育成するために国立職業技術活性化センター（Centro Nacional de Actualización Docente：CNAD）のインストラクター研修能力の向上を目的とする「プラスチック成形技術人材育成プロジェクト」（以下、「プロジェクト」と記す）を日本国に要請した。</p> <p>本プロジェクトは、現在、6名の日本人専門家（総括、副総括／プラスチック射出成形技術、プラスチック材料、射出成形用金型メンテナンス、連携制度構築、業務調整）を派遣中である。</p>	
<p>1-2 協力内容</p> <p>(1) 上位目標： <u>工業高校が質の高い労働力をメキシコのプラスチック産業界に供給することに貢献する。</u></p> <p>(2) プロジェクト目標： <u>職業技術教育活性化センター（CNAD）においてプラスチック射出成形技術に関わる教員育成機能が向上する。</u></p> <p>(3) 成果： 1. CNADインストラクターがプラスチック射出成形技術を工業高校教員に指導できるようになる。 2. CNADにて工業高校教員を研修するため、メキシコのプラスチック産業界のニーズ</p>	

に見合ったプラスチック射出成形技術カリキュラムが作成される。

3. CNAD の工業高校教員向けプラスチック射出成形技術コースが効率的に運営される。
4. モデル工業高校のプラスチック成形技術コースのうち射出成形技術に関するカリキュラムがメキシコのプラスチック産業界のニーズに見合うよう作成、改善される。
5. CNAD とモデル工業高校並びにプラスチック産業界との連携促進を目的として合同委員会が設置される

(4) 投入（中間レビュー時点）

【日本側】

- ・専門家派遣：日本人専門家 6人（総括、副総括／プラスチック射出成型技術、プラスチック材料、射出成型用金型メンテナンス、連携制度構築支援、業務調整／普及促進支援）
- ・本邦研修：2012年11月に5名を派遣して実施予定。

【メキシコ側】

- ・カウンターパート（C/P）配置：（CNAD 講師 9人）、3校のモデル工業技術高校（CETIS/CBTIS）の教員
- ・施設（専門家執務室、プラスチック射出成形技術実習室等）提供、専門家執務室光熱費、公用車提供等

2. 中間レビュー調査団の概要

調査団	団 長	荒井 浩	JICA 産業開発・公共政策部 参事役
	評価計画	石亀 敬治	JICA 産業開発・公共政策部 産業・貿易第二課 主任調査役
	評価分析	小泉 香織	株式会社ティーエーネットワーク
調査日程	2012年10月8～28日（21日間）		調査種類：中間レビュー

3. 評価の概要

3-1 実績の確認

(1) 成 果

活動計画表（PO）Ver.1 及びプロジェクト・デザイン・マトリックス（PDM）Ver.2 に基づいた活動実績にかんがみた成果の達成状況は、おおむね計画どおりである。以下に、成果の達成状況を指標ごとに示す。

1) 成果 1

- ・計画どおり 9人の CNAD インストラクターが同コースに配属されている。また、日本のプラスチック射出成形技術技能検定 3級相当（Cクラス）の習熟確認テスト結果より、全 9人のインストラクターに関して一定レベルの知識向上が確認されている。

2) 成果 2

- ・CNAD は計画どおり、工業高校教員研修カリキュラムのモジュール I（材料）、II（押出成形）、III（射出成形）を開発した。
- ・カリキュラム承認委員会が工業高校教員研修カリキュラムのモジュール I、II、III をプラスチック産業界のニーズを踏まえて取りまとめ、承認した。

3) 成果 3

- ・CNAD にプラスチック射出成形技術グループが発足し、活動中である。

- ・日本人専門家の支援を受けながら、プラスチック射出成形技術コースの研修準備、計画に従った研修の運営、進捗モニタリング、次回研修に向けたフィードバックを実施している。
- ・将来的に、CNAD インストラクターが工業高校教員向けプラスチック射出成形技術コースの研修計画を自ら策定できるよう、定期的にレビューを行っている。

4) 成果 4

- ・モデル工業高校のプラスチック成形技術コースが連邦公共教育省産業技術教育局 (DGETI) に認可されたカリキュラムに沿って開設、運営されている。カリキュラムは産業ニーズを満たすよう策定されている。
- ・モデル工業高校においては第 1 期生を対象にモジュール I の授業が 2011 年 2 月から 6 月にかけて実施され、日本人専門家及び CNAD インストラクターによる授業評価から高い結果となっている。
- ・プラスチック成形技術コースのカリキュラム案は、授業実施状況を踏まえながら産業界のニーズを満たすものとするべく、DGETI によってレビューと改訂が行われている。

5) 成果 5

- ・官民連携活動の内容が具体化するなかでパイロット・プロジェクト・カイゼン (PPK) が提起され、年次のロードマップが策定された。
- ・工業高校教員向けプラスチック射出成形技術研修のカリキュラム内容を検討すべくカリキュラム承認委員会が開催されている。

(2) プロジェクト目標の達成状況

今後の活動が計画どおりに実施されることにより十分に達成可能と見込まれる。

- ・指標 1 : 2012 年 9 月より成形実習に重点を置く技術移転を計画どおり実施しており、理論及び技術の習得が加速されるとみられる。
- ・指標 2 : モジュール I、III、V の研修がプロジェクト終了時までには 2 回ずつ計画されており、更なる技術移転の質的向上が見込まれる。加えて、カリキュラム承認委員会を通じて産業ニーズを汲んだカリキュラムが承認され、工業高校教員向け研修が実施されることになっている。
- ・指標 3 : CNAD の最終試験はプロジェクト終了前の 2014 年時点の目標であり、既述のとおり研修が予定されていること、また習熟確認テストが計 4 回予定されていることから、設定目標の達成は可能と判断される。

(3) 上位目標

上位目標の達成見込みは現時点では判断できない。上位目標「工業高校が質の高い労働力をメキシコのプラスチック産業界に供給することに貢献する。」の達成見込みの判断は、指標が具体的ではないことに加え、モデル工業高校のプラスチック成形コース第 1 期生の卒業が 2014 年 6 月であるために、時期尚早である。

3-2 評価結果の要約

(1) 妥当性 : 高い

- ・メキシコ国の「国家開発計画 (Plan Nacional de Desarrollo) 2007 ~ 2012 年」の五本柱のひとつに「競争力の高い経済と雇用創出」が掲げられている。メキシコは 2005 年 4 月の日・メキシコ経済連携協定 (日墨 EPA) 発効後、日系企業の誘致と投資の呼び込みを促

進し、特に自動車等の輸出を伸ばし続けている。

- ・教育政策に関しては、DGETI が卒業生の専門履修課程と関係のある産業界に多くの学生が就職できるよう 2009 年よりカリキュラム改訂を進めている。
- ・本プロジェクトは対メキシコ国別援助方針の中の重点目標「中小企業・裾野産業の競争力強化プログラム」に位置づけられる。
- ・日本は概して高いプラスチック成形技術を有し、特にその原理及び理論の教授という点で優位性をもつ。メキシコでは 1994 年の CNAD 設立支援以来、メカトロニクス分野における人材育成の経験を有しており、また他国における射出成形技術に関する支援の経験も豊富である。

(2) 有効性：おおむね高い

- ・プロジェクト関係者の高いコミットメント、CNAD における 18 年にわたる人材育成経験、多くのプロジェクト関係者が JICA の本邦研修への参加経験を有すること、そして CNAD の活動が民間企業に受け入れられ始めており、CNAD が所有しない機材を用いた実習のために現場を貸してくれる企業が存在することから、プロジェクトの有効性は高いといえる。
- ・他方、大半の CNAD インストラクター及びモデル工業高校教員が兼務あるいは兼業せざるを得ない状況に起因する時間的制限や、CNAD の限られた予算内でモデル工業高校へのモニタリングに係る出張旅費等を確保することの難しさがある点は、改善が求められる。

(3) 効率性：おおむね高い

- ・日本側投入については、おおむね計画どおりに実施されている。連携制度構築支援専門家がプロジェクト開始時には業務調整を兼務していたが、成果 5 に係る官民連携活動の重要性にかんがみ、2 名体制となった結果、同活動が計画を超えて進捗している。また、技術移転へのフォローアップが日本人専門家によって綿密になされており、技術移転効率は高い。また、CNAD への機材調達の導入を予定していた期間（3 年）よりも短時間で実施した。
- ・メキシコ側投入については、CNAD インストラクターの定員（9 名）が投入された。他方、DGETI によるモデル工業高校用機材調達は米州開発銀行（IDB）の融資を用いて 2013 年 2 月に予定されている。なお、金型及び周辺機器といった一部の機材調達も翌年度に繰り越されることとなっている。

(4) インパクト：現時点では判断不可

- ・上位目標の達成見込みは現時点では判断できないものの、プロジェクトの実施による正のインパクトは複数確認された。
- ・メキシコは、プラスチック産業界が本プロジェクトの影響を受けて人材育成の必要性を認識しつつあることが産業界の代表へのインタビューを通じて確認された。また、モデル工業高校の関係者は本プロジェクトを通じたプラスチック成形コースの効果的な運営が学校自体の発展に寄与していると述べている。

(5) 持続性（見込み）：高い

- ・組織運営面においては、CNAD にはプラスチック射出成形技術コースのインストラクター

とロジ担当者が配置されており、18年にわたって維持する人材育成機能を本プロジェクトを通じて強化していることからその組織運営力は十分と見込まれる。

- ・技術面に関しては、CNAD インストラクターがプロジェクト期間に計画どおり必要な技術を習得することにより、全国の工業高校にプラスチック成形コースを拡張するなかにおいても担当教員に対する技術移転を継続できるものと判断される。
- ・財政面について、CNAD 設立以来、同機関全体の年間予算は一定額となっている。各関係者の意見を総合的に判断すると、CNAD/DGETI の予算は一定レベルでは確保されると考えられる。

3-3 結 論

- ・本プロジェクトでは、関係者の尽力の下で活動に取り組んできた結果として、各活動は順調に進捗していることが確認された。
- ・5項目評価については、メキシコ及び日本の政策と合致し、メキシコ産業界及びターゲットグループのニーズと合致し、プロジェクトのアプローチも適切であることから妥当性は高いことが確認された。
- ・有効性及び効率性については、各活動の成果の達成状況及び投入のタイミング、量、質からおおむね高いことを示している。ただし、プロジェクト目標を確実に達成するためにはメキシコ産業界のニーズの把握、本プロジェクトの円滑な推進のための PR 等のための官民連携活動の更なる促進、活動上の時間的制限にかんがみた実施体制上の工夫、効率的なモニタリングの実施、機材調達及び CNAD/DGETI の活動予算の確保上のフォローアップが重要となる。
- ・インパクトについて、上位目標の達成はプロジェクト目標の達成が前提となることに加え、モデル工業高校のプラスチック成形コース第1期生の卒業が2014年6月であるため、現段階における判断は時期尚早である。さらに、上位目標の達成の判断に際しては指標の具体化が求められる。
- ・持続性については、政策・制度面、組織運営面、技術面の持続性は確保される見込みが高い。財政面については、プロジェクトの上位目標を達成するまでメキシコ政府が実施に必要な予算を確保することが必要である。
- ・以上の状況から、プロジェクト目標の達成に向けて、さらには上位目標の達成を見据えて、プロジェクト後半の活動を促進させるため、PDM を関係者間で再検討した。

3-4 提 言

残る2年間のプロジェクト期間において着実にプロジェクト目標を達成するために、以下を提言する。

(1) モデル工業高校向け実習用機材の確実な調達

DGETI は米州開発銀行 (IDB) の融資を通じた詳細な機材調達計画を策定し、確実に実行する。各モデル工業高校においては機材の設置計画を策定し、調達後には性能確認を速やかに実施し、プラスチック成形コースでの授業に活用できるようにする。

(2) 人材育成現場のモニタリング強化

CNAD で実施されるモデル工業高校教員向けプラスチック射出成形技術研修に対して、日本人専門家はモニタリングを強化する。また、モデル工業高校でプラスチック成形コース担当教員が実施する授業に対して、CNAD インストラクター及び日本人専門家がモニタ

リングを確実に実施していく。

(3) 官民連携制度の強化

CNAD における官民連携活動の実施体制を強化する。また、CNAD 及びモデル工業高校の所在地において関連機関と連携してセミナーを開催するなど、本プロジェクトの PR をより一層強化する。

(4) プラスチック成形コースの増設に向けた計画策定の推進

DGETI は、①産業・地域ニーズに関する基礎調査、②産業ニーズを有する地域に所在する工業高校の調査、③プラスチック成形コース設置候補となる工業高校の選定を実施する。これは、DGETI が毎年実施している計画策定方法（フィージビリティ・スタディ）への改善・追加提案である。

(5) PDM の改訂

本中間レビュー調査の結果を踏まえて、PDM 及び PO を改訂する（巻末付属資料 2「M/M」の Annex 2「PDM Ver.3」及び Annex 4「POVer.2」参照）。

第1章 中間レビュー調査の概要

1-1 調査の背景

メキシコ合衆国（以下、「メキシコ」と記す）は、国民1人当たりGDPが9,935米ドル（2008年）のOECD加盟国でありながら、国内にさまざまな開発問題を抱えており、経済格差是正と貧困削減が大きな課題となっている。

特に、メキシコのプラスチック成形関連企業総数は3,500社（登録企業数）で、他分野の産業と同じく中小零細企業が多く、これらの企業レベルの向上が重要課題となっている。同産業界の労働力は、①技術者・エンジニア、②中間技術者・スーパーバイザー（職工長やライン長）、③単純労働者・機械のオペレーターの3つに分けた場合、②中間技術者・スーパーバイザーの育成が遅れており、社内実務研修（OJT）や社外研修を行っているものの、その育成は不十分であることから産業界としては一定の技術レベルをもつ中間技術者をコンスタントに確保したいという強い要望があると認識している。

この中間技術者を継続して一定量供給できる技術教育機関である工業高校にはプラスチック成形技術コースがなく、また同技術を教える教員も育成されていない。このような状況下、メキシコ政府は、工業高校にプラスチック成形技術コースを新設し、そこで必要となる教員を育成するために国立職業技術活性化センター（Centro Nacional de Actualización Docente：CNAD）のインストラクター研修能力の向上を目的とする「プラスチック成形技術人材育成プロジェクト」（以下、「プロジェクト」と記す）を日本国に要請した。

本プロジェクトは、2010年10月より2014年9月までの4年間の予定で実施されており、現在、6名の日本人専門家（総括、副総括／プラスチック射出成形技術、プラスチック材料、射出成形用金型メンテナンス、連携制度構築、業務調整）を派遣中である。プロジェクト開始後2年を経過し、本プロジェクトのより高い成果を導くため、今般中間レビュー調査を実施することとなった。

1-2 調査の目的及び調査項目

プロジェクトの中間時点での成果・目標達成状況等の実績を確認し、評価5項目に沿って評価を行うとともに、今後のプロジェクト実施・運営に向けた提言を行うことを目的とした。具体的調査項目は以下のとおりである。

- ① プロジェクト・デザイン・マトリックス（PDM）に沿ってプロジェクト活動の進捗、成果達成状況、実施プロセスを確認する。必要に応じ、指標の追加・数値目標設定等、PDMの修正を行う。
- ② 評価5項目（妥当性、有効性、効率性、インパクト、持続性）の観点からプロジェクトの成果、実施上の課題を確認し、対処法に関し、プロジェクトチーム及びメキシコ側関係機関と協議する。
- ③ 評価結果に基づき、今後関係機関が対処すべき事項について提言として取りまとめる。
- ④ 調査結果を合同評価報告書として取りまとめたうえで、提言のメキシコ側アクションを要するものについてミニッツ（M/M）として取りまとめメキシコ側の合意を得る。

また、主たる評価項目は以下のとおりである。

- ① プロジェクトは計画どおり実施され、目標は達成されるか。
- ② プロジェクトの実施プロセスの課題は何か。
- ③ 日本の協力終了後、自力でCNADインストラクターの能力、CNADの組織的能力等を向上させ、上位目標に到達できるか。

1-3 調査方法

評価のための調査は、文献調査、質問票調査、関係者へのインタビュー調査、現地踏査によって実施した。質問票調査、インタビュー調査及び協議は、以下の関係諸機関を主な対象とした。現地調査は、メキシコシティ、シウダ・ビクトリア（タマウリパス州）、ティファナ（バハ・カリフォルニア州）の3カ所にて行った。

- ・メキシコ側：CNAD、公共教育省産業技術教育局（DGETI）、メキシコプラスチック製品製造業協会（ANIPAC）、工業技術高等学校（工業高校：CETIS/CBTIS）、メキシコ全国製造業会議所（CANACINTRA）、タマウリパス州政府、バハ・カリフォルニア州政府等
- ・日本側：専門家、JICA事務所等

1-4 調査団の構成と現地調査期間

担当分野	氏名	所属	現地滞在期間（2012年）
団長	荒井 浩	JICA 産業開発・公共政策部 参事役	10月15～28日
評価計画	石亀 敬治	JICA 産業開発・公共政策部 産業・貿易第二課 主任調査役	10月15～28日
評価分析	小泉 香織	株式会社ティーエーネットワークワーキング	10月8～28日

1-5 主要面談者

イスタパラパ起業家協会（AEI） Mr. Enrique Orozco Aguayo Mr. José Luis Hernández Rosas	Iztapalapa Entrepreneurs' Association President
外務省 国際開発協力庁 （AMEXCID, SRE） Mr. Efraín del Ángel Ramírez Ms. Tania Evelyn Sánchez Hernández	Mexican Agency for International Development Cooperation, Secretary of Foreign Affairs Deputy Director for Bilateral Programs in Asia and the Pacific Technical Cooperation Programs Official for Bilateral Programs in Asia and the Pacific
メキシコプラスチック製品製造業協会（ANIPAC） Mr. Luis Gerardo Álvarez Espinosa	National Association of Plastic Industry Director General

メキシコ全国製造業会議所 (CANACINTRA)	National Chamber of Transformation Industry
Mr. Rafael Blanco Vargas	President, Mexican Institute of the Industries Plastics
Mr. Mauricio E. Abrica Rojas	Mexican Institute of the Industries Plastics
CBTIS 271 (工業高校／シウダ・ビクトリア)	Technological Industrial and Service High School Center No.231
Mr. Alfredo Jaime Rodríguez Rodríguez	Director
CETIS 6 (工業高校／メキシコシティ)	Technological Industrial and Service Studies Center No.6
Mr. Julio César Aguilar Sánchez	Director
CBTIS 237 (工業高校／ティファナ)	Technological Industrial and Service High School Center No.237
Dr. Jaime Armando Chavira Cruz	Director
国立職業技術活性化センター (CNAD)	National Center for Actualization of Industrial Technical Education
Mr. Jimmy de la Hoz Cortés	Director
Dr. Jorge Alejandro Butrón Guillén	Technical Sub-director
Mr. Iván Saéñz Narváez	Administrative Sub-director
Mr. Salvador Téllez Salero	Group Leader
Mr. Martín Fitz Montes	Material Resources Chief
Mr. Juan Carlos Rivera	Mechanical Engineering Teacher
Mr. Gabriel Alegría Espinosa	Evaluation and Quality Manager
Mr. César López Chávez	Mechanical Engineering Teacher
Mr. Felipe de Jesús Riveros Castero	Control Engineering Teacher
Mr. Freddy Gómez Sánchez	Human Resources Manager
Mr. Enrique Alberto León Turrubiates	Control Engineering Teacher
Mr. Francisco Javier González Nava	
ティファナ市教育連携委員会 (CVT)	Tijuana Educational Linkage Committee
Mr. Rafael Trujillo	Director
連邦公共教育省 産業技術教育局 (DGETI, SEP)	Directorate General of Industrial Technological Education, Secretary of Public Education
Mr. José Ángel Camacho Prudente	Technical Director
Mr. Freddy Alberto Rivera Torres	Technical Director, Infrastructure & Equipment Department
Mr. Javier López Pérez	Director, Linkage Department

在メキシコ日本国大使館

谷口 慎二

二等書記官

日本貿易振興機構 (JETRO)

高橋 英行

御器谷 俊之

中野 ビクトル

Japan External Trade Organization Mexico Office

所長

Director for Commercial Promotion

Assistant Director for Industrial Promotion

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稲田 明弘

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総括

副総括／プラスチック射出成形技術

プラスチック材料

射出成型用金型メンテナンス

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Director General

タマウリパス州教育局

Mr. Patricio Garza

Secretary of Education, Tamaulipas State

Director for Public-Private Partnership Building

バハ・カリフォルニア州経済開発省
(SEDECO)

Mr. Paulo Alfonso Carrillo Regino

Ms. Thalina Iraís García Medellín

Secretariat of Economic Development

Sub-secretary of Economic Promotion

Economic Development Promoter

第2章 中間レビュー調査の実施方法

2-1 評価グリッドの作成

本中間レビュー調査では、PDM Ver.2に基づき、達成度、実施プロセス、評価5項目（妥当性、有効性、効率性、インパクト、持続性）を検討するために、評価グリッドを作成し、各項目に関して評価を行った（評価グリッドは、巻末付属資料2「M/M」に添付の合同評価報告書 Annex 6 参照）。

<評価5項目の視点>

評価5項目	評価の視点
妥当性	開発援助と、ターゲットグループ・相手国・ドナーの優先度並びに政策・方針との整合性の度合い。
有効性	開発援助の目標の達成度合いを測る尺度。
効率性	インプットに対するアウトプット（定性並びに定量的）を計測する。開発援助が期待される結果を達成するために最もコストのかからない資源を使っていることを示す経済用語。最も効果的なプロセスが採用されたかを確認するため、通常、他のアプローチとの比較を必要とする。
インパクト	開発援助によって直接または間接的に、意図的または意図せずに生じる、正・負の変化。開発援助が、地域社会・経済・環境並びにその他の開発の指標にもたらす主要な影響や効果を含む。
持続性	ドナーによる支援が終了しても、開発援助による便益が継続するかを測る。開発援助は、環境面でも財政面でも持続可能でなければならない。

出所：「新 JICA 事業評価ガイドライン 第1版」（2010年6月）

2-2 合同評価

本中間レビュー調査は、日本側とメキシコ側両方のメンバーより成る合同評価チームにより、上記評価グリッドに基づき、プロジェクトの実施状況についてレビューと評価がなされた。合同評価チームは調査結果を分析し、評価基準に従い包括的評価を実施した。

2-3 評価の最終取りまとめ

合同評価チームによる評価結果はドラフト評価レポートに取りまとめられ、日本とメキシコの代表者によってレビューが行われたのち、最終化・合意されメキシコ側を代表して国立職業技術活性化センター（CNAD）所長、日本側を代表して中間レビュー調査団長により署名が交わされた。

第3章 調査結果

3-1 プロジェクトの投入実績

日本側の投入としては、当初5名の専門家配置を計画していたが、官民連携活動の充実を図り、業務調整と兼任であった連携制度構築担当を2011年4月より専任とした。結果、計6名を配置した（巻末付属資料2「M/M」に添付の合同評価報告書 Annex 7 参照）。資機材供与については、当初3年間での投入予定を一部機材の投入を前倒しにし、2年間で完了した（同 Annex 9 参照）。これによりCNADインストラクターへの実習研修を早めることができ、効果的であった。現地活動経費は、2012年3月末までに1,263万5,000円を執行済みである（同 Annex 12 参照）。

メキシコ側の投入としては、中間レビュー調査時には計画どおり9人のCNADインストラクター及びモデル3工業高校にプラスチック成形コース担当教員を配置していた。上述のとおり、官民連携活動の強化に伴い、2012年10月よりCNADの官民連携担当の本プロジェクトへの従事度合いを高めることとなった。その他のスタッフはおおむね計画どおりに投入した（巻末付属資料2「M/M」に添付の合同評価報告書 Annex 8 参照）。資機材については、米州開発銀行（IDB）の融資を活用したモデル3工業高校への機材据え付けが遅延している。第1次調達機材の据え付け（モジュールI、II、III用：成形機等の主要機材）は2013年2月を予定しており、残る第2次調達機材の据え付け（モジュールIV、V用：金型及び周辺機器）は2013年度に繰り越すこととなっている。また、CNAD内にプロジェクト事務所、その他必要な資機材が計画どおり確保された。

3-2 プロジェクトの実績

活動計画表（PO）Ver.1及びPDM Ver.2に基づいた活動実績にかんがみ成果の達成状況は、おおむね計画どおりである。以下に、成果の達成状況を指標ごとに示す。

（1）CNADにおける成果（成果1、2、3）

<成果1：CNADインストラクターがプラスチック射出成形技術を工業高校教員に指導できるようになる。>

指標 1-1 9人のCNADインストラクターが工業高校教員向けプラスチック射出成形技術コースへ配属される。

中間レビュー調査時には、計画どおり9人のCNADインストラクターが同コースに配属されている。

指標 1-2 9人のCNADインストラクターが日本のプラスチック射出成形技術技能検定2級同等レベルの最終試験に合格する。

日本のプラスチック射出成形技術技能検定3級相当（Cクラス）の習熟確認テスト¹結果より、全9人のインストラクターに関して一定レベルの知識向上が確認されている。

¹「習熟確認テスト」は理論、「技能評価試験」は実技の習熟度を測るものである。習熟確認テストは回を重ねるごとに難易度が高くなるが、第2回習熟確認テスト以降は継続して能力向上の度合いを測るため、難易度が同等のテストも併せて実施していくこととしている。なお、「Cクラス」は本プロジェクトで設定している基準に沿ったで、日本のプラスチック射出成形技術技能検定3級に相当する。

<成果2：CNADにて工業高校教員を研修するため、メキシコのプラスチック産業界のニーズに見合ったプラスチック射出成形技術カリキュラム²が作成される。>

指標 2-1 CNAD が工業高校教員向けプラスチック射出成形技術研修カリキュラムを開発する。

CNAD は計画どおり、工業高校教員研修カリキュラムのモジュール I（材料）、II（押出成形）、III（射出成形）を開発した。

指標 2-2 CNAD とプラスチック産業界の代表から成るカリキュラム承認委員会が工業高校教員向けプラスチック射出成形技術研修カリキュラムを承認する。

カリキュラム承認委員会が工業高校教員研修カリキュラムのモジュール I、II、III をプラスチック産業界のニーズを踏まえて取りまとめ、承認した。同委員会はモジュール I について、第 1 回研修実施後に教員からの要望や授業後の他者からのフィードバックを反映させて第 2 回研修内容を改訂した。

<成果3：CNAD の工業高校教員向けプラスチック射出成形技術コースが効率的に運営される。>

指標 3-1 CNAD が工業高校教員向けプラスチック射出成形技術コースを運営するグループを新規に設置する。

CNAD にプラスチック射出成形技術グループが発足し、中間レビュー時も活動中である。

指標 3-2 CNAD が工業高校教員向けプラスチック射出成形技術コースの研修準備、計画に沿った研修の運営、モニタリング、フィードバックを実施する。

CNAD は日本人専門家の支援を受けながら、プラスチック射出成形技術コースの研修準備、計画に従った研修の運営、進捗モニタリング、次回研修に向けたフィードバックを実施している。研修は高校の長期休暇に合わせて年 2 回行われており、今後は 2 モジュールあるいは 3 モジュールの研修が同時に実施されることになる。CNAD インストラクター、工業高校教員ともに兼任あるいは兼業している者が多い現状にかんがみると、CNAD にて継続して研修が行われ、また高校教員が確実に研修を受講できるような人材配置が示唆される。さらに、工業高校における授業実施状況のモニタリングが定期的実施されるよう手段を講じることが課題とされる。

指標 3-3 工業高校教員向けプラスチック射出成形技術コースの運営に関する定例ミーティングが開催される。

CNAD インストラクターが将来的には工業高校教員向けプラスチック射出成形技術コースの研修計画を自ら策定できるようになることをめざし、日本人専門家及び CNAD インストラクターが共に定期的にレビューを行っている。

²「カリキュラム」は工業高校教員向け研修用、工業高校での指導用ともに教材と指導要綱等を含む。

(2) モデル工業高校における成果（成果4）

＜成果4：モデル工業高校のプラスチック成形技術コースのうち射出成形技術に関するカリキュラムがメキシコのプラスチック産業界のニーズに見合うよう作成、改善される。＞

指標 4-1 モデル工業高校が産業技術教育局（DGETI）に認可されたカリキュラムに基づいてプラスチック成形技術コースを開設する。

モデル工業高校のプラスチック成形技術コースが DGETI に認可されたカリキュラムに沿って開設、運営されている。カリキュラムはプロジェクトで実施している調査結果から明らかにされた産業ニーズを満たすよう策定されている。

指標 4-2 モデル工業高校がプラスチック成形技術コースへ射出成形技術コンポーネントを組み込む。

工業高校のプラスチック成形技術コースのカリキュラムにプラスチック射出成形技術コンポーネントを組み込むことが DGETI によって承認されている。モデル工業高校においては第1期生を対象にモジュール I の授業が 2011 年 2 月から 6 月にかけて実施され、日本人専門家及び CNAD インストラクターによる授業評価から高い結果となっている。

指標 4-3 工業高校のプラスチック成形技術コースのカリキュラムがプラスチック産業界のニーズに沿って定期的に見直される。

工業高校のプラスチック成形技術コースのカリキュラム案は、高校での授業実施状況を踏まえながら産業界のニーズを満たすものとするべく、DGETI によってレビューと改訂が行われている。しかしながら、高校での授業実施状況のモニタリングはまだ定期的には実施されていない。

(3) CNAD とモデル工業高校における成果（成果5）

＜成果5：CNAD とモデル工業高校並びにプラスチック産業界との連携促進を目的として合同委員会が設置される。＞

指標 5-1 CNAD とプラスチック産業界によるミーティングが定期的開催される。

工業高校教員向けプラスチック射出成形技術研修が実施される前のタイミングで、そのカリキュラム内容を検討すべくカリキュラム承認委員会が開催されている。また、官民連携活動の内容が具体化する中でパイロット・プロジェクト・カイゼン（PPK）が提起され、年次のロードマップが策定された。PPK に関するミーティングはこのロードマップに沿って行われている。

指標 5-2 CNAD の年間計画に従ってオープンセミナーが開催される。

プラスチック関連企業を対象としたオープンセミナーあるいはワークショップは現在までに3回開催されている。

3-3 プロジェクトの実施プロセス

中間レビュー時にはプロジェクト開始時の PO Ver.1 を用いており、活動はおおむね計画どお

りに実施されている。成果5に係る官民連携活動は計画を超えて進捗している。一方で、DGETIによるモデル工業高校への機材調達及び据え付けの遅延は授業の実施に影響を及ぼしており、設定されているスケジュールに従って確実に実施される必要がある。

本プロジェクトの活動進捗状況のモニタリングシステムは次の3つのカスケードより成り立っている。日本人専門家からCNADインストラクターへの技術移転のモニタリングは、日本人専門家の派遣ごとに行われるCNADとの進捗確認ミーティングの開催、習熟確認テスト及び技能評価試験の実施によって行われる。次に、CNADインストラクターから工業高校教員への技術移転のモニタリングは、工業高校教員向け研修後に行われる関係者によるモニタリング・評価定例会議の開催、習熟確認テストの実施を通じて行われる。また、工業高校教員から高校生への技術移転のモニタリングは、DGETI・CNADインストラクター・日本人専門家の三者による工業高校が作成する授業実施報告書を確認することで実施されている。今後の課題として、CNADインストラクターが中心となってモデル工業高校における授業のモニタリングを継続的に実施していくことが挙げられる。

また、本プロジェクトのアクター及び関係者間のコミュニケーションは良好であり、このことは活動の円滑な実施に貢献している。

研修を中心とした技術移転はカスケード方式で行われている。官民連携活動における委員会活動やPPK活動を通じ、メキシコの産業ニーズを反映したかたちで工業高校教員向けプラスチック射出成形技術コースのカリキュラムが策定されている。これらを後押しするものとして、特にモデル工業高校における授業のモニタリングが確実に行われるようになることが必要とされる。

本プロジェクトにはカウンターパート（C/P）としてCNAD関係者が配置されており、CNADの上部機関であるDGETIがプロジェクトを管轄している。また、CNADのプラスチック射出成形技術コースのインストラクター及びモデル3工業高校の関係者が直接的なアクターとして参画している。CNADインストラクターは本プロジェクトを通じてワークスキルを向上させており、また自主性が高まりつつある様子が見受けられた。また、モデル工業高校の教員は多様な専門性と教授力をベースにプラスチック射出成形技術を効率的に習得しつつあることが確認された。

本プロジェクトにおいて官民連携活動を促進する機関としては、全国レベルではプラスチック製品製造業協会（ANIPAC）及び全国製造業会議所（CANACINTRA）、メキシコシティではイスタパラパ起業家協会（AEI）、シウダ・ビクトリアではタマウリパス連携議会（CVT）、ティファナではティファナ市教育連携委員会（CVT）が挙げられる。また、日系企業との連携の可能性を模索するうえでの日本貿易振興機構（JETRO）、JICAの「バハ・カリフォルニア州マキラドーラ地域における電気製品産業人材育成プロジェクト（官民連携）」のC/Pであったバハ・カリフォルニア州経済開発省（SEDECO）との今後の更なる連携が期待される。加えて、JICAメキシコ事務所のプロジェクト担当者によるきめ細かいコーディネーションも活動の進捗を促している。

プロジェクトは2010年10月にPDM Ver.1に基づいて開始され、同年12月に上位目標の指標を追加したVer.2への改訂が行われた。中間レビュー調査の実施にあわせて、成果5に係る官民連携活動の整理と明確化、上位目標の指標の見直しを中心に、PDM Ver.3への改訂を行った。それに伴い、PO Ver.1もVer.2へと改訂した。

第4章 評価結果

4-1 評価5項目による評価結果

4-1-1 妥当性

本プロジェクトの妥当性は以下の観点から高いと判断される。

メキシコの「国家開発計画（Plan Nacional de Desarrollo）2007～2012年」の五本柱のひとつに「競争力の高い経済と雇用創出」が掲げられている。また、現カルデロン政権の経済政策上の最優先課題は中小企業振興と裾野産業育成である。メキシコは2005年4月の日・メキシコ経済連携協定（日墨 EPA）発効後、日系企業の誘致と投資の呼び込みを促進し、特に自動車等の輸出を伸ばし続けている。2012年12月に政権交代が予定されているが、関係者へのインタビュー結果によれば、同政策に大きな変更はないだろうとのことである。教育政策に関しては、DGETIが卒業生の専門履修課程と関係のある産業界に多くの学生が就職できるよう2009年よりカリキュラム改訂を進めている。これは産業界のニーズを踏まえながら工業高校における専門技術者養成を強化するものである。

本プロジェクトは、ターゲットグループである CNAD インストラクター及びモデル工業高校教員のニーズと合致していることがインタビュー調査より明らかとなっている。また、メキシコには30プロセスのプラスチック成形技術が存在し、うち53%は射出成形によってプラスチック製造が行われており、当該技術を備えた人材が産業界で求められている。

CNAD インストラクター及びモデル工業高校のプラスチック成形コース担当教員は、ともにプロジェクトが設けた選定条件に合致した者が選出されている。またモデル工業高校については、3校が所在する地域の産業構造は多少異なり、また地域間の距離はあるものの、モデル事業の実施という観点からは適切に選出されていると見受けられた。

本プロジェクト目標達成のためのアプローチとして、カスケード方式による技術移転及び官民連携活動を実施していることは適切であるという声が産業界の代表数名より聞かれた。

日本の対メキシコ国 ODA 政策は、EPA により緊密化している二国間経済関係の更なる強化につながる産業分野への協力を重視している。本プロジェクトは JICA の「中小企業・裾野産業の競争力強化プログラム」に位置づけられる。

日本は概して高いプラスチック成形技術を有し、特にその原理及び理論の教授という点で優位性をもつ。メキシコでは1994年の CNAD 設立支援以来、メカトロニクス分野における人材育成の経験を有しており、また他国における射出成形技術に関する支援の経験も豊富である。

4-1-2 有効性

本プロジェクトの妥当性は以下の観点からおおむね高いと判断される。一部の阻害要因についてはフォローアップが必要と考えられ、また、活動を実施するうえで一層の工夫が求められる。

中間レビュー時点までの活動はほぼ計画どおりに実施されている。プロジェクト目標「CNAD においてプラスチック射出成形技術に関わる教員育成機能が向上する。」の現時点での達成度を指標ごとに以下に示す。

指標 1：9人の CNAD インストラクターが日本のプラスチック射出成形技術技能検定2級レベ

ルに達する。

9人のCNADインストラクターがプラスチック射出成形技術グループに配置されており、これまでに3回実施済みのインストラクターを対象とした習熟確認テストの結果より現時点までの技術移転の目標値達成が確認されている。2012年10月に実施した模擬技能評価試験の結果はほぼ計画どおりに得られている。

指標2：CNADのプラスチック射出成形技術コースがプラスチック産業界のニーズに沿って運営される。

CNADにおけるモデル工業高校教員向けの研修は1クール1カ月間で、モジュールI「プラスチック材料」(受講者9人、2011年8月～9月)、モジュールIII「射出成型技術」(受講者6人、2012年8月)、モジュールI(第2回目、受講者4人、2012年8月)を実施済みである。これらのモジュールのカリキュラムは産業界のニーズを反映した内容となっており、カリキュラム承認委員会にて承認されている。

指標3：18人のモデル工業高校教員が養成され、CNADの最終評価に合格する。

CNADにおけるモデル工業高校教員向けの研修は、上述のとおり実施済みである。モジュールI、モジュールIII、モジュールI(第2回目)の研修受講者数は重複受講者を除くと計14人³である。

プロジェクト目標は今後の活動が計画どおりに実施されることにより十分に達成可能と見込まれる。指標1に関しては、2012年9月より成形実習に重点を置く技術移転を計画どおり実施しており、理論及び技術の習得が加速されるとみられる。指標2については、モジュールI、III、Vの研修がプロジェクト終了時までには2回ずつ計画されており、更なる技術移転の質的向上が見込まれる。加えて、引き続きカリキュラム承認委員会を通じて産業ニーズを汲んだカリキュラムが承認され、工業高校教員向け研修が実施されることになっている。指標3については、CNADの最終試験はプロジェクト終了前の2014年時点の目標であり、既述のとおり研修が予定されていること、また習熟確認テストが計4回予定されていることから、設定目標の達成は可能と判断される。

成果5はそれぞれCNAD、モデル工業高校と産業界とをつなぐ官民連携委員会が設置されることについて言及している。プロジェクト目標達成のためには、設置された同委員会が効率的に機能していくことが求められる。

プロジェクト目標達成への貢献要因としては、プロジェクト関係者の高いコミットメント、CNADにおける18年にわたる人材育成経験、CNADインストラクターの9名中7名及びその他多くのプロジェクト関係者がJICAの本邦研修への参加経験を有することが挙げられる。産業界との関連においては、CNADの活動が民間企業に受け入れられ始めており、CNADが所有しない機材を用いた実習のために現場を貸してくれる企業が存在すること、世界経済が停滞しているなかでもメキシコでは輸出が増大している自動車産業や需要が伸びている医療産業等に

³ 本プロジェクトが直接的に技術移転の対象としていないモジュールIIの研修受講者数は算入していない。また習熟確認テストはCNADでの研修実施の半年後、すなわち教員が工業高校で授業を行う直前に実施されており、中間レビュー時にはモジュールI(第1回目)についてのみ同テストを実施済みである。

関わるプラスチック成形技術の向上がますます求められつつあることが特筆に値する。

他方、プロジェクト目標達成への阻害要因としては、大半の CNAD インストラクター及びモデル工業高校教員が兼務あるいは兼業せざるを得ない状況に起因する時間的制限や、DGETI によって配賦される CNAD の限られた予算内でモデル工業高校へのモニタリングに係る出張旅費等を確保することの難しさがある。また、DGETI によるモデル工業高校用機材調達の遅延により、プラスチック成形コース第 1 期生は機材を用いた実習を経験できないことになるため、教員の工夫により代替案が講じられる予定となっている。

4-1-3 効率性

本プロジェクトの効率性は以下の観点からおおむね高いと判断される。

日本側投入について、連携制度構築支援専門家がプロジェクト開始時には業務調整を兼務していたが、成果 5 に係る官民連携活動の重要性にかんがみ、2011 年 10 月より専任となった結果、同活動が計画を超えて進捗している。また、技術移転へのフォローアップが日本人専門家によって綿密になされており、関係者へのインタビュー結果及び習熟度からも技術移転効率は高いと評価できる。CNAD への機材調達は当初 3 年度に分けて実施する計画であったが、プロジェクト期間中の供与機材の投資効率を最大化するため、JICA 供与機材の導入を最短で実施した。

メキシコ側投入については、CNAD インストラクターは 9 名の定員を満たしていない時期もあったが、中間レビュー時においてはおおむね適切に投入されている。また、成果 5 に係る官民連携活動の内容の具体化に伴い、2012 年 10 月より CNAD の官民連携担当者が本プロジェクトに関与する比率を高めることとなった。DGETI によるモデル工業高校用機材調達は遅延しており、IDB の融資を用いた初回調達には 2013 年 2 月に予定されている。なお、プラスチック成形コース履修学生数に対する同コースへの予算配賦の比率が工業高校の他のコースと比較した時に突出して高くなっているため、金型及び周辺機器といった一部の機材調達は翌年度に繰り越されることとなっている。CNAD による本プロジェクト活動費の予算化については、特にモデル工業高校をモニタリングするための出張費の確保が困難な状況にある。

本プロジェクトにおいて官民連携活動を促進する機関としては、全国レベルでは ANIPAC 及び CANACINTRA、メキシコシティでは AEI、シウダ・ビクトリアでは CVT、ティファナでは CVT が挙げられる。

プロジェクトの効率性を高める要因としては、工業高校の学生を対象とした奨学金制度の存在がある。さらに、DGETI による工業高校のためのインターンシップ奨学金制度が 2013 年度よりプラスチック成形コースの学生にも適用される予定であり、企業での実習機会の増大に寄与する可能性が示唆される。他方、モデル工業高校のプラスチック成形コース担当教員が独自に教材を開発・作成しなければならない状況にかんがみると、プロジェクトの効率性を高めるため、高校間における情報共有がより活発に行われることが期待される。

4-1-4 インパクト

上位目標の達成見込みは現時点では判断できない。また、プロジェクトの実施による正のインパクトは複数確認された。

上位目標「工業高校が質の高い労働力をメキシコのプラスチック産業界に供給することに貢

献する。」の達成見込みの判断は指標が具体的ではないことに加え、モデル工業高校のプラスチック成形コース第1期生の卒業が2014年6月であるために時期尚早である。メキシコ政府がプラスチック産業界のニーズ及び各地域に存在する人材ニーズを把握し、プラスチック成形コースの拡張計画の作成に着手することが必要である。

上位目標の達成に向けてはモデル工業高校教員がカリキュラムに含まれる全5モジュールに相当する技術を獲得することが必須である。本プロジェクトでは直接的な技術移転対象としておらず、CNADが自ら工業高校教員向けに実施している押出成形技術、熱硬化プロセス技術の研修についても日本側は引き続き間接的支援を行うとともに、対象としているプラスチック射出成形技術（プラスチック材料、射出成形技術、金型技術）に関する技術移転により一層注力していくことで、CNADインストラクターが全モジュールをバランスよく指導できるようになることが重要と考えられる。

メキシコでは従来、社内人材育成にさほど力を入れてこなかったといわれることが多いが、プラスチック産業界が本プロジェクトの影響を受けて人材育成の必要性を認識しつつあることが産業界の代表へのインタビューを通じて確認された。また、モデル工業高校の関係者は本プロジェクトを通じたプラスチック成形コースの効果的な運営が学校自体の発展に寄与していると述べている。さらに、モデル工業高校のなかには女子学生の比率が高い学校もあり、本プロジェクトが間接的に女性の社会進出を促進しているといえる。加えて、中間レビュー時にCNADで活動中のJICAシニアボランティアが手掛けている通信教育システム等が機能するようになると、本プロジェクトに潜在するニーズを満たす可能性があるかもしれない。

4-1-5 持続性

本プロジェクトの持続性は、今後適切な措置が講じられれば確保され得ると判断される。

政策・制度面においては、今後もプラスチック産業界に多大なニーズが存在し続けると想定され、DGETIの下で工業高校におけるプラスチック成形技術者育成が継続されるものと見込まれる。組織運営面については、CNADにはプラスチック射出成形技術コースのインストラクターとロジ担当者が配置されており、また、18年にわたって維持する人材育成機能を本プロジェクトを通じて強化していることから、その組織運営力は十分と見込まれる。技術面に関しては、CNADインストラクターがプロジェクト期間に計画どおり必要な技術を習得することにより、全国の工業高校にプラスチック成形コースを拡張するなかにおいても、担当教員に対する技術移転を継続できるものと判断される。財政面について、CNAD設立以来、同機関全体の年間予算は約300万ペソと一定額となっている。各関係者の意見を総合的に判断すると、CNAD/DGETIの予算は一定レベルでは確保されると考えられるが、メキシコ政府が本プロジェクトの上位目標を達成するまで毎年、活動実施に必要な予算を確保することが必要である。一方で、CNADは産業界を対象とした研修を実施することで事業収入を得る構想も有している。

4-2 結論

本プロジェクトでは、関係者の尽力の下で活動に取り組んできた結果として、各活動は順調に進捗していることが確認された。

5項目評価については、メキシコ及び日本の政策と合致し、メキシコ産業界及びターゲットグループのニーズと合致し、プロジェクトのアプローチも適切であることから妥当性は高いことが

確認された。

有効性及び効率性については、各活動の成果の達成状況及び投入のタイミング、量、質からおおむね高いことを示している。ただし、プロジェクト目標を確実に達成するためにはメキシコ産業界のニーズ把握、本プロジェクトの円滑な推進のためのPR等のための官民連携活動の更なる促進、活動上の時間的制限にかんがみた実施体制上の工夫、効率的なモニタリングの実施、機材調達及びCNAD/DGETIの活動予算の確保上のフォローアップが重要となる。

インパクトについて、上位目標の達成はプロジェクト目標の達成が前提となることに加え、モデル工業高校のプラスチック成形コース第1期生の卒業が2014年6月であるため、現段階における判断は時期尚早である。さらに、上位目標の達成の判断に際しては指標の具体化が求められる。

持続性については、政策・制度面、組織運営面、技術面の持続性は確保される見込みが高い。財政面については、プロジェクトの上位目標を達成するまでメキシコ政府が実施に必要な予算を確保することが必要である。

以上の状況から、プロジェクト目標の達成に向けて、さらには上位目標の達成を見据えて、プロジェクト後半の活動を促進させるため、PDMを関係者間で再検討した。

4-3 提言

残る2年間のプロジェクト期間において着実にプロジェクト目標を達成するために、以下を提言する。

(1) モデル工業高校向け実習用機材の確実な調達

DGETIはIDBの融資を通じた詳細な機材調達計画を策定し、確実に実行する。各モデル工業高校においては機材の設置計画を策定し、調達後には性能確認を速やかに実施し、プラスチック成形コースでの授業に活用できるようにする。

(2) 人材育成現場のモニタリング強化

CNADで実施されるモデル工業高校教員向けプラスチック射出成形技術研修に対して、日本人専門家はモニタリングを強化する。また、モデル工業高校でプラスチック成形コース担当教員が実施する授業に対して、CNADインストラクター及び日本人専門家がモニタリングを確実に実施していく。

(3) 官民連携制度の強化

CNADにおける官民連携活動の実施体制を強化する。また、CNAD及びモデル工業高校の所在地において関連機関と連携してセミナーを開催するなど、本プロジェクトのPRをより一層強化する。

(4) プラスチック成形コースの増設に向けた計画策定の推進

DGETIは、①産業・地域ニーズに関する基礎調査、②産業ニーズを有する地域に所在する工業高校の調査、③プラスチック成形コース設置候補となる工業高校の選定を実施する。これは、DGETIが毎年実施している計画策定方法(フィージビリティ・スタディ)への改善・

追加提案である。

(5) PDM の改訂

本中間レビュー調査の結果を踏まえて、PDM 及び PO を改訂する（巻末付属資料 2 「M/M」に添付の合同評価報告書」 Annex 2 「PDM Ver.3」 及び Annex 4 「PO Ver.2」 参照）。

4-4 プロジェクト後半部に向けての留意事項

<高校の義務教育化の影響>

2012 年 2 月に発出された大統領令では、教育改革の一環として 2013 年度より中高等教育を義務教育化し、2022 年度をめどにユニバーサルカバレッジを実現するとしている。議会も複数年度予算の策定を承認済みである。加えて、現カルデロン大統領は、経済的に困窮している学生への奨学金支給、教育機関の質及び量的な拡充、教育の質の向上、メキシコの産業界のニーズと教育現場とのマッチングを掲げている。

上記の動きがメキシコ国内の工業高校におけるプラスチック成形コースの運営及び拡張にどのような影響を及ぼすかは未知数であるが、残りのプロジェクト期間の動向を注意深く見守る必要がある。

第5章 団長総括

本件評価にあたっては、日・メキシコ経済連携協定（日・墨 EPA）の発効後、緊密化している二国間経済関係のなかで、本件「プラスチック成形技術人材育成プロジェクト」が、一層メキシコ国経済社会開発に貢献するとの認識の下、2年前に両国が定めたプロジェクト目標及び上位目標を確実に達成することができるかということに主眼をおいて行った。

また、プラスチック産業は、高度なものになるにつれ、ノウハウ・経験・工夫が必要な装置産業であり、日本の培ってきた経験が、計画どおり効率的・効果的に技術移転されているかという視点でも調査を行った。

結果、本件プロジェクトは、ほぼ計画どおり進捗しており、現時点ではプロジェクト目標は十分達成できる見込みと考えられる。

日本人専門家の専門性・能力は高く、また本件の中心の実施機関である CNAD も、メカトロニクス分野での日・メキシコ共同プロジェクトなどを過去に行った経験を有していることから、極めて円滑にプロジェクトの実施がなされている。

ほぼ唯一の懸案事項は、メキシコ政府教育省によるモデル工業高校の実習機材の調達遅延であり、現在見直しされた計画に基づき、確実に実施されることで、プロジェクトの目標達成には大きな影響がでないと考えられる。提言においても、より確実な機材調達の着実な実行を促しておいた。

また、本件プロジェクトは、カスケード方式を用いた技術移転とともに、官民連携委員会の設立をはじめとする官民連携制度によりメキシコの産業ニーズを汲み上げプロジェクトに反映することを目的としている。官民連携制度での副次的な効果として、企業における学生の機材を用いた実習促進や、インターンシップが挙げられるが、モデル工業高校の実習機材の調達遅延の補完や工業高校生の就職先の確保のため、官民連携制度の一層の推進による本件プロジェクトの PR の強化についても提言に盛り込んだ。

なお、メキシコにおいては、2013 年度より高校の義務教育化が始まる予定とされているが、2012 年 12 月の政権交代を前に政治的な背景がうわさされており、その義務教育制度の詳細については不明であり、本件プロジェクトへの影響についても不透明である。関係者による継続的な注視が必要と考える。

合同評価報告書には、「政権交代による」という表現を用いて、本プロジェクトへの影響については特段明記しなかったが、これは関係機関上層部が強く影響を否定しているためであり、彼らにとっては別の非常にセンシティブな問題により否定しているように感じたため、あえてそのような表現を用いず、直接的に目的及び行為を表現（例えば「プロジェクトに必要な財政支援は目標達成まで確実に調達することが必要」とすることとしたものである。

現状では、本プロジェクトの上位目標は、ほぼ達成される見込みと考えられるが、資材調達の遅延など内部要因とともに、政権交代による社会システムの変更、関係者の人事異動など外部要因による影響も十分考えられるため、プロジェクト目標や上位目標の達成のため今後も注視が必要と思料する。

付 属 資 料

1. 調査日程
2. M/M（中間レビュー報告書）

1. 調査日程

	日付	活動
1	10月8日 月	メキシコシティ着 (UA4590、小泉団員)
2	10月9日 火	JICAメキシコ事務所にて打合せ(上條所長、Ríosプログラムオフィサー) CNADにて打合せ (De la Hoz所長、Butrón技術部長) 専門家チームとの打合せ
3	10月10日 水	インタビュー (CNAD: De la Hoz所長、Butrón技術部長、インストラクター)
4	10月11日 木	インタビュー (CNAD: インストラクター) インタビュー (専門家)
5	10月12日 金	タマウリパス州シウダ・ビクトリア着 (VW332) インタビュー (CBTIS 271: Rodríguez校長、プラスチック成形コース担当教員) インタビュー (タマウリパス州教育局: Garza 官民連携担当) メキシコシティ着 (VW331)
7	10月13日 土	レポート作成
8	10月14日 日	レポート作成 メキシコシティ着 (UA4590、荒井団長、石亀団員)
9	10月15日 月	JICAメキシコ事務所にて打合せ インタビュー (DGETI: Camacho技術部長) インタビュー (JETRO: 高橋所長)
10	10月16日 火	インタビュー (DGETI: Freddyインフラ・機材担当課長) インタビュー (DGETI: López 官民連携担当次長) CNADとの協議 (De la Hoz所長、Butrón技術部長、Saézn総務部長)
11	10月17日 水	インタビュー (CETIS 6: César校長、プラスチック成形コース担当教員、官民連携担当) インタビュー (AEI: Orozco会長) インタビュー (CANACINTRA: Blanco会長, Mexican Institute of the Industries Plastics) インタビュー (ANIPAC: Gerardo会長)
12	10月18日 木	パハ・カリフォルニア州ティファナ着 (AM170) インタビュー (CBTIS 237: Chavira校長、プラスチック成形コース担当教員、官民連携担当)
13	10月19日 金	インタビュー (SEDECO: Alfonso経済促進次官) インタビュー (CVT: Rafael委員長) メキシコシティ着 (AM177)
14	10月20日 土	レポート作成
15	10月21日 日	レポート作成
16	10月22日 月	インタビュー (Nissei México: 宮崎社長) 専門家チームとの協議
17	10月23日 火	合同評価団との協議 レポート修正
18	10月24日 水	CNADとの協議 (De la Hoz所長) JICAメキシコ事務所との協議 (上條所長、関口次長)
19	10月25日 木	合同調整委員会参加 機材供与式参加
20	10月26日 金	ミニッツ署名 (合同評価報告書) 最終報告 (JICAメキシコ事務所: 上條所長、関口次長 日本大使館: 谷口二等書記官)
21	10月27日 土	メキシコシティ発 (UA1085)
22	10月28日 日	日本着 (UA007)

MINUTES OF MEETINGS BETWEEN
THE JAPANESE MID-TERM REVIEW TEAM
AND
AUTHORITIES CONCERNED OF THE GOVERNMENT OF
THE UNITED MEXICAN STATES
ON JAPANESE TECHNICAL COOPERATION FOR
THE PROJECT FOR HUMAN RESOURCE DEVELOPMENT IN THE TECHNOLOGY
OF PLASTIC TRANSFORMATION

The Japanese Mid-term Review Team (hereinafter referred to as “the Team”), organized by the Japan International Cooperation Agency (hereinafter referred to as “JICA”) and headed by Mr. Hiroshi ARAI, visited the United Mexican States from October 8 to October 28, 2012. The purpose of the mid-term review is to assess the achievements made during the two year’s cooperation period and to make recommendations for the PROJECT FOR HUMAN RESOURCE DEVELOPMENT IN THE TECHNOLOGY OF PLASTIC TRANSFORMATION (hereinafter referred to as “the Project”).

During review period, both the Team and concerned authorities of the Government of the United Mexican States (hereinafter referred to as “both sides”) had a series of discussions and exchanged views on the Project. Both sides jointly monitored the activities and evaluated the achievements.

As a result of the discussions, both sides agreed upon the matters referred to in the Joint Evaluation Report documents attached hereto, which is signed on each page at the margins.

Mexico City, October 26, 2012



Mr. Hiroshi Arai
Leader
The Japanese Mid-term Review Team
Japan International Cooperation Agency
Japan



Ing. Jimmy de la Hoz Cortés
Director
National Center for Actualization of
Industrial Technical Education (CNAD)
Ministry of Public Education
The United Mexican States

**JOINT EVALUATION REPORT
(MID-TERM REVIEW)**

**PROJECT FOR HUMAN RESOURCE DEVELOPMENT IN
THE TECHNOLOGY OF PLASTIC TRANSFORMATION**



MEXICO CITY, 26 OCTOBER 2012



ABBREVIATIONS

Abbreviations	English	Spanish
AEI	Iztapalapa Entrepreneurs' Association	Asociación de Empresarios de Iztapalapa
AMEXID	Mexican Agency for International Development Cooperation	Agencia Mexicana de Cooperación Internacional para el Desarrollo
ANIPAC	National Association of Plastic Industry	Asociación Nacional de Industrias del Plástico A.C.
CANACINTRA	National Chamber of Transformation Industry	Cámara Nacional de la Industria de Transformación
CBTIS	Technological Industrial and Service High School Center	Centro de Bachillerato Tecnológico Industrial y de Servicios
CETIS	Technological Industrial and Service Studies Center	Centro de Estudios Tecnológicos Industrial y de Servicios
CNAD	National Center for Actualization of Industrial Technical Education	Centro Nacional de Actualización Docente
CVCC	Course Curriculum Validation Committee	Comité de Validación de Contenido de Cursos
CVT (Tamaulipas)	Tamaulipas Council of Public Private Partnership	Consejo de Vinculación de Tamaulipas
CVT (Tijuana)	Tijuana Educational Linkage Committee	Comité de Vinculación Educativa de Tijuana
C/P	Counterpart	-
DGETI	Directorate General of Industrial Technological Education	Dirección General de Educación Tecnológica Industrial
EPA	Economic Partnership Agreement	-
IDB	Inter-American Development Bank	-
JETRO	Japan External Trade Organization	-
JCC	Joint Coordinating Committee	-
M/M	Minutes of Meeting	-
ODA	Official Development Assistance	-
PDM	Project Design Matrix	-
PPK	Pilot Project of Kaizen	Proyecto Piloto Kaizen
PPP	Public Private Partnership	-
R/D	Record of Discussion	-
SEDECO	Secretariat of Economic Development	Secretaría de Desarrollo Económico
SEP	Secretary of Public Education	Secretaría de Educación Pública
SMEs	Small and Medium-sized Enterprises	-
SRE	Secretary of Foreign Affairs	Secretaría de Relaciones Exteriores

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1. Outline of Evaluation

1-1. Objectives of Evaluation

The Japanese Mid-term Review Team organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Hiroshi Arai, visited the United Mexican States from 8 October to 28 October, 2012, for the purpose of evaluating Japanese technical cooperation project "the Project for Human Resource Development in the Technology of Plastic Transformation" (hereinafter referred to as the "Project") jointly with the evaluation team of the Mexican side. The objectives of the joint evaluation are the following:

- a) To review the conducted activities and outputs of the Project;
- b) To analyze the progress and achievements based on the Project Design Matrix (hereinafter referred to as the "PDM") and five evaluation criteria (relevance, efficiency, effectiveness, impact, and sustainability) and to prepare a Joint Evaluation Report;
- c) To hold a Steering Committee meeting to confirm the results of the evaluation through discussion; and
- d) To provide recommendations for the activities to be conducted during the remaining period of the Project.

1-2. Method of Evaluation

Performance of the Project was studied based on the verifiable indicators stated in the PDM and other relevant information collected through literature review and the discussions with officials of the governmental agencies involved in the Project (counterpart personnel; hereinafter referred to as the "C/P") and the related institutions and Japanese experts.

The teams jointly conducted evaluation based on the five criteria (relevance, effectiveness, efficiency, impact and sustainability) the contents of which are stated below.

1-2-1. Criteria for Evaluation

1) Relevance

Relevance refers to the degree of compatibility between the development assistance and priority of policy of the target group, the recipient, and the donor.

2) Effectiveness

Effectiveness refers to a measure of the extent to which an aid activity attains its objectives.

3) Efficiency

Efficiency measures the outputs -- qualitative and quantitative -- in relation to the inputs. It is an economic term which is used to assess the extent to which aid uses the least costly resources possible in order to achieve the desired results. This generally requires comparing alternative approaches to achieving the same outputs, to see whether the most efficient process has been adopted.

4) Impact

Impact refers to the positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended. This involves the main impacts and effects resulting from the activity on the local social, economic, environmental and other development indicators.

5) Sustainability

Sustainability is concerned with measuring whether the benefits of an activity are likely to continue after donor funding has been withdrawn. Projects need to be environmentally as well as financially sustainable.

1-2-2. Sources of Information

The following sources of information were used in this evaluation:

- 1) Document agreed upon by both sides prior to and/or during the course of the Project implementation including:
 - Record of Discussions (R/D);
 - Minutes of Meeting (M/M);
 - Project Design Matrix (PDM); and
 - Plan of Operation (PO);
- 2) Records of inputs and activities of the Project;
- 3) Data and statistics which indicate the degree of the achievement of the Outputs and the Project Purpose; and
- 4) Interviews to the C/P, Japanese experts, and the related institutions.

1-3. Members of Evaluation Teams

Mexican side:

Mr. Efraín del Ángel Ramírez	Deputy Director for Bilateral Programs in Asia and the Pacific, Mexican Agency for International Development Cooperation (AMEXID), Ministry of Foreign Affairs
Mr. Iván Saéñz Narváez	Administrative Subdirector, Administrative Subdirector, National Center for Actualization of Industrial Technical Education (CNAD)
Ms. Tania Evelyn Sánchez Hernández	Technical Cooperation Programs Official for Bilateral Programs in Asia and the Pacific, Mexican Agency for International Development Cooperation (AMEXID), Ministry of Foreign Affairs

Japanese side:

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2. Outline of the Project

2-1. Background of the Project

In response to the Agreement between Japan and the United Mexican States for the Strengthening of the Economic Partnership (EPA) concluded in April 2005, the Japan's Official Development Assistance (ODA) policy states its further contributions to the socio-economic development in Mexico by supporting its "development of small and medium-sized enterprises (SMEs) and local supporting industries". In Mexico, the number of companies in the field of plastic transformation amounts approximately to 3,500 and most of them are classified as SMEs. The companies have difficulty in recruiting qualified workers because skilled labor, especially supervisors, is in short supply. The Technological Industrial and Service Studies Center (CETIS) and Technological Industrial and Service High School Center (CBTIS) are expected to provide potential supervisors. They, however, did not have a course on plastic transformation technology.

Under these circumstances, the Government of Mexico requested the Government of Japan to implement "the Project for Human Resource Development in the Technology of Plastic Transformation in the United Mexican States". It aims at improving the CNAD's capacity to train CETIS/CBTIS teachers on plastic injection molding technology. Based on the Record of Discussions (R/D) signed on 20 July 2010, JICA started implementing the Project in October 2010 with the expected duration of four years.

2-2. Project Design Matrix (PDM)

The PDM Ver.2 is attached as Annex 1. The PDM has the three major items called Overall Goal, Project Purpose, and Outputs of the Project.

1) Overall Goal: The goal achieved by the contribution of the Project in three to five years after its completion

Overall Goal

CETIS/CBTIS which set up the course of the plastic transformation technology will contribute to turn out the quality labor force to the plastic industry in Mexico.

2) Project Purpose: The purpose achieved by the direct contribution of the Project outputs by the end of the Project period

Project Purpose

The capacity to train the instructors of the plastic injection molding technology in CETIS/CBTIS is improved at CNAD.

3) Outputs: The outputs brought about by the results of the Project activities

Outputs of the Project and the Verifiable Indicators

● at CNAD

Output 1: The CNAD instructors become to train the CETIS/CBTIS teachers about the plastic injection molding technology.

1-1 9 instructors are assigned to the plastic injection molding technology course at CNAD.

1-2 9 instructors pass the final evaluation test equivalent to the Japanese second grade of plastic injection molding technical certificate.

Output 2: The training curriculum¹ which matches with the needs of the plastic industry in Mexico for the plastic injection molding technology to train the CETIS/CBTIS teacher is made up at CNAD.

2-1 CNAD develops the curriculum.

2-2 The committee consisted by CNAD and the representative from the plastic industry approves the curriculum.

Output 3: The training course of plastic injection molding technology for the CETIS/CBTIS teachers is set up and managed efficiently at CNAD.

3-1 CNAD creates the new group to implement the plastic injection molding technology course.

3-2 CNAD prepares the logistic for the implementation of the training course,

¹ "Curriculum" (Contenido de Cursos/Plan de Estudio) means not only educational materials but guidelines and outlines

implement the training course based on the training plan, monitor the progress of the course, and feedback the result of the implementation of the course to improve the following course.

3-3 Periodical management meeting for the training course is held.

● at CETIS/CBTIS

Output 4: The curriculum and practical training of the plastic injection molding technology subject which is set in the plastic transformation technology course at model CETIS/CBTIS selected by Mexican side is made up and improved to match with the needs of the plastic industry in Mexico.

4-1 The model CETIS/CBTIS opens the plastic transformation technology course with the curriculum authorized by DGETI.

4-2 The model CETIS/CBTIS incorporates the plastic injection molding technology component into the course.

4-3 The curriculum is reviewed by DGETI periodically based on the needs of the plastic industry.

● at CNAD and model CETIS/CBTIS

Output 5: The joint committee for the linkage among CNAD, the model CETIS/CBTIS and the plastic industry is set up.

5-1 The periodical meeting of CNAD and the plastic industry is held.

5-2 The open seminar is held according to the annual plan of CNAD.

4) Activities: The activities being implemented by C/P under the support of Japanese experts

Activities of the Project

Activity 0: CNAD selects the candidates of the CNAD instructors for the plastic injection molding technology.

1-1 Japanese experts review the equipment list based on the training needs.

1-2 Japanese experts make up the training plan for the CNAD instructors.

1-3 JICA provides the equipment for the practical training for the project in CNAD.

1-4 Japanese experts lecture in related to the plastic material technology, injection molding technology, mold and die for plastic injection (design and fabrication) to the CNAD instructors.

1-5 Japanese experts have a practical training to the CNAD instructors with the equipment.

1-6 Japanese experts conduct a test for CNAD instructors to check the progress.

Activity 2:

2-1 CNAD, DGETI and Japanese experts jointly review the draft curriculum of the plastic injection molding technology for the model CETIS/CBTIS teachers training based on the needs of plastic industry.

for the plastic transformation technology course.

- 2-2 CNAD and Japanese experts lead to set up the joint curriculum committee including relevant parties then they discuss the curriculum.

Activity 3:

- 3-1 CNAD experimentally implements the plastic injection molding technology training course for the model CETIS/CBTIS teachers with the help of Japanese experts.
- 3-2 CNAD sets up and holds the monitoring committee on the management of the course.

Activity 4:

- 4-1 CNAD instructors advice the curriculum and its equipment at the model CETIS/CBTIS with the help of Japanese experts.
- 4-2 CNAD conducts a test for the model CETIS/CBTIS teachers at the end of the training.
- 4-3 CNAD instructors supervise the teaching activities by the model CETIS/CBTIS teachers at the model CETIS/CBTIS with the help of Japanese experts.

Activity 5:

- 5-1 CNAD holds periodically a joint committee consisting of the representative of plastic industry.
- 5-2 CNAD implements an open seminar regarding to the plastic injection molding technology for the plastic industry in Mexico with the help of Japanese experts.
- 5-3 CNAD and Japanese experts support the model CETIS/CBTIS to hold a joint committee for making up the linkage between it and the plastic industry in Mexico.

3. Achievements of the Project

3-1. Results of the Inputs

Japanese side (Annexes 7 and 9)

Experts: 6 experts have been assigned. The PPP building expert has been full-time since April 2011. Initially, he was also the operational coordinator.

Equipment and materials: All the purchases of equipment for CNAD were completed ahead of schedule. It was timely and efficient to commence the trainings for CNAD instructors making use of equipment earlier than planned.

Local costs: 12,635,000 yen has been executed as of March 31 2012.

Mexican side (Annex 8)

C/P and other personnel: 9 CNAD instructors and the three model CETIS/CBTIS teachers for the plastic transformation technology course have been assigned so far. The person in charge of PPP building at CNAD has come to dedicate more to the Project since October 2012. The other personnel have been assigned as planned in general.

Equipment and materials: The purchase of equipment for the three model CETIS/CBTIS

has been in delay. The installments of principal equipment for the Modules I, II and III such as plastic injection molding machine are scheduled for February 2013. The equipment for the Modules IV and V such as molds and die and peripheral device is planned to be purchased in the following fiscal year.

Facilities: The project office and other necessary equipment and materials have been provided to CNAD.

3-2. Results of the Activities

Most of activities of the Project, as stated in Plan of Operation (PO) Ver.1 and PDM Ver.2 have been conducted without major delays compared with the planned schedule. The results of the activities are summarized in the following table.

No.	Activities (PDM)	Activities conducted
0	CNAD selects the candidates of the CNAD instructors for the plastic injection molding technology.	Completed. <ul style="list-style-type: none"> Nine candidate CNAD instructors were selected from November 2010 to March 2011. In spite of some of the candidates' personnel transfers and study abroad, the number of instructors has eventually reached the expected number of nine. Those nine instructors have been divided into three groups: "plastic material technology", "injection molding technology" and "mold and die for plastic injection". All of them have ever taken the same training given by the Japanese experts so that they are able to teach any subjects flexibly. Six of them have been working from the beginning of the Project.

Output 1: The CNAD instructors become to train the CETIS/CBTIS teachers about the plastic injection molding technology.

No.	Activities (PDM)	Activities conducted
1-1	Japanese experts review the equipment list based on the training needs.	Completed. <ul style="list-style-type: none"> A survey on the needs of the domestic plastic industry was carried out through the visits to the industrial associations and companies. The survey covered the Secretary of Public Education (SEP) and Directorate General of Industrial Technological Education (DGETI)'s education system as well as curriculum of human resource development related to plastic transformation technology and the needs of related equipment. Based on the results of the survey, the recommendation on necessary equipment was given to JICA Mexico Office and CNAD and was agreed on at the Joint Coordinating Committee (JCC) held in December 2010.
1-2	Japanese experts make up the training plan for the CNAD instructors.	Completed. <ul style="list-style-type: none"> The training plan (Plan de Capacitación)" that outlines the details of technical transfer to the CNAD instructors was elaborated by Japanese experts to be well-structured as well as pragmatic meeting the industry's needs. The training plan (Plan de Capacitación) was agreed on at the JCC held in December 2010.

No.	Activities (PDM)	Activities conducted
1-3	JICA provides the equipment for the practical training for the project in CNAD.	<p>Completed.</p> <ul style="list-style-type: none"> • The first tender for the procurement of the equipment was implemented by JICA Mexico Office in February 2011. The equipment such as plastic injection molding machine was installed in August 2011. • The second procurement was implemented in January 2012. Installments and initial performance checks of all the equipment were completed at CNAD in July 2012. • The procurements of equipment were completed about one year earlier than the original plan (See the Annex 9).
1-4	Japanese experts lecture related to the plastic material technology, injection molding technology, mold and die for plastic injection (design and fabrication) to the CNAD instructors.	<p>In progress.</p> <ul style="list-style-type: none"> • A total of 281-hour technical transfer to the CNAD instructors, comprised of 81 theoretical and 37 practical trainings, was conducted as planned. (See the Annex 10). The attendance rate was about 70 to 80% due to their multiple functions at CNAD or their second jobs outside of CNAD. • The lectures on theories were initially given to the CNAD instructors by Japanese experts. Subsequently, the CNAD instructors delivered lectures to review the same subjects under observation of Japanese experts. Through the lectures to review, the instructors' level of understanding was evaluated by Japanese experts. • Follow-up lectures were given when the instructors did not fully understand. • At Japanese experts' absence, the assignments for the instructors such as visits to the companies related to plastic transformation and group works were given to the CNAD instructors.
1-5	Japanese experts have a practical training to the CNAD instructors with the equipment.	<p>In progress.</p> <ul style="list-style-type: none"> • Practical trainings with equipment for the instructors began in September 2011. It was commenced earlier than planned for the purpose of effective and efficient technical transfer making use of the equipment. • The trainings have been made tailored according to the needs of individual instructors so that each instructor can deepen their comprehension. The instructors have come to realize that it is necessary to understand the principle of plastic transformation well.
1-6	Japanese experts conduct a test for CNAD instructors to check the progress.	<p>In progress.</p> <ul style="list-style-type: none"> • The evaluation on the CNAD instructors' capacity as a baseline survey was implemented in January 2011. • The effects on the technical transfer have been measured by the results of proficiency test conducted twice a year. The tests have been conducted after the instructors delivered the lectures to CETIS/CBTIS teachers. The results of the three tests have been reflected in the contents of the trainings. A certain level of improvements in all the instructors has been confirmed; the average score of the third test was 81 points whereas that of the second one was 55². However, there are some variations in the

² The level of the first proficiency test was easier than the second and third ones. While the level of the test will be gradually higher as the Project progresses, the test at the same level as the second one will be conducted continuously in

No.	Activities (PDM)	Activities conducted
		instructors' capacity. • Practical test was introduced in October 2012 for the first time.

Output 2: The training curriculum which matches with the needs of the plastic industry in Mexico for the plastic injection molding technology to train the CETIS/CBTIS teacher is made up at CNAD.

No.	Activities (PDM)	Activities conducted
2-1	CNAD, DGETI and Japanese experts jointly review the draft curriculum of the plastic injection molding technology for the model CETIS/CBTIS teachers training based on the needs of plastic industry.	In progress. • Based on the industry's needs, the advice has been given on the draft curriculum of plastic injection molding technology for the Modules I, II and III (Contenido de Cursos).
2-2	CNAD and Japanese experts lead to set up CVCC including relevant parties then they discuss the curriculum.	In progress. • Course Curriculum Validation Committee (CVCC) was established in March 2011 to discuss and approve the contents of the training curriculum for CETIS/CBTIS teachers (Contenido de Cursos) to continuously meet the industry's needs. The committee consists of the representatives of the industry, CNAD, DGETI and the model CETIS/CBTIS teachers. • A CVCC meeting has been held just before the biannual training for CETIS/CBTIS teachers, which has been conducted half a year before the corresponding module is given at CETIS/CBTIS. • The Modules I "Prepare materials for molding", II "Mold plastic by the process of extrusion" and III "Mold plastic by the process of injection" of the curriculum (Contenido de Cursos) were authorized at the second to the seventh CVCC meetings. • The Agendas of the meetings were the approval process of the curriculum (Contenido de Cursos), measures to be taken by working groups organized by a module basis among others. CVCC agreed to make a rule that the curriculum (Contenido de Cursos) should be reviewed every two to three years ³ .

Output 3: The training course of plastic injection molding technology for the CETIS/CBTIS teachers is set up and managed efficiently at CNAD.

No.	Activities (PDM)	Activities conducted
3-1	CNAD	In progress.

order to measure instructors' progress in understanding the subject.

³ The frequency of the revision for the curriculum (Contenido de Cursos) depends on the module.

No.	Activities (PDM)	Activities conducted
	experimentally implements the plastic injection molding technology training course for the model CETIS/CBTIS teachers with the help of Japanese experts.	<ul style="list-style-type: none"> • The plastic injection molding technology group was organized at CNAD in October 2010, at the beginning of the Project. The group consists of nine CNAD instructors that gives trainings for CETIS/CBTIS teachers. • As the training for the model CETIS/CBTIS teachers, the following modules were conducted: the Module I (August to September 2011), the Module II (November to December 2011), the Module III and the Module I for the second time with the equipment (August 2012). The Modules I and III have been directly supported by the Project.
3-2	CNAD sets up and holds the monitoring committee on the management of the course.	<p>In progress.</p> <ul style="list-style-type: none"> • The monitoring system with the use of the five kinds of monitoring formats has been established. The monitoring and evaluation meetings have been held within a month after each training for CETIS/CBTIS teachers instead of the monitoring committee. A total of four meetings have taken place so far. One of the formats was improved by introducing technical criteria for evaluation and has been utilized since the fourth meeting. Japanese experts started to follow up instructors' teaching activities at CETIS/CBTIS since then as well. The meeting has been held through video conference with the attendance of the three model CETIS/CBTIS teachers. It has facilitated exchanges of feedbacks among those teachers, CNAD instructors and Japanese experts.

Output 4: The curriculum and practical training of the plastic injection molding technology subject which is set in the plastic transformation technology course at model CETIS/CBTIS selected by Mexican side is made up and improved to match with the needs of the plastic industry in Mexico.

No.	Activities (PDM)	Activities conducted
4-1	CNAD instructors advise the curriculum and its equipment at the model CETIS/CBTIS with the help of Japanese experts.	<p>In progress.</p> <ul style="list-style-type: none"> • Japanese experts advised that the two subjects "plastic material technology" and "mold and die for plastic injection" are especially important to comprehend all the five modules to be taught at CETIS/CBTIS. The curriculum (Plan de Estudio) was revised based on the Japanese experts' advice. • The CNAD instructors have advised on the curriculum for the model CETIS/CBTIS teachers' use (Plan de Estudio). The session for educational material elaboration has been held during the training. After the training, the CNAD instructors have given advice to CETIS/CBTIS teachers on request basis while the teachers prepare for the classes in accordance with SEP's outline. • The instructors have given advice on the specifications, layouts and preparation for wirings for the installation of plastic injection molding machine to be installed at CETIS/CBTIS.
4-2	CNAD conducts a test for the model CETIS/CBTIS	<p>In progress.</p> <ul style="list-style-type: none"> • The proficiency test for the model CETIS/CBTIS teachers has been conducted just before they give classes, that is, half a year

No.	Activities (PDM)	Activities conducted
	teachers at the end of the training.	after the training. The test for the teachers who attended the training Module I was conducted in February 2012.
4-3	CNAD instructors supervise the teaching activities by the model CETIS/CBTIS teachers at the model CETIS/CBTIS with the help of Japanese experts.	In progress. <ul style="list-style-type: none"> The plastic injection molding technology course at the model CETIS/CBTIS has been run since October 2011. The Module I was conducted in the second semester⁴ (February 2012) and the Module II in the third one (September 2012). However, the monitoring for the teaching activities at those CETIS/CBTIS has been conducted mostly only by Japanese experts and has not been realized by the CNAD instructors regularly due to the limitation of CNAD's budget for travel expenses.

Output 5: The joint committee for the linkage among CNAD, the model CETIS/CBTIS and the plastic industry is set up.

No.	Activities (PDM)	Activities conducted
5-1	CNAD holds periodically a joint committee consisting of the representative of plastic industry.	In process. <ul style="list-style-type: none"> The joint committee between CNAD and the plastic industry was established at CNAD in February 2012. The joint committee meetings have been held three times so far. The following three activities have been conducted in coordination with the industry: 1) CVCC (See the Activity 2-2). 2) Pilot Project of Kaizen (PPK), which was adopted at the second joint committee meeting held in June 2012. CNAD's technical service delivery for private companies is also the opportunities for the CNAD instructors to improve their practical ability on production site. The instructors provide consultations on productivity and quality improvements to the four pilot companies. The presentations on the results are to be made at the seminar scheduled in February 2013. PPK has been implemented based on the annual road map. 3) Open seminar (See the Activity 5-2).
5-2	CNAD implements an open seminar and a workshop regarding the plastic injection molding technology for the plastic industry in Mexico with the help of Japanese experts.	In progress. <ul style="list-style-type: none"> The following seminars have been held so far: International Seminar (February 2012), a seminar for companies held on request (June 2012) and an open seminar targeting the pilot companies for PPK and others (September 2012).
5-3	CNAD and Japanese experts support the model CETIS/CBTIS to hold a joint committee for making up the linkage between it	In progress. <ul style="list-style-type: none"> The joint committee was organized at CBTIS No.271 in June 2012. It is a school that is newly established in Ciudad Victoria at the beginning of the Project. The same committee had been established at CETIS No.6 in Mexico City and CBTIS No.237 in Tijuana before the commencement of the project. CETIS/CBTIS teachers have come to realize the industry's

⁴ An academic year consists of two semesters, and therefore a three-year plastic injection molding technology course consists of six semesters.

No.	Activities (PDM)	Activities conducted
	and the plastic industry in Mexico.	<p>needs, which have been reflected in the contents of their classes.</p> <ul style="list-style-type: none"> The following research activities to identify the needs for human resources have been conducted: a research to identify enterprises seeking for interns, and a survey to identify companies that are willing to recruit graduates from those CETIS/CBTIS. Each CETIS/CBTIS has started preparing the company data base.

3-3. Achievements of the Outputs

Both the Japanese and Mexican evaluation teams confirmed that the Project has so far fulfilled the following outputs along with the plan stated in PDM Ver.2. The degrees of fulfillment are shown under each output.

Output 1: The CNAD instructors become to train the CETIS/CBTIS teachers about the plastic injection molding technology.

OVI
1-1 9 instructors are assigned to the plastic injection molding technology course at CNAD.
1-2 9 instructors pass the final evaluation test equivalent to the Japanese second grade of plastic injection molding technical certificate.

OVI 1-1

Nine instructors are currently assigned to the course at CNAD as planned.

OVI 1-2

A certain level of improvements in all the instructors has been confirmed according to the results of proficiency tests equivalent to the third grade of plastic molding technical certificate (C class).

The results of the mock technical certificate examination for the instructors conducted in October 2012 were by large satisfactory as planned.

Output 2: The training curriculum which matches with the needs of the plastic industry in Mexico for the plastic injection molding technology to train the CETIS/CBTIS teacher is made up at CNAD.

OVI
2-1 CNAD develops the curriculum.
2-2 The committee consisted by CNAD and the representative from the plastic industry approves the curriculum.

OVI 2-1

CNAD has developed the curriculum of the training (Contenido de Cursos) for the Modules I, II and III as planned.

OVI 2-2

CVCC elaborated the curriculum of the training (Contenido de Cursos) for the Modules I, II

and III to meet the industry's needs and approved them. CVCC modified the contents of the second training for the Module I reflecting the teachers' requests and the feedbacks collected at the end of the classes at CETIS/CBTIS.

Output 3: The training course of plastic injection molding technology for the CETIS/CBTIS teachers is set up and managed efficiently at CNAD.

OVI
3-1 CNAD creates the new group to implement the plastic injection molding technology course.
3-2 CNAD prepares the logistic for the implementation of the training course, implement the training course based on the training plan, monitor the progress of the course, and feedback the result of the implementation of the course to improve the following course.
3-3 Periodical management meeting for the training course is held.

OVI 3-1

The plastic injection molding technology group has been established and active at CNAD.

OVI 3-2

CNAD has prepared the logistics for the implementation of the training course, implemented the training course based on the training plan, monitored the progress of the course, and collected feedbacks regarding the results of the implementation of the course in order to improve the following courses so far supported by Japanese experts.

The trainings for CETIS/CBTIS teachers are given every half a year. In the due course, two to three modules are to be conducted at the same time. Taking into account the burden on both CNAD instructors and the teachers who have multiple functions or their second jobs, it is supposed that CNAD and CETIS/CBTIS continuously assign the instructors and teachers to the Project to conduct the trainings at CNAD.

Moreover, the possible measures are recommended to be taken on the monitoring on teaching activities at CETIS/CBTIS on a regular basis.

OVI 3-3

The planning for the training course has been regularly examined by Japanese experts together with the instructors so that the instructors will be capable of doing it by themselves.

Output 4: The curriculum and practical training of the plastic injection molding technology subject which is set in the plastic transformation technology course at model CETIS/CBTIS selected by Mexican side is made up and improved to match with the needs of the plastic industry in Mexico.

OVI
4-1 The model CETIS/CBTIS opens the plastic transformation technology course with the curriculum authorized by DGETI.
4-2 The model CETIS/CBTIS incorporates the plastic injection molding technology component into the course.
4-3 The curriculum is reviewed by DGETI periodically based on the needs of the plastic industry.

OVI 4-1

The plastic transformation technology course at CETIS/CBTIS has been conducted with the curriculum (Plan de Estudio) authorized by DGETI based on the industry's needs identified by the Project survey.

OVI 4-2

It was authorized to incorporate the components related to the plastic injection molding technology into the curriculum (Plan de Estudio) by DGETI.

The Module I was conducted for the students in the first generation in February to June 2011. The classes were highly evaluated by both CNAD instructors and Japanese experts. The Module III "plastic injection molding technology" is to be taught at CETIS/CBTIS in February 2013.

OVI 4-3

The draft curriculum (Plan de Estudio) was reviewed and revised by DGETI. The purpose for the reviews is to ensure that the curriculum (Plan de Estudio) appropriately meets the industry's needs taking into account the teaching practices at CETIS/CBTIS. It has been observed necessary to review the way of monitoring CETIS/CBTIS so that the frequencies of monitoring will be sufficient.

Output 5: The joint committee for the linkage among CNAD, the model CETIS/CBTIS and the plastic industry is set up.

OVI
5-1 The periodical meeting of CNAD and the plastic industry is held.
5-2 The open seminar is held according to the annual plan of CNAD.

OVI 5-1

As the contents of the public private partnership activities have become concrete, each CVCC meeting has taken place before the training for CETIS/CBTIS teachers. PPK was proposed with its annual road map. The meetings for PPK have been held in accordance with it.

The joint committees for the linkage between CETIS/CBTIS and the plastic industry have been established at each project site.

OVI 5-2

The open seminar/workshops for plastic companies have been held three times so far.

3-4 Implementation Process of the Project

The activities have been favorably in progress in accordance with the original Plan of Operation Ver.1. Especially, public private partnership (PPP) building activities related to the Output 5 have progressed further than planned. In turn, the purchase and installments of equipment for the model CETIS/CBTIS has been delayed and has influenced on their classes. It should be carried out as scheduled at the moment.

The monitoring system for the Project activities consists of the following three cascades: (a) the monitoring for the technical transfer from Japanese experts to CNAD instructors is based on the monitoring meetings held at CNAD on each Japanese experts' dispatch and the implementation of proficiency tests and technical certificate examinations; (b) the monitoring for the technical transfer from CNAD instructors to the model CETIS/CBTIS teachers is based on the monitoring and evaluation meetings held after the trainings for the CETIS/CBTIS teachers with the attendance of the relevant parties and the implementation of proficiency tests; and (c) the monitoring for the technical transfer from the model CETIS/CBTIS teachers to their students is based on the reports on the conducted classes for the plastic transformation molding technology course elaborated by those teachers to be reviewed by DGETI, CNAD and Japanese experts. It should be a challenge to continuously conduct monitoring on the teaching activities at the model CETIS/CBTIS principally by CNAD instructors.

It has been observed that there is a good communication among the players and the related parties in the Project. It has contributed to smooth implementation of the activities.

As for the methods of technical transfer, the capacity development has been realized by cascaded method. Also, the curriculum for the plastic transformation molding technology for the CNAD instructor's use (Contenido de Cursos) has been elaborated reflecting the industry's needs in Mexico through the PPP building activities such as the activities for CVCC and PPK.

The personnel of CNAD have been assigned to the Project while DGETI that is the superior organization to CNAD is responsible for the Project. The CNAD instructors for the plastic transformation molding course and the three model CETIS/CBTIS teachers have participated in the Project as principal players. It has been confirmed that the instructors have been improving their work skills and have cultivated their self-initiative. Also, it has been observed that the CETIS/CBTIS teachers have been efficiently acquiring the plastic transformation molding technology based on their variable expertise and teaching skills.

The organizations that have been coordinating PPP building activities are: National Association of Plastic Industry (ANIPAC) and National Chamber of Transformation Industry (CANACINTRA) at national level, Iztapalapa Entrepreneurs' Association (AEI) in Mexico City, Tamaulipas Council of Public Private Partnership (CVT) in Tamaulipas and Tijuana Educational Linkage Committee (CVT) in Tijuana. The partnerships will be expected to be deepened with Japan External Trade Organization (JETRO) and Secretariat of Economic Development (SEDECO) that was the C/P of JICA's former project in Tijuana. Detailed responses given by the project coordinator of JICA Mexico Office has contributed to the implementation of activities as well.

The Project was started with PDM Ver.1 in October 2010. Then, it was modified by adding some indicators for the Overall Goal in December in the same year. At the moment of the Mid-term Review, PDM Ver.2 is to be modified by clarifying PPP building activities related to the Output 5

and reviewing the indicators for the Overall Goal. Consequently, PO Ver.1 is to be modified as well.

4. Results of Evaluation by Five Criteria

4-1. Relevance

The Project is assessed to be highly relevant for the following reasons.

The Project is consistent with the Mexican national policies. "Competitive economy and employment generation" is listed in the Mexican Development Plan (Plan Nacional de Desarrollo) formulated in May 2007 as one of its priority areas. The actual government gives top priority to development of SMEs and local supporting industries in its economic policies. Since the conclusion of the EPA between Japan and Mexico in April 2005, the Mexican government has attracted Japanese companies and direct investments and above all has promoted the export from Japanese automaker in Mexico and so on. Regardless of the change of government scheduled for December 2012, it is anticipated that there are no big changes in the policies. Regarding its education policies, DGETI has been working on the modification of the curriculums so that the graduates from CETIS/CBTIS will be able to obtain employment in the industries related to their courses. These competence-based curriculums reinforce the training of technical workers based on the needs of the industries.

The Project is consistent with the Japan's ODA policies. Japan's ODA policies give importance to the cooperation in Mexican industrial field that will lead to even closer economic ties between the two countries. The Project is situated in JICA's Program for Strengthening the Competitiveness of SMEs and the Supporting Industry.

The Project is consistent with the needs of CNAD instructors and the model CETIS/CBTIS teachers. As for the industry's needs, the plastic injection molding technology covers more than half of the plastic production in Mexico. The human resources with the technology are much needed in the industry as well.

The target group has been properly selected from the point of view of model project implementation taking into account slight differences among the industrial structures of the regions where the three model CETIS/CBTIS are and the distance from Mexico City where the implementation organization of the Project is. It has been observed that both CNAD instructors and CETIS/CBTIS teachers meeting the selection criteria have been assigned to the Project.

Japan has comparatively high technologies in the plastic injection molding technology in general and especially has advantages in teaching its theories. It has rich experiences in the cooperation in the injection molding technology in other countries as well. Japan is well experienced in human resource development in the mechatronics field at CNAD.

4-2. Effectiveness

The effectiveness of the Project is assessed to be generally high for the following reasons. It is considered necessary to follow up on a part of the impeding factors. The activities could be more improved in some aspects.

Almost 100% of the planned activities has been conducted so far. The degree to which the Project Purpose's OVI's been achieved is shown as follows.

- OVI 1. Nine instructors have been assigned to the plastic injection molding technology course. The target of technical transfer has been attained according to the results of conducted three proficiency tests (C class⁶). The results of the mock technical certificate examination for the instructors conducted in October 2012 were by large satisfactory as planned.
- OVI 2. One-month-trainings for the model CETIS/CBTIS teachers were conducted as follows: the Module I "plastic material" (targeting 9 teachers, August to September 2011) and the Modules III "plastic injection molding technology" and I for the second time with the equipment (targeting 6 and 4 teachers respectively, August 2012). The curriculum for those modules (Contenido de Cursos) has been approved at CVCC meeting the industry's needs.
- OVI 3. 14 CETIS/CBTIS teachers in total have been trained so far⁷.

It is expected highly probable to achieve the Project Purpose for the reasons based on its OVI's as stated below.

- OVI 1. The trainings putting emphasis on the practice on the plastic transformation technology have been given since September 2012 as planned. The technical transfer is anticipated to be accelerated.
- OVI 2. It is anticipated that qualitative improvements in technical transfer will be facilitated through two more trainings for the Modules I, III and V respectively planned by the Project completion. Furthermore, it is anticipated that the trainings for CETIS/CBTIS teachers will be given based on the curriculum (Contenido de Cursos) approval at CVCC reflecting the industry's needs.
- OVI 3. It is anticipated that two more trainings for the Modules I, III and V respectively will be given before the final evaluation for CETIS/CBTIS teachers. Also, four proficiency tests will be conducted.

The Output 5 mentions the establishment of the joint committee for building the linkages among CNAD, the model CETIS/CBTIS and the plastic industry. It can be assumed that the established joint committee should be efficiently managed for the purpose of achieving the Project Purpose.

There are some factors that contribute to the achievement of the Project Purpose. First of all,

⁶ C class is equivalent to the Japanese third grade of the plastic molding technical certificate. The level of the test will be gradually higher as the Project progresses.

⁷ A total number of the trained teachers is 19, 5 of whom have attended another module. In addition, 7 teachers have attended the training for Module II that has not been directly supported by the Project.

interviewed players have been observed highly committed to the Project. Secondly, the Project activities have been smoothly conducted with the accumulated experiences through the cooperation in the mechatronics field at CNAD. Seven of the nine instructors and many of the players and related parties have ever participated in JICA's training in Japan. Thirdly, with CNAD's activities accepted by private companies, some of the companies have come to offer the instructors their job site with the equipment such as extrusion blow molding machine that CNAD does not own for their practices. Finally, the needs for improvements in the plastic transformation technology have been becoming larger due to the largely increasing exports of automobile and the rising demand for medical device.

On the other hand, there are some factors that impede to the achievement of the Project Purpose. Appropriate measures should be taken for them. Firstly, most of the CNAD instructors and CETIS/CBTIS teachers have limited to dedicate to the Project activities due to their time multiple functions or second jobs. Secondly, CNAD has a limited annual budget allocated by DGETI. It has been the same amount for 18 years regardless of the expansion of its activities. It is difficult to secure the budget for Project activities, especially travelling expenses to monitor the teaching activities at the model CETIS/CBTIS. Thirdly, the first installment of the equipment for the Modules, I, II and III at the model CETIS/CBTIS financed by Inter-American Development Bank (IDB) has been delayed and scheduled for February 2013. The first generation will not take classes with the equipment. The teachers have heard the students' parents' concerns that the students may not graduate with sufficient practical skills although the teachers have attempted to give alternative classes for complement. A part of the equipment for the Modules IV and V has been scheduled to be purchased in the following fiscal year due to the extremely large budget allocated to the plastic transformation technology course per number of students compared with other courses.

4-3. Efficiency

The efficiency of the Project is assessed to be high in general for the following reasons.

With regard to the inputs from the Japanese side, all interviewed players have commented that the assignment of Japanese experts has been appropriate in terms of their number, their expertise and capabilities, and the assignment periods and timing. It has been observed that technical transfer has been efficiently conducted through Japanese experts' careful follow-up in general. The expert in PPP building was initially in charge of both PPP building and the operational coordination. Taking into account the importance of the activities for PPP building, an expert in operational coordination was additionally dispatched. The expert in PPP building has been the dedicated expert since April 2011. The related activities have been progressing further than originally planned. The equipment provision has been seen appropriate. Installments of all the equipment were completed at CNAD in July 2012, earlier than originally planned. A part of the training for the CNAD instructors with the equipment was conducted ahead of initial schedule and was timely and efficient.

Regarding the inputs from the Mexican side, there were some moments when the number of

instructors did not reach the expected number of nine. However, their assignment has been almost appropriate so far in terms of their number, duties and capacity. With PPP building activities materialized, the person in charge at CNAD has come to dedicate more to the Project since October 2012. As for the Mexican government's budget for the Project, CNAD has a limited annual budget allocated by DGETI. It is difficult to secure the budget for Project activities, especially travelling expenses to monitor the teaching activities at the model CETIS/CBTIS. Also, the first installment of the equipment at the model CETIS/CBTIS financed by IDB has been delayed. A part of the equipment has been scheduled to be purchased in the following fiscal year.

The organizations that have been coordinating PPP building activities are as follows: ANIPAC and CANACINTRA, promoting the partnership between CNAD and the industry at national level; AEI, promoting the partnership between CNAD and the industry as well as between CETIS 6 and the industry in Mexico City; CVT, promoting the partnership between CBTIS 271 and the industry in Tamaulipas; and CVT, promoting the partnership between CBTIS 237 and the industry in Tijuana. The closer partnership will be expected between CBTIS 237 and SEDECO that was the C/P of JICA's completed "Project for Human Resource Development for the Electronics Industry in Maquiladora Zone in Baja California". The partnership between CNAD and JETRO is expected to be deepened as well.

The exchange of information among the three model CETIS/CBTIS teachers has been increased the efficiency of the Project, which should be more active. Other favorable factors for the students of CETIS/CBTIS are that there are some scholarships for high school students in Mexico. In addition, DGETI's internship scholarship system is to be applied to the students of the plastic transformation technology course in 2013, which may contribute to the increase in opportunities for internship.

4-4. Impact

It is difficult to judge the probability to achieve the Overall Goal so far due to the absence of concrete indicators and the necessity to wait for the first generation's graduation from the model CETIS/CBTIS. Meanwhile, it is indispensable for the Mexican government to elaborate the extension plan for the plastic transformation technology course at CETIS/CBTIS based on the needs of the industry and the regions. The Project's PDM should be modified by clarifying and materializing the indicators as well.

The model CETIS/CBTIS teachers are required to acquire the knowledge and skills needed to teach all five modules to achieve the Overall Goal. It has been observed that Japanese experts should indirectly continue supporting the trainings on extrusion molding technology and thermal process technology conducted by CNAD along with the other three modules dealt with in the Project.

Some positive impacts have been identified as follows. It has been observed that the Project has indirectly affected the industry to come to realize the necessity to human resource development. Another impact is that many of the related parties at the model CETIS/CBTIS, especially those of

CBTIS 237 in Tamaulipas that has newly established at the commencement of the Project, have commented that the efficient implementation of the plastic transformation technology course should lead to the schools' development. The Project could indirectly promote women's participation in society as the ratio of female students at CBTIS 271 in Tamaulipas. There is also a possibility that the distance learning system that the team of JICA senior volunteers assigned to CNAD has just started building will meet some needs of the Project.

4-5. Sustainability

The sustainability is expected to be high from political, institutional, organizational and technical points of view. However, it is considered necessary to follow up on financial aspect.

It is anticipated that the Mexican government will continue training CETIS/CBTIS teachers on the plastic injection molding technology due to the growing needs of the industry.

CNAD's operational capacity is expected to be sufficient to continue training CETIS/CBTIS teachers on the plastic injection molding technology to expand their activities even after the Project's completion. The instructors and the persons in charge of logistics have been properly assigned to the plastic injection molding technology course. In addition, CNAD has been enhancing the functions of human resource development in the Project based on those maintained in the mechatronics field.

CNAD's annual budget allocated by DGETI has been approximately 3 million pesos since its establishment in 1994. It is anticipated that CNAD's financial sustainability will be secured at a certain level according to the related parties' opinions. It should be expected that the Mexican government secure annual budget necessary for the Project implementation until the achievement of the overall goal of the Project. CNAD has a concept to give trainings targeting private companies for income generation.

CNAD instructors have been trained sufficiently in number and quality so far. Judging from the results of proficiency tests, it is expected that they will keep on building their capacities as planned and will continue technical transfer to CETIS/CBTIS teachers.

5. Conclusion

It has been confirmed that the activities have been favorably in progress as a result of the actors' dedication and efforts.

As for the five evaluation criteria, the relevance of the Project is endorsed by its consistency with the Mexican government national policies, the needs of CNAD instructors and the model CETIS/CBTIS teachers and the Japanese aid policies.

The effectiveness and the efficiency of the Project have been confirmed generally high from the point of view of the implementation of activities, achievement of results and timing, quality and quantity of the inputs. However, to assure the achievement of the Project Purpose, it is crucial to grasp the industry's needs in Mexico and promote PPP building activities such as public relations activities for the purpose of smooth implementation of the Project, conduct monitoring of activities in efficient ways and secure the purchases of equipment for the model CETIS/CBTIS and CNAD's budget for the Project activities.

So far it is too early to judge the impact which is largely based on the achievement of the Project Purpose. Also, it is necessary to materialize the indicators for the Overall Goal.

The sustainability is expected to be high from political, institutional, organizational and technical points of view. However, it is considered indispensable for the Mexican government to secure the necessary budget until the Overall Goal is achieved.

Taking account of the situation stated above, it is necessary to review the PDM Ver.2 and promote the activities in the latter part of the Project in order to achieve the Project Purpose.

6. Recommendations

(1) Smooth implementation of the equipment procurement for the model CETIS/CBTIS

The equipment for the model CETIS/CBTIS financed by IDB has been delayed. The equipment for the Modules, I, II and III is under SEP's procurement with those installments scheduled for February 2013. The equipment for the Modules IV and V has been postponed to be purchased in the following fiscal year due to the extremely large budget allocated to the plastic transformation technology course per number of the students compared with other courses.

Many relevant institutions, especially the model CETIS/CBTIS has faced a serious situation that the first generation of the students will not take classes using the equipment. The teachers have heard the students' parents' concerns that the students may not graduate with sufficient practical skills although the teachers have attempted to give alternative classes for complement.

It is therefore necessary for the Mexican Government to smoothly conduct the procurement on the current schedule. DGETI should carry out the first installment of the equipment for the Modules, I, II and III in February in close communication with CNAD and the model CETIS/CBTIS. The model CETIS/CBTIS will secure the space for the equipment and collaborate with DGETI on the installments and the initial performance confirmation. It is also recommended that DGETI develop a detailed plan to procure the equipment for the Modules IV and V in the following fiscal year. The plan should be informed to CNAD and the model CETIS/CBTIS in advance.

(2) Improvements in monitoring the trainings for the CETIS/CBTIS teachers at CNAD and the teaching activities at the model CETIS/CBTIS

The monitoring system for the Project activities consists of the following three cascades: (a) the monitoring for the technical transfer from Japanese experts to CNAD instructors; (b) the monitoring for the technical transfer from CNAD instructors to the model CETIS/CBTIS teachers; and (c) the monitoring for the technical transfer from the model CETIS/CBTIS teachers to their students. The measure/tools for the monitoring are proficiency tests, technical certificate examinations, monitoring and evaluation meetings, reports prepared by the teachers. The monitoring system is a crucial function to achieve the Project Purpose through continuous improvements in the quality of both the trainings for the CNAD instructors and the CETIS/CBTIS teachers.

One of the important monitoring measures is direct observation on the trainings for the teachers at CNAD and the teaching activities at the model CETIS/CBTIS. These observations for monitoring, however, have not been carried out on a regular basis. During Japanese experts' assignment for CNAD, they mainly dedicate in the trainings for the CNAD instructors at the moment and have hardly been able to observe the trainings for the teachers. In respect to the monitoring for the teaching activities at the model CETIS/CBTIS, the monitoring for those CETIS/CBTIS has been conducted only by Japanese experts in most cases and has not been realized by the CNAD instructors regularly due to CNAD's limited budget for travel expenses.

Taking into consideration the situation stated above, it is recommended that monitoring by direct observation on the trainings for the teachers at CNAD and the teaching activities at the model CETIS/CBTIS should be improved. Japanese experts will monitor the trainings for the teachers at CNAD more frequently and provide feedbacks to the CNAD instructors. The observations and feedbacks could be fully utilized to improve the trainings for the CNAD instructors. The CNAD instructors and the Japanese experts are to elaborate a plan to make regular visits to the model CETIS/CBTIS. Then, the CNAD instructors will provide feedbacks to the teacher assisted by Japanese experts. The CNAD instructors will improve the trainings for the teachers based on the results from the monitoring on the teaching activities. It is also recommended that DGETI and CNAD secure the necessary budget for travel expense of the monitoring in the model CETIS/CBTIS.

(3) Enhancement of the Public Private Partnership (PPP) building system

The Project gives importance to the development of curriculum meeting the needs of the plastic industry and thus PPP building is one of the main components of the Project. The PPP building activities related to the Output 5 have progressed further than planned. The Output 5 "the joint committee for the linkage among CNAD, the model CETIS/CBTIS and the plastic industry is set up" has already been achieved in the middle of the Project period, in June 2012. It is assumed that the established joint committee should be efficiently managed, and that the system for PPP building activities should be enhanced in order to achieve the Project Purpose. Therefore, it is

recommended that CNAD and the model CETIS/CBTIS under DGETI's supervision should consolidate the implementation system for PPP building. Not only those directly in charge of PPP building but the CNAD instructors and CETIS/CBTIS teachers are to be involved in the related PPP building activities. The promotion of the plastic transformation course and the Project such as open seminars and workshops targeting the public or especially the plastic industry should be conducted more actively by CNAD and the model CETIS/CBTIS.

(4) Promotion of formulating of the extension plan for the plastic transformation technology course at CETIS/CBTIS

The Project Overall Goal is expected to be achieved by extending the plastic transformation technology course to other CETIS/CBTIS based on the lessons learned from the Project implementation. The Mexican government attempts to start formulating the extension plan. It is recommended that DGETI and CNAD should conduct the following activities assisted by Japanese experts:

- (a) Conducting a baseline survey on the regional/industrial needs of human resources with regards to plastic transformation technology;
- (b) Conducting a survey on CETIS/CBTIS that are located in areas with the industrial needs for human resources in the field of plastic transformation technology; and
- (c) Identifying CETIS/CBTIS in the regions that have a potential to establish the plastic transformation technology course in accordance with the regional/industrial needs for the human resources.

(5) Modification of the PDM

Based on the recommendations stated above, it is recommended that the PDM be modified as shown in Annex 2.

7. List of Annexes

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| Annex 1 | Project Design Matrix (Ver.2) |
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Annex 1 Project Design Matrix (Ver.2)

Project Name: The Project for Human Resources Development in the technology of Plastic Transformation

Target Group: CNAD instructors and the model CETIS/CBTIS teachers

Project Duration: Oct. 2010 – Oct. 2014(4years)

Dec. 10 , 2010 (Ver.2)

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumption
<p>[Overall Goal] Centro de Estudios Tecnológicos Industrial y de Servicios/Centro de Bachillerato Tecnológico Industrial y de Servicios (hereinafter referred to as CETIS/CBTIS) which set up the course of the plastic transformation technology will contribute to turn out the quality labor force to the plastic industry in Mexico.</p>	<ol style="list-style-type: none"> The number of qualified graduates from the plastic transformation technology course in CETIS/CBTIS. The number of the plastic transformation technology course in CETIS/CBTIS. The number of graduates employed by the plastic industry. The number of proceed to faculty / department of university which related plastic industry from the plastic transformation technology course in CETIS/CBTIS. 	<ol style="list-style-type: none"> The report of DGETI The report of DGETI The report of DGETI and CETIS/CBTIS The report of DGETI and CETIS/CBTIS 	<p>There is no drastic change in political and economical situation in the United Mexican States.</p>
<p>[Project Purpose] The capacity to train the instructors of the plastic injection molding technology in CETIS/CBTIS is improved at CNAD.</p>	<ol style="list-style-type: none"> 9 instructors whose skill level is equivalent to Japanese second grade of plastic injection molding technical certificate are trained at CNAD. The plastic injection molding technology course at CNAD is managed according to the needs of the plastic industry. 18 teachers of the model CETIS/CBTIS are trained and pass the final evaluation at CNAD. 	<ol style="list-style-type: none"> The report of the Project which includes organization chart, the result of the evaluation test for the CNAD instructors The report of the Project, annual report of CNAD, the result of questionnaire to the participant of the plastic injection molding technology course The report of the Project, annual report of CNAD, the result of the final evaluation of the 18 teachers 	<p>Mexican government maintains functions of CNAD for the training of the CETIS/CBTIS teacher.</p>
<p>[Outputs of the Project] at CNAD</p> <ul style="list-style-type: none"> The CNAD instructors become to train the CETIS/CBTIS teachers about the plastic injection molding technology. The training curriculum which matches with the needs of the plastic industry in Mexico for the plastic injection molding technology to train the CETIS/CBTIS teacher is made up at CNAD. The training course of plastic injection molding technology for the CETIS/CBTIS teachers is set up and managed efficiently at CNAD. The curriculum and practical training of the plastic injection molding technology subject which is set in the plastic transformation technology course at model CETIS/CBTIS selected by Mexican side is made up and improved to match with the needs of the plastic industry in Mexico. The joint committee for the linkage among CNAD, the model CETIS/CBTIS and the plastic industry is set up. 	<ol style="list-style-type: none"> 9 instructors are assigned to the plastic injection molding technology course at CNAD. 9 instructors pass the final evaluation test equivalent to the Japanese second grade of plastic injection molding technical certificate. CNAD develops the curriculum. The committee consisted by CNAD and the representative from the plastic industry approves the curriculum. CNAD creates the new group to implement the plastic injection molding technology course. CNAD prepares the logistic for the implementation of the training course, implement the training course based on the training plan, monitor the progress of the course, and feed back the result of the implementation of the course to improve the following course. Periodical management meeting for the training course is held. The model CETIS/CBTIS opens the plastic transformation technology course with the curriculum authorized by DGETI. The model CETIS/CBTIS incorporates the plastic injection molding technology component into the course. The curriculum is reviewed by DGETI periodically based on the needs of the plastic industry. The periodical meeting of CNAD and the plastic industry is held. The open seminar is held according to the annual plan of CNAD. 	<ol style="list-style-type: none"> The report of the Project The report of the Project Academic report by CNAD, which includes curriculum document The minutes of meeting on the committee The report of the Project The report of the Project, the general information of training course issued by CNAD, the report of the course The minutes of meeting on the periodical management meeting The report of DGETI, the official document for the authorization of the curriculum by DGETI The curriculum made by DGETI The revised curriculum made by DGETI The minutes of the periodical meeting of CNAD and the plastic industry The open seminar report by CNAD 	<p>Trained instructors remains at CNAD.</p>

2


[Activities]	Inputs	
<p>0. CNAD selects the candidates of the CNAD instructors for the plastic injection molding technology.</p> <p>1-1 Japanese experts review the equipments list based on the training needs.</p> <p>1-2 Japanese experts make up the training plan for the CNAD instructors.</p> <p>1-3 JICA provides the equipment for the practical training for the project in CNAD.</p> <p>1-4 Japanese experts lecture in related to the plastic material technology, injection molding technology, mold and die for plastic injection (design and fabrication) to the CNAD instructors.</p> <p>1-5 Japanese experts have a practical training to the CNAD instructors with the equipment.</p> <p>1-6 Japanese experts conduct a test for CNAD instructors to check the progress.</p> <p>2-1 CNAD, DGETI and Japanese experts jointly review the draft curriculum of the plastic injection molding technology for the model CETIS/CBTIS teachers training based on the needs of plastic industry.</p> <p>2-2 CNAD and Japanese experts lead to set up the joint curriculum committees including relevant parties then they discuss the curriculum.</p> <p>3-1 CNAD experimentally implements the plastic injection molding technology training course for the model CETIS/CBTIS teachers with the help of Japanese experts.</p> <p>3-2 CNAD sets up and holds the monitoring committee on the management of the course.</p> <p>4-1 CNAD instructors advise the curriculum and its equipments at the model CETIS/CBTIS with the help of Japanese experts.</p> <p>4-2 CNAD conducts a test for the model CETIS/CBTIS teachers at the end of the training.</p> <p>4-3 CNAD instructors supervise the teaching activities by the model CETIS/CBTIS teachers at the model CETIS/CBTIS with the help of Japanese experts.</p> <p>5-1 CNAD holds periodically a joint committee consisting of the representative of plastic industry.</p> <p>5-2 CNAD implements an open seminar regarding to the plastic injection molding technology for the plastic industry in Mexico with the help of Japanese experts.</p> <p>5-3 CNAD and Japanese experts support the model CETIS/CBTIS to hold a joint committee for making up the linkage between it and the plastic industry in Mexico.</p>	<p>[The Mexican side]</p> <ol style="list-style-type: none"> 1. Provision and maintenance of building and facilities. (1) Office spaces and facilities necessary for the Japanese experts (2) Car for the Project activity and commuting necessary for the Japanese experts (3) Telephone and internet facilities necessary for the Japanese experts 2. Allocation of C/P and administrative personnel (1) Project Director (2) Project Manager (3) Project Coordinator (4) Administrative staff, necessary number (5) Technical staff, necessary number (6) Supporting staff <ol style="list-style-type: none"> a. Secretary b. Driver c. Other necessary staff upon request by the Japanese experts 3. Provision of their maintenance for their machinery & equipment 4. Model CETIS/CBTIS and its teachers 5. Local Cost Necessary budget for the Project 	<p>[The Japanese side]</p> <ol style="list-style-type: none"> 1. Dispatch of Japanese Experts in the following fields <ol style="list-style-type: none"> (1) Chief Advisor/Team Leader (2) Expert in the field of injection molding technology (3) Expert in the field of plastic material technology (4) Expert in the field of mold technology for plastic injection maintenance (5) Operational Coordinator 2. Mexican C/P's Training in Japan <p>The number of C/P and their duration of training will be determined in accordance with the necessary each year.</p> 3. Provision of Minimum and Necessary Machinery & Equipment <ol style="list-style-type: none"> (1) Injection molding training equipment (injection molding machines, mold exchange crane, etc.) (2) Mold assembly/maintenance equipment (mold for training, mold for material analysis, mold cleaning equipment, small heat treated furnace, etc.) (3) Analysis, examination equipment (plastic flow analysis software, infrared thermography, etc.) 4. Supporting Local Cost
		<p>[Prerequisite]</p> <p>DGETI ensures the budget, machinery and teachers for plastic transformation course at model CETIS/CBTIS.</p>

Annex 2 Project Design Matrix (Ver.3)

Project Name: The Project for Human Resource Development in the technology of Plastic Transformation
 Target Group: CNAD instructors (9) and the model CETIS/CBTIS teachers (18)

Project Duration: Oct. 2010 – Oct. 2014 (4 years)
 Oct. 25, 2012 (Ver.3)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
<p>[Overall Goal] Centro de Estudios Tecnológicos Industrial y de Servicios/Carino de Bachillerato Tecnológico Industrial y de Servicios (hereinafter referred to as CETIS/CBTIS) which set up the course of the plastic transformation technology will contribute to turn out the quality labor force to the plastic industry in Mexico.</p>	<p>1. 60% of the graduates from the plastic transformation technology course in CETIS/CBTIS obtain Técnico with completion of in-company training (práctica profesional). X⁸ plastic transformation technology courses in CETIS/CBTIS are established. X% of the graduates from the plastic transformation technology course in CETIS/CBTIS are employed in plastic industry.¹⁰ X% of the students enrolling in university from the plastic transformation technology course in CETIS/CBTIS proceed to faculty / department of university related the plastic industry¹¹.</p>	<p>1. The report of DGETI 2. The report of DGETI 3. The report of DGETI and CETIS/CBTIS 4. The report of DGETI and CETIS/CBTIS</p>	<p>There is no drastic change in political and economic situation in the United Mexican States.</p>
<p>[Project Purpose] The capacity to train the instructors of the plastic injection molding technology in CETIS/CBTIS is improved at CNAD.</p>	<p>1. 9 instructors whose skill level is equivalent to Japanese second grade of plastic injection molding technical certificate are trained at CNAD. 2. The plastic injection molding technology course at CNAD is managed according to the needs of the plastic industry. 3. 18 teachers¹² of the model CETIS/CBTIS are trained and pass the final evaluation at CNAD.</p>	<p>1. The report of the Project which includes organization chart, the result of the evaluation test for the CNAD instructors 2. The report of the Project, annual report of CNAD, the result of questionnaire to the participant of the plastic injection molding technology course 3. The report of the Project, annual report of CNAD, the result of the final evaluation of the 18 teachers</p>	<p>Mexican government maintains functions of the CETIS/CBTIS teacher.</p>
<p>[Outputs of the Project] • at CNAD 1. The CNAD instructors become to train the CETIS/CBTIS teachers about the plastic injection molding technology. 2. The training curriculum which meets the needs of the plastic industry in Mexico for the plastic injection molding technology to train the CETIS/CBTIS teacher is made up at CNAD. 3. The training course of plastic injection molding technology for the CETIS/CBTIS teachers is set up and managed efficiently at CNAD. • at CETIS/CBTIS 4. The curriculum (theoretical and practical training) of the plastic injection molding technology subject which is set in the plastic transformation technology course at model CETIS/CBTIS selected by Mexican side is made up and improved to meet the needs of the plastic industry in Mexico. • at CNAD and model CETIS/CBTIS 5. CNAD's and model CETIS/CBTIS's capacity for promoting linkage with the plastic industry is enhanced.</p>	<p>1-1. 9 instructors are assigned to the plastic injection molding technology course at CNAD. 1-2. 9 instructors pass the final evaluation test equivalent to the Japanese second grade of plastic injection molding technical certificate. 2-1. CNAD develops the curriculum. 2-2. The committee (CVCC: Comité de Validación de Contenidos de Cursos) consisted by CNAD and the representative from the plastic industry approves the curriculum. 3-1. CNAD creates the new group to implement the plastic injection molding technology course. 3-2. CNAD prepares the logistics for the implementation of the training course, implements the training course based on the training plan, monitors the progress of the course, and collects feedback of the course to improve the following course. 3-3. The periodical meeting for monitoring and evaluation for the training course is held. 4-1. The model CETIS/CBTIS opens the plastic transformation technology course with the curriculum authorized by DGETI. 4-2. The model CETIS/CBTIS incorporates the plastic injection molding technology component into the course. 4-3. The curriculum (theoretical and practical training) is reviewed by DGETI</p>	<p>1-1. The report of the Project 1-2. The report of the Project 2-1. Academic report by CNAD, which includes curriculum document 2-2. The minutes of meeting on CVCC 3-1. The report of the Project 3-2. The report of the Project, the general information of training course issued by CNAD, the report of the course 3-3. The minutes of meeting on the periodical management meeting 4-1. the report of DGETI, the official document for the authorization of the curriculum by DGETI 4-2. The curriculum made by DGETI 4-3. The revised curriculum, (theoretical and practical</p>	<p>Trained instructors remain at CNAD.</p>

⁸ Figure "X" will be decided in JCC held in November, 2013.

⁹ The course establishment in the planning phase is included for evaluation of the Project.

¹⁰ The plastic industry here is defined based on of ANIPAC's classification of its member companies.

¹¹ Faculty / department of university related to the plastic industry covers plastic engineering, mechanical engineering, electric engineering, etc. It will be decided in JCC held in November, 2013.

¹² The number of teachers includes teachers for Module I, Module III and Module V. Teachers for Module II and Module IV are not included.

<p>[Activities]</p> <p>0. CNAD selects the candidates of the CNAD instructors for the plastic injection molding technology.</p> <p>1-1 Japanese experts review the equipment list based on the training needs.</p> <p>1-2 Japanese experts make up the training plan for the CNAD instructors.</p> <p>1-3 JICA provides the equipment for the practical training for the project in CNAD.</p> <p>1-4 Japanese experts lecture in related to the plastic material technology, injection molding technology, mold and die for plastic injection (design and fabrication) to the CNAD instructors.</p> <p>1-5 Japanese experts provide a practical training to the CNAD instructors with the equipment.</p> <p>1-6 Japanese experts conduct a test for CNAD instructors to monitor the progress.</p> <p>2-1 CNAD, DGETI and Japanese experts jointly review the draft curriculum of the plastic injection molding technology for the model CETIS/CBTIS teachers training based on the needs of plastic industry.</p> <p>2-2 CNAD and Japanese experts lead to set up CVCC including relevant parties then they discuss the curriculum.</p> <p>3-1 CNAD experimentally implements the plastic injection molding technology training course for the model CETIS/CBTIS teachers with the assist of Japanese experts.</p> <p>3-2 CNAD sets up and holds the periodical meeting for monitoring and evaluation on the management of the course.</p> <p>4-1 CNAD instructors advise the curriculum and its equipment at the model CETIS/CBTIS with the assist of Japanese experts.</p> <p>4-2 CNAD conducts a test for the model CETIS/CBTIS teachers at the end of the training.</p> <p>4-3 CNAD instructors supervise the teaching activities by the model CETIS/CBTIS teachers at the model CETIS/CBTIS with the help assist of Japanese experts.</p> <p>5-1 CNAD holds periodically the joint committee consisting of the representatives of plastic industry with the assist of Japanese experts.</p> <p>5-2 CNAD holds periodically CVCC consisting of the representatives of plastic industry with the assist of Japanese experts.</p> <p>5-3 CNAD implements the Pilot Project Kaizen (PPK) as a PPP building activity between CNAD and plastic industry with the assist of Japanese experts.</p> <p>5-4 CETIS/CBTIS holds the joint committee as a PPP building activity between CETIS/CBTIS and plastic industry with the assist of Japanese experts.</p>	<p>based on the needs of the plastic industry.</p> <p>5-1. The joint committees (both CNAD level and the model CETIS/CBTIS level) for linkage with the plastic industry and CVCC are held at least once a year.</p> <p>5-2. The joint committees propose activities (e.g. Pilot Project Kaizen (PPK), open seminars and workshops) and implement according to their plans.</p> <p>5-3. 60% of student has in-company training (practical professional).</p>	<p>training) made by DGETI</p> <p>5-1. The minutes or documents of the joint committees for the linkage with the plastic industry.</p> <p>5-2. The minutes and/or analysis report by working group of CVCC of CNAD consisted of the related members included plastic related companies.</p> <p>5-3. The final report of Pilot Project Kaizen (PPK)</p> <p>5-4. The open seminar and/or workshop report by CNAD</p> <p>5-5. The report of DGETI and CETIS/CBTIS</p>	
<p>[Inputs]</p> <p>[The Mexican side]</p> <p>1. Provision and maintenance of building and facilities.</p> <p>(1) Office spaces and facilities necessary for the Japanese experts</p> <p>(2) Car for the Project activity and commuting necessary for the Japanese experts</p> <p>(3) Telephone and internet facilities necessary for the Japanese experts</p> <p>2. Allocation of CIP and administrative personnel</p> <p>(1) Project Director</p> <p>(2) Project Manager</p> <p>(3) Project Coordinator</p> <p>(4) Administrative staff, necessary number</p> <p>(5) Technical staff, necessary number</p> <p>(6) Supporting staff</p> <p>a. Secretary</p> <p>b. Driver</p> <p>c. Other necessary staff upon request by the Japanese experts (e.g. officers in the field of public-private partnership building)</p> <p>3. Provision of their maintenance for their machinery & equipment</p> <p>4. Model CETIS/CBTIS and its teachers</p> <p>5. Local Cost</p> <p>Necessary budget for the Project</p>	<p>[The Japanese side]</p> <p>1. Dispatch of Japanese Experts in the following fields</p> <p>(1) Chief Advisor/Team Leader</p> <p>(2) Expert in the field of injection molding technology</p> <p>(3) Expert in the field of plastic material technology</p> <p>(4) Expert in the field of mold technology for plastic injection maintenance)</p> <p>(5) Expert in the field of public-private partnership building.</p> <p>(6) Operational Coordinator</p> <p>2. Mexican CIP's training in Japan</p> <p>The number of CIP and their duration of training will be determined in accordance with the necessary each year.</p> <p>3. Provision of Minimum and Necessary Machinery & Equipment</p> <p>(1) Injection molding training equipment (injection molding machines mold exchange crane, etc.)</p> <p>(2) Mold assembly/maintenance equipment (mold for training, mold for material analysis, mold cleaning equipment, small heat treated furnace, etc.)</p> <p>(3) Analysis examination equipment (plastic flow analysis software, infrared thermography, etc.)</p> <p>4. Supporting Local Cost</p>		



5-5 CETIS/CBTIS implements company-visit and needs survey of human resource development of plastic industry.
5-6 CNAID implements open seminars and a workshops regarding to the plastic injection molding technology for the plastic industry in Mexico with the assistance of Japanese experts.

[Prerequisite]

DGETI ensures the budget, machinery and teachers for plastic transformation course at model CETIS/CBTIS.

Annex 3 Plan of Operation (Ver.1)

July 26, 2010 (Ver.1)

Tentative Plan of Operation (PO)
The Project for Human Resource Development in the Technology of Plastic Transformation

Calendar Year	2010												2011												2012												2013												2014											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Term of Technical Cooperation Project Period																																																												
Transferable Working Period in Mexico																																																												
0	CIVAO selects the candidates of the CIMAD instructors for the plastic injection molding technology.																																																											
1-1	Japanese experts review the equipments installed on the training needs.																																																											
1-2	Japanese experts make up the learning plan for the CIMAD instructors.																																																											
1-3	JICA provides the equipment for the practical training for the project in CIMAD.																																																											
1-4	Japanese experts lecture in related to the plastic injection molding technology, injection molding technology, mold and die for plastic injection molding to the CIMAD instructors.																																																											
1-5	Japanese experts have a practical training to the CIMAD instructors with the equipment.																																																											
1-6	Japanese experts conduct a test for CIMAD instructors to check the progress.																																																											
2-1	CIMAD, DIET and Japanese experts jointly deliver the draft curriculum of the plastic injection molding technology for the model CETIC/CBTIC teachers' training based on the needs of plastic CIMAD and Japanese experts lead to set up the joint curriculum contents including relevant parties then they discuss the curriculum.																																																											
3-1	CIMAD expert seminar implemented the plastic injection molding technology training course for the model CETIC/CBTIC teachers with the help of JAPANESE EXPERTS.																																																											
3-2	CIMAD set up and monitor the monitoring system on the management of the course.																																																											
4-1	CIMAD instructors advice the curriculum and its equipments at the model CETIC/CBTIC with the help of Japanese experts.																																																											
4-2	CIMAD conducts a test for the model CETIC/CBTIC ROOMMATE AT THE end of the training.																																																											
4-3	CIMAD instructors supervise the learning activities by the model CETIC/CBTIC teachers at the model CETIC/CBTIC with the help of Japanese experts.																																																											
5-1	CIMAD holds periodically a joint committee consisting of the representative of plastic industry.																																																											
5-2	CIMAD implements an open seminar regarding to the plastic injection molding technology for the plastic industry in Mexico with the help of Japanese experts.																																																											
5-3	CIMAD and Japanese experts support the model CETIC/CBTIC to hold a joint committee for making up the linkage between CIMAD and the plastic industry in Mexico.																																																											

Annex 4 Plan of Operation (Ver.2)

Tentative Plan of Operation (PO)
The Project for Human Resource Development in the Technology of Plastic Transformation

Calendar Year	2010												2011												2012												2013												2014											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
0	CNAO selects the candidates of the CNAO instructors for the plastic injection molding technology.																																																											
1-1	Japanese experts review the equipments list based on the training needs.																																																											
1-2	Japanese experts make up the training plan for the CNAO instructors.																																																											
1-3	JFA provides the equipment for the practical training for the project in CNAO.																																																											
1-4	Japanese experts lecture in related to the plastic material technology, injection molding technology, mold and die for plastic injection (maintenance) to the CNAO instructors.																																																											
1-5	Japanese experts provide a practical training to the CNAO instructors with the equipment.																																																											
1-6	Japanese experts conduct a test for CNAO instructors to monitor the progress.																																																											
2-1	CNAO, OGIETI and Japanese experts jointly review the draft curriculum of the plastic injection molding technology for the model CETSCBTS teachers training based on the needs of plastic industry.																																																											
2-2	CNAO and Japanese experts lead to set up CVCC rotating network panel their any discuss the curriculum.																																																											
3-1	CNAO experimentally implements the plastic injection molding technology training course for the model CETSCBTS teachers with the assist of Japanese experts.																																																											
3-2	CNAO sets up and holds the periodical meeting for monitoring and evaluation on the management of the course.																																																											
4-1	CNAO instructors select the curriculum and the equipment at the model CETSCBTS with the assist of Japanese experts.																																																											
4-2	CNAO conducts a test for the model CETSCBTS teachers at the end of the training.																																																											
4-3	CNAO instructors supervise the teaching activities by the model CETSCBTS teachers at the model CETSCBTS with the assist of Japanese experts.																																																											
5-1	CNAO holds periodically the joint committee consisting of the representatives of plastic industry with the assist of Japanese experts.																																																											
5-2	CNAO holds periodically CVCC consulting of the representatives of plastic industry with the assist of Japanese experts.																																																											
5-3	CNAO organizes the Pilot Project Forum (PPF) as a PPF building activity between CNAO and plastic industry with the assist of Japanese experts.																																																											
5-4	CETSCBTS holds the joint committee as PPF building activity between CETSCBTS and plastic industry with the assist of Japanese experts.																																																											
5-5	CETSCBTS implements company-visit and needs survey of human resource development of plastic industry.																																																											
5-6	CNAO implements open seminars and workshops regarding to the plastic injection molding technology for the plastic industry in Hokkaido with the assistance of Japanese experts.																																																											

Oct. 26, 2012 (Ver.2)

Annex 5 Achievements of Outputs

As of 25 October 2012

No.	Activities (PDM)	Activities conducted	Outputs (PDM)	Objectively Verifiable Indicators (PDM)	Observation
0	CNAD selects the candidates of the CNAD instructors for the plastic injection molding technology.	<ul style="list-style-type: none"> Completed. Nine candidate CNAD instructors were selected from November 2010 to March 2011. In spite of some of the candidates' personnel transfers and study abroad, the number of instructors has eventually reached the expected number of nine. Those nine instructors have been divided into three groups: "plastic material technology", "injection molding technology" and "mold and die for plastic injection". All of them have ever taken the same training given by the Japanese experts so that they are able to teach any subjects flexibly. Six of them have been working from the beginning of the Project. 			
1-1	Japanese experts review the equipment list based on the training needs.	<ul style="list-style-type: none"> Completed. A survey on the needs of the domestic plastic industry was carried out through the visits to the industrial associations and companies. The survey covered the SEP and DGETT's education system as well as curriculum of human resource development related to plastic transformation technology and the needs of related equipment. Based on the results of the survey, the recommendation on necessary equipment was given to JICA Mexico Office and CNAD and was agreed on at the JCC held in December 2010. 	The CNAD instructors become to train the CETIS/CBTIS teachers about the plastic injection molding technology.	<ul style="list-style-type: none"> 1-1. 9 instructors are assigned to the plastic injection molding technology course at CNAD. 1-2. 9 instructors pass the final evaluation test equivalent to the Japanese second grade of plastic injection molding technical certificate. 	<ul style="list-style-type: none"> 1-1. Nine instructors are currently assigned to the course at CNAD as planned. 1-2. A certain level of improvements in all the instructors has been confirmed according to the results of proficiency tests equivalent to the third grade of plastic molding technical certificate (C class). <p>The results of the mock technical certificate examination for the instructors conducted in October 2012 were by large satisfactory as planned.</p>
1-2	Japanese experts make up the training plan for the CNAD instructors.	<ul style="list-style-type: none"> Completed. The training plan (Plan de Capacitación) that outlines the details of technical transfer to the CNAD instructors was elaborated by Japanese experts to be well-structured as well as pragmatic 			

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No.	Activities (PDM)	Activities conducted	Outputs (PDM)	Objectively Verifiable Indicators (PDM)	Observation
1-3	<p>JICA provides the equipment for the practical training for the project in CNAD.</p>	<p>meeting the industry's needs. The training plan (Plan de Capacitación) was agreed on at the JCC held in December 2010. Completed.</p> <ul style="list-style-type: none"> The first tender for the procurement of the equipment was implemented by JICA Mexico Office in February 2011. The equipment such as plastic injection molding machine was installed in August 2011. The second procurement was implemented in January 2012. Installments and initial performance checks of all the equipment were completed at CNAD in July 2012. The procurements of equipment were completed about one year earlier than the original plan (See the Annex 9). 			
1-4	<p>Japanese experts lecture related to the plastic material technology, injection molding technology, mold and die for plastic injection (design and fabrication) to the CNAD instructors.</p>	<ul style="list-style-type: none"> In progress. A total of 281-hour technical transfer to the CNAD instructors, comprised of 81 theoretical and 37 practical trainings, was conducted as planned. (See the Annex 10). The attendance rate was about 70 to 80% due to their multiple functions at CNAD or their second jobs outside of CNAD. The lectures on theories were initially given to the CNAD instructors by Japanese experts. Subsequently, the CNAD instructors delivered lectures to review the same subjects under observation of Japanese experts. Through the lectures to review, the instructors' level of understanding was evaluated by Japanese experts. Follow-up lectures were given when the instructors did not fully understand. At Japanese experts' absence, the assignments for the instructors such as visits to the companies related 			

No.	Activities (PDM)	Activities conducted	Outputs (PDM)	Objectively Verifiable Indicators (PDM)	Observation
1-5	Japanese experts have a practical training to the CNAD instructors with the equipment.	<p>to plastic transformation and group works were given to the CNAD instructors.</p> <p>In progress.</p> <ul style="list-style-type: none"> Practical trainings with equipment for the instructors began in September 2011. It was commenced earlier than planned for the purpose of effective and efficient technical transfer making use of the equipment. The trainings have been made tailored according to the needs of individual instructors so that each instructor can deepen their comprehension. The instructors have come to realize that it is necessary to understand the principle of plastic transformation well. 			
1-6	Japanese experts conduct a test for CNAD instructors to check the progress.	<p>In progress.</p> <ul style="list-style-type: none"> The evaluation on the CNAD instructors' capacity as a baseline survey was implemented in January 2011. The effects on the technical transfer have been measured by the results of proficiency test conducted twice a year. The tests have been conducted after the instructors delivered the lectures to CETIS/CBTIS teachers. The results of the three tests have been reflected in the contents of the trainings. A certain level of improvements in all the instructors has been confirmed; the average score of the third test was 81 points whereas that of the second one was 55¹³. However, there are some variations in the instructors' capacity. Practical test was introduced in October 2012 for the first time. 			
2-1	CNAD, DGETI and	In progress.	The training	2-1. CNAD develops the	2-1. CNAD has developed the curriculum of

¹³ The level of the first proficiency test was easier than the second and third ones. While the level of the test will be gradually higher as the Project progresses, the test at the same level as the second one will be conducted continuously in order to measure instructors' progress in understanding the subject.

No.	Activities (PDM)	Activities conducted	Outputs (PDM)	Objectively Verifiable Indicators (PDM)	Observation
	<p>Japanese experts jointly review the draft curriculum of the plastic injection molding technology for the model CETIS/CBTIS teachers training based on the needs of plastic industry.</p>	<ul style="list-style-type: none"> Based on the industry's needs, the advice has been given on the draft curriculum of plastic injection molding technology for the Módulos I, II and III (Contenido de Cursos). 	<p>curriculum which matches with the needs of the plastic industry in Mexico for the plastic injection molding technology to train the CETIS/CBTIS teacher is made up at CNAD.</p>	<p>2-2. The committee consisted by CNAD and the representative from the plastic industry approves the curriculum.</p>	<p>the training (Contenido de Cursos) for the Módulos I, II and III as planned. CVCC elaborated the curriculum of the training (Contenido de Cursos) for the Módulos I, II and III to meet the industry's needs and approved them. CVCC modified the contents of the second training for the Module I reflecting the teachers' requests and the feedbacks collected at the end of the classes at CETIS/CBTIS.</p>
2-2	<p>CNAD and Japanese experts lead to set up CVCC including relevant parties then they discuss the curriculum.</p>	<ul style="list-style-type: none"> In progress. CVCC was established in March 2011 to discuss and approve the contents of the training curriculum for CETIS/CBTIS teachers (Contenido de Cursos) to continuously meet the industry's needs. The committee consists of the representatives of the industry, CNAD, DGETI and the model CETIS/CBTIS teachers. A CVCC meeting has been held just before the biannual training for CETIS/CBTIS teachers, which has been conducted half a year before the corresponding module is given at CETIS/CBTIS. The Modules I "Prepare materials for molding", II "Mold plastic by the process of extrusion" and III "Mold plastic by the process of injection" of the curriculum (Contenido de Cursos) were authorized at the second to the seventh CVCC meetings. The Agendas of the meetings were the approval process of the curriculum (Contenido de Cursos), measures to be taken by working groups organized by a module basis among others. CVCC agreed to make a rule that the curriculum (Contenido de Cursos) should be reviewed every two to three years¹⁴. 			

¹⁴ The frequency of the revision for the curriculum (Contenido de Cursos) depends on the module.

No.	Activities (PDM)	Activities conducted	Outputs (PDM)	Objectively Verifiable Indicators (PDM)	Observation
3-1	<p>CNAD experimentally implements the plastic injection molding technology training course for the model CETIS/CBTIS teachers with the help of Japanese experts.</p>	<p>In progress.</p> <ul style="list-style-type: none"> The plastic injection molding technology group was organized at CNAD in October 2010, at the beginning of the Project. The group consists of nine -CNAD instructors that gives trainings for CETIS/CBTIS teachers. As the training for the model CETIS/CBTIS teachers, the following modules were conducted: the Module I (August to September 2011), the Module II (November to December 2011), the Module III and the Module I for the second time with the equipment (August 2012). The Modules I and III have been directly supported by the Project. 	<p>The training course of plastic injection molding technology for the CETIS/CBTIS teachers is set up and managed efficiently at CNAD.</p>	<p>3-1. CNAD creates the new group to implement the plastic injection molding technology course.</p> <p>3-2. CNAD prepares the logistic for the implementation of the training course, implement the training course based on the training plan, monitor the progress of the course, and feedback the result of the implementation of the course to improve the following courses so far supported by Japanese experts.</p> <p>3-3. Periodical management meeting for the training course is held.</p>	<p>3-1. The plastic injection molding technology group has been established and active at CNAD.</p> <p>3-2. CNAD has prepared the logistics for the implementation of the training course, implemented the training course based on the training plan, monitored the progress of the course, and collected feedbacks regarding the results of the implementation of the course in order to improve the following courses so far supported by Japanese experts.</p> <p>The trainings for CETIS/CBTIS teachers are given every half a year. In the due course, two to three modules are to be conducted at the same time. Taking into account the burden on both CNAD instructors and the teachers who have multiple functions or their second jobs, it is supposed that CNAD and CETIS/CBTIS continuously assign the instructors and teachers to the Project to conduct the trainings at CNAD.</p> <p>Moreover, the possible measures are recommended to be taken on the monitoring on teaching activities at CETIS/CBTIS on a regular basis.</p> <p>3-3. The planning for the training course has been regularly examined by Japanese experts together with the instructors so that the instructors will be capable of doing it by themselves.</p>
3-2	<p>CNAD sets up and holds the monitoring committee on the management of the course.</p>	<p>In progress.</p> <ul style="list-style-type: none"> The monitoring system with the use of the five kinds of monitoring formats has been established. The monitoring and evaluation meetings have been held within a month after each training for CETIS/CBTIS teachers instead of the monitoring committee. A total of four meetings have taken place so far. One of the formats was improved by introducing technical criteria for evaluation and has been utilized since the fourth meeting. Japanese experts started to follow up instructors' teaching activities at CETIS/CBTIS since then as well. The meeting has been held through video conference with the attendance of the three model CETIS/CBTIS teachers. It has facilitated exchanges of feedbacks among those teachers, CNAD instructors and Japanese experts. 			
4-1	<p>CNAD instructors advise the curriculum and its</p>	<p>In progress.</p> <ul style="list-style-type: none"> Japanese experts advised that the two subjects 	<p>The curriculum and practical training of</p>	<p>4-1. The model CETIS/CBTIS opens</p>	<p>4-1. The plastic transformation technology course at CETIS/CBTIS has been conducted with</p>

No.	Activities (PDM)	Activities conducted	Outputs (PDM)	Objectively Verifiable Indicators (PDM)	Observation
	<p>equipment at the model CETIS/CBTIS with the help of Japanese experts.</p>	<p>"plastic material technology" and "mold and die for plastic injection" are especially important to comprehend all the five modules to be taught at CETIS/CBTIS. The curriculum (Plan de Estudio) was revised based on the Japanese experts' advice.</p> <ul style="list-style-type: none"> The CNAD instructors have advised on the curriculum for the model CETIS/CBTIS teachers' use (Plan de Estudio). The session for educational material elaboration has been held during the training. After the training, the CNAD instructors have given advice to CETIS/CBTIS teachers on request basis while the teachers prepare for the classes in accordance with SEP's outline. The instructors have given advice on the specifications, layouts and preparation for wirings for the installation of plastic injection molding machine to be installed at CETIS/CBTIS. 	<p>the plastic injection molding technology subject which is set in the plastic transformation technology course at model CETIS/CBTIS selected by Mexican side is made up and improved to match with the needs of the plastic industry in Mexico.</p>	<p>the plastic transformation technology course with the curriculum authorized by DGETI. 4-2. The model CETIS/CBTIS incorporates the plastic injection molding technology component into the course. 4-3. The curriculum is reviewed by DGETI periodically based on the needs of the plastic industry.</p>	<p>the curriculum (Plan de Estudio) authorized by DGETI based on the industry's needs identified by the Project survey. 4-2. It was authorized to incorporate the components related to the plastic injection molding technology into the curriculum (Plan de Estudio) by DGETI. The Module I was conducted for the students in the first generation in February to June 2011. The classes were highly evaluated by both CNAD instructors and Japanese experts. The Module III "plastic injection molding technology" is to be taught at CETIS/CBTIS in February 2013. 4-3. The draft curriculum (Plan de Estudio) was reviewed and revised by DGETI. The purpose for the reviews is to ensure that the curriculum (Plan de Estudio) appropriately meets the industry's needs taking into account the teaching practices at CETIS/CBTIS. Frequencies of monitoring at CETIS/CBTIS are insufficient.</p>
4-2	<p>CNAD conducts a test for the model CETIS/CBTIS teachers at the end of the training.</p>	<p>In progress.</p> <ul style="list-style-type: none"> The proficiency test for the model CETIS/CBTIS teachers has been conducted just before they give classes, that is, half a year after the training. The test for the teachers who attended the training Module I was conducted in February 2012. 			
4-3	<p>CNAD instructors supervise the teaching activities by the model CETIS/CBTIS teachers at the model CETIS/CBTIS with the help of Japanese experts.</p>	<p>In progress.</p> <ul style="list-style-type: none"> The plastic injection molding technology course at the model CETIS/CBTIS has been run since October 2011. The Module I was conducted in the second semester⁵ (February 2012) and the Module II in the third one (September 2012). However, the monitoring for the teaching activities at those CETIS/CBTIS has been conducted mostly only by 			

¹⁵ An academic year consists of two semesters, and therefore a three-year plastic injection molding technology course consists of six semesters.

No.	Activities (PDM)	Activities conducted	Outputs (PDM)	Objectively Verifiable Indicators (PDM)	Observation
5-1	<p>CNAD holds periodically a joint committee consisting of the representative of plastic industry.</p>	<p>Japanese experts and has not been realized by the CNAD instructors regularly due to the limitation of CNAD's budget for travel expenses.</p> <p>In process.</p> <ul style="list-style-type: none"> The joint committee between CNAD and the plastic industry was established at CNAD in February 2012. The joint committee meetings have been held three times so far. The following three activities have been conducted in coordination with the industry: 1) CVCC (See the Activity 2-2). 2) Pilot Project of Kaizen (PPK), which was adopted at the second joint committee meeting held in June 2012. CNAD's technical service delivery for private companies is also the opportunities for the CNAD instructors to improve their practical ability on production site. The instructors provide consultations on productivity and quality improvements to the four pilot companies. The presentations on the results are to be made at the seminar scheduled in February 2013. PPK has been implemented based on the annual road map. 3) Open seminar (See the Activity 5-2). 	<p>The joint committee for the linkage among CNAD, the model CETIS/CBTIS and the plastic industry is set up.</p>	<p>5-1. The periodical meeting of CNAD and the plastic industry is held.</p> <p>5-2. The open seminar is held according to the annual plan of CNAD.</p>	<p>5-1. As the contents of the public private partnership activities have become concrete, each CVCC meeting has taken place before the training for CETIS/CBTIS teachers. PPK was proposed with its annual road map. The meetings for PPK have been held in accordance with it.</p> <p>The joint committees for the linkage between CETIS/CBTIS and the plastic industry have been established at each project site.</p> <p>5-2. The open seminar/workshops for plastic companies have been held three times so far.</p>
5-2	<p>CNAD implements an open seminar and a workshop regarding the plastic injection molding technology for the plastic industry in Mexico with the help of Japanese experts.</p>	<p>In progress.</p> <ul style="list-style-type: none"> The following seminars have been held so far: International Seminar (February 2012), a seminar for companies held on request (June 2012) and an open seminar targeting the pilot companies for PPK and others (September 2012). 			
5-3	<p>CNAD and Japanese experts support the model CETIS/CBTIS to hold a joint committee for making up the linkage</p>	<p>In progress.</p> <ul style="list-style-type: none"> The joint committee was organized at CBTIS No.271 in June 2012. It is a school that is newly established in Ciudad Victoria at the beginning of the Project. The same committee had been 			

No.	Activities (PDM)	Activities conducted	Outputs (PDM)	Objectively Verifiable Indicators (PDM)	Observation
	<p>between it and the plastic industry in Mexico.</p>	<p>established at CETIS No.6 in Mexico City and CBTIS No.237 in Tijuana before the commencement of the project.</p> <ul style="list-style-type: none"> • CETIS/CBTIS teachers have come to realize the industry's needs, which have been reflected in the contents of their classes. • The following research activities to identify the needs for human resources have been conducted: a research to identify enterprises seeking for interns, and a survey to identify companies that are willing to recruit graduates from those CETIS/CBTIS. Each CETIS/CBTIS has started preparing the company data base. 			

Note: *Please refer to the "Abbreviations" at the beginning of the text.
 **"Curriculum" (Contenido de Cursos/Plan de Estudio) means not only educational materials but guidelines and outlines for the plastic transformation technology course.

Annex 6 Evaluation Grid

As of 25 October 2012

Evaluation Criteria	Evaluation Questions		Observation
	Main Questions	Sub Questions	
Relevance	Consistency with the development policies of Mexico	<p>Is the Project's Overall Goal in accordance with the priority of development policies of the Mexican government?</p> <p><u>Overall Goal:</u> Centro de Estudios Tecnológicos Industrial y de Servicios/Centro de Bachillerato Tecnológico Industrial y de Servicios (CETIS/CBTIS) which set up the course of the plastic transformation technology will contribute to turn out the quality labor force to the plastic industry in Mexico.</p>	<ul style="list-style-type: none"> • "Competitive economy and employment generation" is listed in the Mexican Development Plan (Plan Nacional de Desarrollo) formulated in May 2007 as one of its priority areas. • The actual government gives top priority to development of SMEs and local supporting industries in its economic policies. Since the conclusion of the EPA between Japan and Mexico in April 2005, the Mexican government has attracted Japanese companies and direct investments and above all has promoted the export from Japanese automaker in Mexico and so on. Regardless of the change of government scheduled for December 2012, it is anticipated that there are no big changes in the policies. • DGETI has been working on the modification of the curriculums so that the graduates from CETIS/CBTIS will be able to obtain employment in the industries related to their courses. These competence-based curriculums reinforce the training of technical workers based on the needs of the industries.
	Consistency with the Japan's ODA policies and JICA's aid policies	<p>Is the Project in line with the Japanese government's assistance policies and JICA's aid policies in general and for Mexico?</p>	<ul style="list-style-type: none"> • Japan's ODA policies give importance to the cooperation in Mexican industrial field that will lead to even closer economic ties between the two countries. • The Project is situated in JICA's Program for Strengthening the Competitiveness of SMEs and the Supporting Industry.
	Consistency with the target group's needs	<p>Is the Project Purpose in line with the target group's (CNAD instructors and the model CETIS/CBTIS teachers) needs?</p>	<ul style="list-style-type: none"> • Both the CNAD instructors and the model CETIS/CBTIS teachers have clearly expressed that the Project Purpose fulfills their needs. • The plastic injection molding technology covers more than half of the plastic production in Mexico. The human resources with the technology are much needed in the industry as well.
	Appropriateness of the Project approach	<p>Is the adoption of cascaded trainings based on the industry's needs in line with the target group's (CNAD instructors and the model CETIS/CBTIS teachers) needs?</p>	<ul style="list-style-type: none"> • Some representatives of the industry organizations have stated that it has been appropriate to have adopted cascaded trainings which consist of the trainings for the CNAD instructors, those for the model CETIS/CBTIS teachers and the course for CETIS/CBTIS students.
	Appropriateness of	<p>Has the target group been properly selected?</p>	<ul style="list-style-type: none"> • It has been observed that the target group has been properly selected from the

Evaluation Criteria	Evaluation Questions		Observation
	Main Questions	Sub Questions	
	the selection of the target group		<p>point of view of model project implementation taking into account slight differences among the industrial structures of the regions where the three model CETIS/CBTIS are and the distance from Mexico City where the implementation organization of the Project is.</p> <ul style="list-style-type: none"> It has been observed that both CNAD instructors and CETIS/CBTIS teachers meeting the selection criteria have been assigned to the Project.
	Special consideration	Are there any assiduities for gender issues, social stratification, environment, ethnic groups, etc.?	<ul style="list-style-type: none"> It has been observed that nothing special should be taken into consideration so far.
	Japan's cooperation's comparative advantages	Does Japan have technological and empirical advantages in supporting capacity development in plastic injection molding technology?	<ul style="list-style-type: none"> Japan has comparatively high technologies in the plastic injection molding technology in general and especially has advantages in teaching its theories. It has rich experiences in the cooperation in the injection molding technology in other countries as well. Japan is well experienced in human resource development in the mechatronics field at CNAD.
Effectiveness	Degree of achievement of the Project Purpose	<p>To what degree have the Project Purpose's Objectively Verifiable Indicators (OVIs) been achieved?</p> <p><u>Project Purpose:</u> The capacity to train the instructors of the plastic injection molding technology in CETIS/CBTIS is improved at CNAD.</p> <p><u>OVI's:</u> 1. 9 instructors whose skill level is equivalent to Japanese second grade of plastic injection molding technical certificate are trained at</p>	<ul style="list-style-type: none"> Almost 100% of the planned activities has been conducted so far. Nine instructors have been assigned to the plastic injection molding technology course. The target of technical transfer has been attained according to the results of conducted three proficiency tests (C class¹⁶). The results of the mock technical certificate examination for the instructors conducted in October 2012 were by large satisfactory as planned. One-month-trainings for the model CETIS/CBTIS teachers were conducted as follows: the Module I "plastic material" (targeting 9 teachers, August to September 2011) and the Modules III "plastic injection molding technology" and I for the second time with the equipment (targeting 6 and 4 teachers respectively, August 2012). The curriculum for those modules (Contenido de Cursos) has been approved at CVCC meeting the industry's

¹⁶ C class is equivalent to the Japanese third grade of the plastic molding technical certificate. The level of the test will be gradually higher as the Project progresses.

Evaluation Criteria	Evaluation Questions		Observation
	Main Questions	Sub Questions	
		CNAD. 2. The plastic injection molding technology course at CNAD is managed according to the needs of the plastic industry. 3. 18 teachers of the model CETIS/CBTIS are trained and pass the final evaluation at CNAD. What is the prospect of achieving the Project Purpose?	needs. 3. 14 CETIS/CBTIS teachers in total have been trained so far ¹⁷ . • It is expected highly probable to achieve the Project Purpose. 1. The trainings putting emphasis on the practice on the plastic transformation technology have been given since September 2012 as planned. The technical transfer is anticipated to be accelerated. 2. It is anticipated that qualitative improvements in technical transfer will be facilitated through two more trainings for the Modules I, III and V respectively planned by the Project completion. Furthermore, it is anticipated that the trainings for CETIS/CBTIS teachers will be given based on the curriculum (Contenido de Cursos) approval at CVCC reflecting the industry's needs. 3. It is anticipated that two more trainings for the Modules I, III and V respectively will be given before the final evaluation for CETIS/CBTIS teachers. Also, four proficiency tests will be conducted.
	Cause-and-Effect relationship	Are the Outputs sufficient to achieve the Project Purpose? Is the Important Assumption for achieving the Project Purpose being met? <u>Important Assumption:</u>	• The Output 5 mentions the establishment of the joint committee for building the linkages among CNAD, the model CETIS/CBTIS and the plastic industry. It can be assumed that the established joint committee should be efficiently managed for the purpose of achieving the Project Purpose. • It has been observed that the Important Assumption that "trained instructors remain at CNAD" is being met.

¹⁷ A total number of the trained teachers is 19, 5 of whom have attended another module. In addition, 7 teachers have attended the training for Module II that has not been directly supported by the Project.

Evaluation Criteria	Evaluation Questions		Observation
	Main Questions	Sub Questions	
		Trained instructors remain at CNAD.	
	Factors that contribute to the achievement of the Project Purpose	Have there been any factors that contribute to the achievement of the Project Purpose?	<ul style="list-style-type: none"> • Interviewed players have been observed highly committed to the Project. • The Project activities have been smoothly conducted with the accumulated experiences through the cooperation in the mechatronics field at CNAD. Seven of the nine instructors and many of the players and related parties have ever participated in JICA's training in Japan. • With CNAD's activities accepted by private companies, some of the companies have come to offer the instructors their job site with the equipment such as extrusion blow molding machine that CNAD does not own for their practices. • The needs for improvements in the plastic transformation technology have been becoming larger due to the largely increasing exports of automobile and the rising demand for medical device. • Most of the CNAD instructors and CETIS/CBTIS teachers have limited to dedicate to the Project activities due to their time multiple functions or second jobs. • CNAD has a limited annual budget allocated by DGETI. It has been the same amount for 18 years regardless of the expansion of its activities. It is difficult to secure the budget for Project activities, especially travelling expenses to monitor the teaching activities at the model CETIS/CBTIS. • The first installment of the equipment for the Modules, I, II and III at the model CETIS/CBTIS financed by IDB has been delayed and scheduled for February 2013. The first generation will not take classes with the equipment. However, the teachers have ingeniously attempted to give alternative classes for complement. A part of the equipment for the Modules IV and V has been scheduled to be purchased in the following fiscal year due to the extremely large budget allocated to the plastic transformation technology course per number of the students compared with other courses.
	Factors that impede the achievement of the Project Purpose	Have there been any factors that impede the achievement of the Project Purpose?	<ul style="list-style-type: none"> • All interviewed players have commented that the assignment of Japanese experts has been appropriate in terms of their number, their expertise and capabilities,
Efficiency	Appropriateness	How appropriate has the assignment of Japanese experts been in terms of their number, their expertise and capabilities, and the	

Evaluation Criteria	Evaluation Questions		Observation
	Main Questions	Sub Questions	
	of Inputs by Japan	assignment periods and timing?	<p>and the assignment periods and timing.</p> <ul style="list-style-type: none"> The expert in PPP building was initially in charge of both PPP building and the operational coordination. Taking into account the importance of the activities for PPP building, an expert in operational coordination was additionally dispatched. The expert in PPP building has been the dedicated expert since April 2011. The related activities have been progressing further than originally planned. It has been observed that technical transfer has been efficiently conducted through Japanese experts' careful follow-up.
	How appropriate has the equipment provision been in terms of their model, number and the timing?		<ul style="list-style-type: none"> All interviewed players have commented that the equipment provision has been appropriate. Installments of all the equipment were completed at CNAD in July 2012, earlier than originally planned. A part of the training for the CNAD instructors with the equipment was conducted ahead of initial schedule and was timely and efficient.
	Appropriateness of Inputs by the Mexican side	How appropriate has the assignment of C/Ps been in terms of their number, duties and capacity?	<ul style="list-style-type: none"> There were some moments when the number of instructors did not reach the expected number of nine. However, their assignment has been almost appropriate so far in terms of their number, duties and capacity. With PPP building activities materialized, the person in charge at CNAD has come to dedicate more to the Project since October 2012.
		Has the Mexican government's budget for the Project been appropriate in scale and for timing?	<ul style="list-style-type: none"> CNAD has a limited annual budget allocated by DGETI. It is difficult to secure the budget for Project activities, especially travelling expenses to monitor the teaching activities at the model CETIS/CBTIS. The first installment of the equipment at the model CETIS/CBTIS financed by IDB has been delayed. A part of the equipment has been scheduled to be purchased in the following fiscal year.
	Performance of Oversight Committee	Has the Joint Coordination Committee functioned appropriately?	<ul style="list-style-type: none"> The Joint Coordination Committee meetings have taken place annually and have functioned appropriately.

Evaluation Criteria	Evaluation Questions		Observation
	Main Questions	Sub Questions	
	Cooperation with other organizations/projects	Has there been any cooperation with other organizations or projects that has increased the efficiency of the Project?	<ul style="list-style-type: none"> The organizations that have been coordinating PPP building activities are as follows: <ul style="list-style-type: none"> - ANIPAC and CANACINTRA, promoting the partnership between CNAD and the industry at national level; - AEL, promoting the partnership between CNAD and the industry as well as between CETIS 6 and the industry in Mexico City; - CVT, promoting the partnership between CBTIS 271 and the industry in Tamaulipas; and - CVT, promoting the partnership between CBTIS 237 and the industry in Tijuana. The closer partnership will be expected between CBTIS 237 and SEDECO that was the C/P of JICA's completed "Project for Human Resource Development for the Electronics Industry in Maquiladora Zone in Baja California". The closer partnership will be expected between CNAD and JETRO. The exchange of information among the three model CETIS/CBTIS teachers has been increased the efficiency of the Project, which should be more active. There are some scholarships for high school students in Mexico. In addition, DGETI's internship scholarship system is to be applied to the students of the plastic transformation technology course in 2013, which may contribute to the increase in opportunities for internship.
Impact	Other factors that have increased or decreased the efficiency of the Project Prospects of achieving the Overall Goal	Have there been any other factors that have increased or decreased the efficiency of the Project? Will the Overall Goal be achieved in 3 to 5 years after the completion of the Project? Are the OVIs for the Overall Goal still valid? <u>Overall Goal:</u> Centro de Estudios Tecnológicos Industrial y de Servicios/Centro de Bachillerato Tecnológico Industrial y de Servicios (CETIS/CBTIS) which set up the course of the plastic	<ul style="list-style-type: none"> It is difficult to judge the prospect of achieving the Overall Goal due to the absence of concrete indicators and the following reasons. <ol style="list-style-type: none"> 1. The graduation of the first generation of the plastic transformation technology course is scheduled in August 2014. 2. There are some possible patterns such as the extension of class at the present model CETIS/CBTIS, the extension of the CETIS/CBTIS with the plastic transformation technology course among others. However, it is unable to be mentioned in front of the change of the government.

Evaluation Criteria	Evaluation Questions		Observation
	Main Questions	Sub Questions	
		<p>transformation technology will contribute to turn out the quality labor force to the plastic industry in Mexico.</p> <p><u>OVI:</u></p> <ol style="list-style-type: none"> 1. The number of qualified graduates from the plastic transformation technology course in CETIS/CBETIS. 2. The number of the plastic transformation technology course in CETIS/CBTIS. 3. The number of graduates employed by plastic industry. 4. The number of proceed to faculty / department of university which related plastic industry from the plastic transformation technology course in CETIS/CBTIS. 	<ol style="list-style-type: none"> 3. The graduation of the first generation of the plastic transformation technology course is scheduled in August 2014. 4. The graduation of the first generation of the plastic transformation technology course is scheduled in August 2014. <ul style="list-style-type: none"> • It is indispensable for the Mexican government to elaborate the extension plan for the plastic transformation technology course at CETIS/CBTIS based on the needs of the industry and the regions. • The Project's PDM is to be modified by clarifying and materializing the indicators.
	Cause-and-Effect relationship	<p>Are the Project Purpose sufficient to achieve the Overall Goals?</p> <p>Is the Important Assumption for achieving the Overall Goal being met?</p> <p><u>Important Assumption:</u> Mexican government maintains functions of CNAD for the training of the CETIS/CBTIS teachers.</p>	<ul style="list-style-type: none"> • The model CETIS/CBTIS teachers are required to acquire the knowledge and skills needed to teach all five modules to achieve the Overall Goal. It has been observed that Japanese experts should indirectly continue supporting the trainings on extrusion molding technology and thermal process technology conducted by CNAD along with the other three modules dealt with in the Project. • It is anticipated that there are no big changes in the policies related to the Project regardless of the change of government scheduled for December 2012.
	Other aspects	<p>Are there any unexpected positive and negative impacts?</p>	<ul style="list-style-type: none"> • It has been observed that the Project has indirectly affected the industry to come to realize the necessity to human resource development.

Evaluation Criteria	Evaluation Questions		Observation
	Main Questions	Sub Questions	
			<ul style="list-style-type: none"> • Many of the related parties at the model CETIS/CBTIS, especially those of CBTIS 237 in Tamaulipas that has newly established at the commencement of the Project, have commented that the efficient implementation of the plastic transformation technology course should lead to the schools' development. • The Project could indirectly promote women's participation in society as the ratio of female students at CBTIS 271 in Tamaulipas. • There is a possibility that the distance learning system that the team of JICA senior volunteers assigned to CNAD has just started building will meet some needs of the Project.
Sustainability	Political and institutional aspects	What is the prospect of the Mexican government to continue training CETIS/CBTIS teachers on the plastic injection molding technology?	<ul style="list-style-type: none"> • It is anticipated that the Mexican government will continue training CETIS/CBTIS teachers on the plastic injection molding technology due to the growing needs of the industry.
		Will CNAD's operational capacity be sufficient to continue training CETIS/CBTIS teachers on the plastic injection molding technology to expand the benefits derived from the Project after the Project's completion?	<ul style="list-style-type: none"> • CNAD's operational capacity is expected to be sufficient to continue training CETIS/CBTIS teachers on the plastic injection molding technology to expand their activities even after the Project's completion. The instructors and the persons in charge of logistics have been properly assigned to the plastic injection molding technology course. In addition, CNAD has been enhancing the functions of human resource development in the Project based on those maintained in the mechatronics field.
	Financial aspects	What is the prospect of securing CNAD (DGETI)'s financial sustainability?	<ul style="list-style-type: none"> • CNAD's annual budget allocated by DGETI has been approximately 3 million pesos since its establishment in 1994. It is anticipated that CNAD's financial sustainability will be secured at a certain level according to the related parties' opinions. It should be expected that the Mexican government secure annual budget necessary for the Project implementation until the achievement of the overall goal of the Project. CNAD has a concept to give trainings targeting private companies for income generation.
	Technical aspects	Are CNAD instructors being trained sufficiently in number and quality? Will they be able to maintain their capacity and to transfer the knowledge to CETIS/ CBTIS teachers?	<ul style="list-style-type: none"> • CNAD instructors have been trained sufficiently in number and quality so far. Judging from the results of proficiency tests, it is expected that they will keep on building their capacities as planned and will continue technical transfer to CETIS/CBTIS teachers.

Annex 7 List of Assignments of Japanese Experts

2010(the fiscal year)

Job Title	Name	Period in Mexico
Chief Advisor	Mr. Akihiro INADA	30 October 2010 – 18 December 2010 17 January 2011 - 14 March 2011
Sub-chief / Expert in the field of injection molding technology	Mr. Yuichi FUKUSHIMA	30 October 2010 – 18 December 2010 10 January 2011 - 28 February 2011
Expert in the field of plastic material technology	Mr. Sadakatsu HASHIMOTO	10 January 2011 - 14 March 2011
Expert in the field of mold technology for plastic injection maintenance	Mr. Makoto NAKAZAWA	30 January 2011 - 14 March 2011
Expert in the field of public-private partnership building / Operational Coordinator	Mr. Shuichi TAKANO	30 October 2010 – 18 December 2010 10 January 2011 - 12 March 2011

2011 (the fiscal year)

Job Title	Name	Period in Mexico
Chief Advisor	Mr. Akihiro INADA	30 May 2011 – 17 July 2011 13 September 2011 – 12 November 2011 17 January 2012 - 3 March 2012
Sub-chief / Expert in the field of injection molding technology	Mr. Yuichi FUKUSHIMA	30 May 2011 – 17 July 2011 11 September 2011 – 8 November 2011 14 January 2012 - 3 March 2012
Expert in the field of plastic material technology	Mr. Sadakatsu HASHIMOTO	11 September 2011 – 7 October 2011 29 January 2012- 18 February 2012
Expert in the field of mold technology for plastic injection maintenance	Mr. Makoto NAKAZAWA	13 June 2011 – 3 July 2011 17 October 2011 – 12 November 2011 3 February 2012- 3 March 2012
Expert in the field of public-private partnership building	Mr. Shuichi TAKANO	30 May 2011 – 17 July 2011 11 September 2011–12 November 2011 15 January 2012 - 3 March 2012
Operational Coordinator	Ms. Tomoko INABA	30 May 2011 – 17 July 2011 11 September 2011–12 November 2011 14 January 2012 - 3 March 2012

2012 (the fiscal year)

Job Title	Name	Period in Mexico
Chief Advisor	Mr. Akihiro INADA	12 May 2012 - 27 May 2012 16 June 2012 - 8 July 2012 9 September 2012 - 18 November 2012
Sub-chief / Expert in the field of injection molding technology	Mr. Yuichi FUKUSHIMA	12 May 2012 - 8 July 2012 16 September 2012 - 18 November 2012
Expert in the field of plastic material technology	Mr. Sadakatsu HASHIMOTO	9 June 2012 - 8 July 2012 19 August 2012 - 26 August 2012 29 September 2012 - 4 November 2012
Expert in the field of mold technology for plastic injection maintenance	Mr. Makoto NAKAZAWA	2 June 2012 - 8 July 2012 19 August 2012 - 26 August 2012 9 September 2012 - 14 October 2012
Expert in the field of public-private partnership building	Mr. Shuichi TAKANO	27 May 2012 - 8 July 2012 23 September 2012 - 29 October 2012
Operational Coordinator	Ms. Tomoko INABA	12 May 2012 - 8 July 2012 19 August 2012 - 26 August 2012 9 September 2012 - 18 November 2012

Annex 8 List of Counterpart Personnel

No	Job Title	Counterpart Name
1	Director Centro Nacional de Actualización Docente (CNAD)	Mr. Jimmy de la Hoz Cortés
2	Technical Subdirector Centro Nacional de Actualización Docente (CNAD)	Dr. Jorge Alejandro Butrón Guillén
3	Group Leader Centro Nacional de Actualización Docente (CNAD)	Mr. Salvador Téllez Salero
4	Material Resources Chief Centro Nacional de Actualización Docente (CNAD)	Mr. Martín Fitz Montes
5	Mechanical Engineering Teacher Centro Nacional de Actualización Docente (CNAD)	Mr. Juan Carlos Rivera
6	Evaluation and Quality Manager Centro Nacional de Actualización Docente (CNAD)	Mr. Gabriel Alegría Espinosa
7	Mechanical Engineering Teacher Centro Nacional de Actualización Docente (CNAD)	Mr. César López Chávez
8	Control Engineering Teacher Centro Nacional de Actualización Docente (CNAD)	Mr. Felipe de Jesús Riveros Castero
9	Human Resources Manager Centro Nacional de Actualización Docente (CNAD)	Mr. Freddy Gómez Sánchez
10	Control Engineering Teacher Centro Nacional de Actualización Docente (CNAD)	Mr. Enrique Alberto León Turrubiates
11	Centro Nacional de Actualización Docente (CNAD)	Mr. Francisco Javier González Nava

Annex 9 List of Equipment

№	Name of Machinery and Equipment	2010	2011
		Qty.	Qty.
1	Plastic injection molding machine with one set of necessary spare parts (Clamping force: 50t)		1
2	Plastic injection molding machine with one set of necessary spare parts (Clamping force: 80t - 100t)	1	
3	Dryer	1	
4	Mold temperature controller	1	
5	Mixer	1	
6	Mill	1	
7	Portable gate type crane	1	
8	Mold Chiller	1	
9	Installation for connecting new machines on electrical power, hydraulic force and air pressure	±	
10	Mold washer	1	
11	Mold for tub-testers according to ASTM	1	
12	Molds for primary training course		1
13	Molds for intermediate training course		1
14	Molds for understanding injection molding technology		1
15	Mold padding welder		1
16	Mold polisher		4
17	Kit to maintenance of molds	1	
18	Hoses and couples for molds	±	
19	[A]Mold flow software		1
	[B]Mold flow software		3
20	Melt flow indexer	1	
21	Handy digital thermometer	2	
22	Infrared thermography		1
23	Digital hygrometer	2	
24	Inprocess measuring system for plastic flow pressure and plastic temperature	1	
25	Digital balance	1	
26	Universal testing machine for plastics		1
27	Dehumidifying Air Dryer		1

Implementation of training for teachers by instructors of the CNAD (diplomado)

Modules	Duration	Nr. of participants	Qualification	Assistance
Module I	From August 8 to September 2, 2011	9	9.3	100 %
Module I	From 6 to 31 August 2012	4	9.3	100 %
Module II	From November 14 to December 9, 2011	7	9.3	95 %
Module III	From 6 to 31 August 2012	6	9.5	98 %



Annex 11 List of conducted Meetings

Activities of the "Course Content Validation Committee" (CVCC)

Meetingon	Dates (places)	Main topics	Results
1st meeting	9/3/2011 (CNAD)	<ul style="list-style-type: none"> • Establish the validation Committee of the CC • Analysis of the membership of the Committee • Review of the mission and functions of the Committee 	<ul style="list-style-type: none"> • Establishment of the Committee • Determination of the mission and functions
2nd meeting	20/06/2011 (CNAD)	<ul style="list-style-type: none"> • Review of the process of approval of the content of course • Selection of the Working Group (module I) • Presentation of the course content (module I) 	<ul style="list-style-type: none"> • The "content of course" approval process • Working Group (m-I)
3rd meeting	08/07/2011 (CNAD)	<ul style="list-style-type: none"> • Review of the technical content of course (module I) relevance • Approval of the content of course (module I) 	<ul style="list-style-type: none"> • Analysis report (m-I) • Approval of Content of course (m-I)
4th meeting	11/10/2011 (CNAD)	<ul style="list-style-type: none"> • Selection of the Working Group (module II) • Presentation of the course content (module II) 	<ul style="list-style-type: none"> • Working Group (M-II)
5th meeting	27/10/2011 (JICA Mexico)	<ul style="list-style-type: none"> • Review of the technical content of course (module II) relevance • Approval of the content of course (module II) 	<ul style="list-style-type: none"> • Report of analysis (M-II) • Approved course content (M-II)
6th meeting	15/6/2012 (CNAD)	<ul style="list-style-type: none"> • Presentation of the modification of the content of course (module I) • Selection of the Working Group (module III) • Presentation of the course content (module III) 	<ul style="list-style-type: none"> • Working Group (M -III)
7th meeting	6/29/2012 (CNAD)	<ul style="list-style-type: none"> • Review of the technical content of course (module III) relevance • Approval of the content of course (module III) 	<ul style="list-style-type: none"> • Report of analysis (M-III) • Approved course content (M-III)




The periodic meeting of monitoring and evaluation activities

Meeting	Date	Topics treaties
1st meeting	Jul 8, 2011	Agreed on the objective and the mode of operation of the periodic meeting of monitoring and evaluation
2nd meeting	Sep 27, 2011	Evaluation and review of the results of the diploma of teachers of module I
3rd meeting	Feb 3, 2012	Evaluation and review of the results of the diploma of teachers of module II
4th meeting	Sep 28, 2012	Evaluation and review of the results of the course of teachers of modules I and III

Linkage Activities and Meeting of "Linkage Committee" between public and private sectors

(CVSPP) in CNAD

Activities (meeting)	Period or date	Topics treaties
1st meeting	Feb 24, 2012	<ul style="list-style-type: none"> • Establishing the Committee of linkage between public and private sectors in CNAD (CVSPP) • Analysis of the membership of the Committee • Confirmation of the programme and action plan of the Committee
2nd meeting	June 4, 2012	<ul style="list-style-type: none"> • Approval of the plan of implementation of the pilot project "KAIZEN" (PPK) (objective, period, flow chart, companies model selection criteria, evaluation and overall schedule template)
3rd meeting	July 3, 2012	<ul style="list-style-type: none"> • Presentation of the final result of the rapid diagnosis by CNAD and JICA experts. • Selection of 4 model enterprises for PPK. • Reconfirmation timetable General of the PPK
Modifying a approval of "con... co.	** See above the CVCC activities.	
PPK	Jun/2012 - Feb/2013	<ul style="list-style-type: none"> • study of the business profile • rapid diagnosis • detailed diagnostics • implementation of KAIZEN (ongoing) • final evaluation (feb/2013) • seminar (feb/2013)




Linkage Activities of 3 model schools.

Activities (meeting)	Period or date	Topics treaties
CETIS No.6 (Mexico D.F)		
Meeting of regional linkage Committee of Iztapalapa	February / 2012	<ul style="list-style-type: none"> • Promotion of the plastics project and introduction of activities of professional practices.
Employment Bureau	July / 2012	<ul style="list-style-type: none"> • Study of needs of plastics industry in Mexico City. (General information and human resource needs) • Promotion of the plastics project and introduction of activities of professional practices.
Employment Bureau	August - September / 2012	<ul style="list-style-type: none"> • Study of needs of plastics industry in Mexico City. (General information and human resource needs) • Promotion of the plastics project and introduction of activities of professional practices.
Meeting of regional linkage Committee of Iztapalapa	September / 2012	<ul style="list-style-type: none"> • Promotion of the plastics project and introduction of activities of professional practices.
Meeting of regional linkage Committee of Iztapalapa	26 / October / 2012	<ul style="list-style-type: none"> • Promotion of the plastics project and introduction of activities of professional practices.
CBTIS No.237 (Tijuana)		
Meeting of Linkage Committee of Tijuana	January / 2012	<ul style="list-style-type: none"> • Promotion of the plastics project and introduction of activities of professional practices.
Employment Bureau	June / 2012	<ul style="list-style-type: none"> • Study of plastic industry needs (General information and human resource needs) • Promotion of the plastics project and introduction of activities of professional practices.
Employment Bureau	August - September / 2012	<ul style="list-style-type: none"> • Study of plastic industry needs (General information and human resource needs) • Promotion of the plastics project and introduction of activities of professional practices.
Meeting of Linkage Committee of Tijuana	September / 2012	<ul style="list-style-type: none"> • Promotion of the plastics project and introduction of activities of professional practices.
Employment Bureau	02-October 2012	<ul style="list-style-type: none"> • Promotion of the plastics project and introduction of activities of professional practices for JMA (Japanese Maquiladora Association)

Seminar	04 / October / 2012	<ul style="list-style-type: none"> • Promotion of the plastics project and introduction of activities of professional practices seminar of the Committee of ARHITAC (Association of human resources in the industry in Tijuana, civil association)
Seminar	09/October / 2012	<ul style="list-style-type: none"> • Promotion of the plastics project and introduction of activities of professional practices, seminar of the Committee of AIM (Association of industry and Exportation)
CBTIS No.271 (Ciudad Victoria)		
Preparedness Linkage Committee meeting	Feb / 2012	<ul style="list-style-type: none"> • prepare for the public and Industrial Linkage Committee. • Promotion of the plastics project and introduction of activities of professional practices.
Employment Bureau	June / 2012	<ul style="list-style-type: none"> • Study of needs of industry plastics in Tampico, Altamira and Ciudad Victoria (General information and human resource needs)
Meeting of local Linkage Committee	11 / June / 2012	<ul style="list-style-type: none"> • Established the local Committee of linkage between Industrial and CBTIS No.271. • Promotion of the plastics project and introduction of activities of professional practices.
Employment Bureau	August - September / 2012	<ul style="list-style-type: none"> • Study of needs of plastics industry in Tamaulipas (General information and human resource needs) • Promotion of the plastics project and introduction of activities of professional practices.

Annex 12 Local Costs borne by JICA

Japanese Fiscal Year	Local Cost (Japanese Yen)
JFY2010	4,511,000
JFY2011	8,124,000
Total	12,635,000

