

科學英文論文寫作

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課程綱要
(以上共 18
小時)

課程系列	課程內容
系列一	主 研究論文組織寫作 題 英文編修訓練
	要 (1) 工作提案計劃(第一部份): 背景 點 (2) 常用主動語氣 (3) 明白寫作
系列二	主 研究論文組織寫作 題 英文編修訓練
	要 (1) 工作提案計劃(第二部份): 行動 點 (2) 常用主動語氣: 常用主動語氣 (3) 明白寫作: 主詞及動詞必須前後呼應
系列三	主 研究論文組織寫作 題 英文編修訓練
	要 (1) 問題描述 點 (2) 常用主動語氣: 動詞替代名詞 (3) 明白寫作: 代名詞必須清楚的使用
系列四	主 研究論文組織寫作 題 英文編修訓練
	要 (1) 假設描述 點 (2) 常用主動語氣: 強有力的動詞 (3) 明白寫作: 句子的結構須有一致性
系列五	主 研究論文組織寫作 題 英文編修訓練
	要 (1) 摘要撰寫(第一部份): 簡介背景,目標及方法 點 (2) 常用主動語氣: 避免過度使用 It 及 There 開頭句 (3) 明白寫作: 去除修飾語所造成的問題 再次檢查錯誤的比較詞及粗心的疏漏 避免不必要的句中轉換 結合「精確寫作」與「明白寫作」)
系列六	主 研究論文組織寫作 /英文編修訓練 題

柯泰德先生自 1989 年即在國立交通大學及清華大學任教研究所科技英文寫作課程。曾任工研院化工所副研究員 (1994-2000)及曾任元培技術學院外文組的專任講師 (2002-2005)。著有五本科技英文寫作系列及八本應用英文寫作系列叢書。同時他也是數本科技期刊的英文編輯。柯先生目前正在攻讀英國東安格利亞大學的教育博士學位。

- 美國公民
- 第一個獲得台灣永久居留證(APRC)的美國人
- 中華民國長期居留證 (新竹市第一張外國人永久居留證)
- 中華民國教育部講師證

一. 學歷

1987-1988 美國國際學院公共行政碩士

1983-1987 美國印第安那州 法蘭克林學院歷史學士

目前在就讀英國 University of East Anglia 教育博士(2001 年 迄今)

二. 現職

元培科學技術學院 外文組講師 (並任英文寫作中心主任一職) (2002-2005)負責教育部四年的『提昇大學基礎教育計劃』- 生命關懷教育-人文、倫理與藝術學習。成立:英文寫作中心 (網址: www.owl.yust.edu.tw),非同步遠距教學系統,研究所課程設計,及跨學科英文寫作。任教於清華大學(資工)及交通大學(運輸管理及工業管理系)講授科技英文寫作課程。

三. 經歷

1. 曾於南非、印度、瑞士等地從事研究工作
2. 工研院副研究員(1994-2000):負責和李國鼎科技發展基金會合作語言課程分類設計,來推廣國內科技寫作教育。並修改所內所有投稿國際期刊或研討會的英文文件。
3. 國科會 Proceedings 期刊英文編輯
4. 李國鼎科技發展基金會資深編輯(修改過之論文總數超過 2000 份以上)
5. 經濟部工業局中華民國清潔生產英文簡訊
6. 行政院環境保護署環境保護英文簡訊
7. 中央大學(電機、化工)
8. 清華大學自強社
9. 清華大學(資工、化工、化學、動機、電機、生科系)講授科技英文寫作課程
10. 交通大學(電信、資訊管理、資科)講授科技英文寫作課程國科會獎助優良期刊頒獎典禮受邀演講:“科技期刊國際化文稿編寫要領說明”
11. 中華民國力學學會期刊
12. 中國化學工程師學會誌
13. 中華民國獸醫學會雜誌
14. 中華民國台灣醫學雜誌
15. 微軟 2001 校園資訊應用交流研討會受邀演講“非同步遠距教學所帶來教育上的變革”
16. 中華民國氣膠學會
17. 中華民國護理學會

18. 長庚醫院
19. 養豬科學研究所
20. 中華民國土木技師工會
21. 中正理工學院
22. 國家實驗動物中心(中研院內)
23. 台灣大學工業工程系所
24. 南開技術學院(研發組)
25. 清雲科技大學(研發處)
26. 水土保持局(教學講座影片)
27. 新竹科學園區(矽統、啓碁、茂矽、台積電(工業工程部)等)
28. 台灣科技大學電機研究所
29. 台灣經濟研究院白皮書
30. 臺灣師範大學材料工程所
31. 中研院資創中心
32. 國立成大工業與資訊管理系
33. 長庚科技大學護理學院
34. 國立雲林科技大學化學工程與材料工程系
35. 國立台灣科技大學資管所
36. 國立臺南大學針對數位學習科技系
37. 中原大學電機系

四.著作 科技英文寫作系列叢書：

1. 精通科技論文寫作(An English Style Approach for Chinese Technical Writers)
2. 做好英文會議簡報(English Oral Presentations for Chinese Technical Writers-A Case Study Approach)
3. 英文信函參考手冊(A Correspondence Manual for Chinese Writers)
4. 科技英文編修訓練手冊(An Editing Workbook for Chinese Technical Writers)
5. 科技英文編修訓練手冊進階篇(Advanced Copyediting Practice for Chinese Technical Writers)

應用英文寫作系列叢書：

1. 有效撰寫讀書計畫(Writing Effective Study Plans)
2. 有效撰寫英文工作提案(Writing Effective Work Proposals)
3. 有效撰寫英文工作自傳(Writing Effective Employment Application Statements)
4. 有效撰寫英文職涯經歷(Writing Effective Career Statements)
5. 有效撰寫英文電子郵件(Effectively Communicating Online)
6. 有效撰寫行銷英文(Writing Effective Marketing Promotional Materials)
7. 管理英文(Effective Management Communication)
8. 商用英文(Effective Business Communication)

結合精確寫作及明白寫作

工程英文寫作上之常見問題

柯泰德／元培技術學院外文組講師



柯泰德先生自1989年即在國立交通大學及清華大學任教研究所科技英文寫作課程。目前柯先生是元培技術學院外文組的講師。著有五本科技英文寫作系列及十本應用英文寫作系列叢書。同時他也是數本科技期刊的英文編輯。柯先生目前正在攻讀英國東安格利亞大學的教育博士學位。柯泰德線上英文論文編修訓練服務 www.cc.nctu.edu.tw/~tedknoy

要把科技英文寫得精確並不是件容易的事情。通常工程師在文稿完成後或投寄發表前，都要不斷反覆修飾原稿避免辭不達意的窘境，由於這過程是如此的繁複，最後甚至需請專業人士代為編修始能清楚闡述作者原意。而明白寫作原則可使科技英文作者想表達的意思不會被誤解。就是要把文章中的曖昧不清全部去除，使讀者很容易的理解作品的精髓。

一、前言

中國人從事科技英文寫作時，文詞表現自然有別於以英文為母語者。當然，文章能獲得國際人士的認可，這才是寫作的主要目的。然而，過去在臺灣講授科技英文寫作方法，卻往往不切實際地要求中國人所寫的英文文章也能達到英文母語人士的同一水準。此點並不意指國人無法寫出優良的科技英文作品。但是，對於首次嘗試發表英文論文的學者或工程師而言，期望他能寫出與英文母語人士同等品質的文章，這是緣木求魚。

儘管有許多國際期刊上的論著可提供寫作者的詞句參考，但是傳統的教學方式，通常過於強調先比較別人的文句再加以應用。因此，為了刻意地表現出母語式英文的風格，過度依賴並套用期刊著作上的句子或結構，以作為著筆資源的寫作方式，可能導致肆無忌憚的抄襲，甚至不幸陷入剽竊別人作品之嫌。

另一問題是，模仿國外期刊論著的作者，也時常無法判斷自己為何在這些特定情況下使用了某些句子。他們的回答大抵上是：「因為我曾在某某期刊上的論文見過」。此種不當的

英文著作方式，主要是因為國內大學或研究機構很少開授適當的科技論文寫作課程。再者，提供國內學生適當的科技論文寫作途徑，理當站在該國文化的觀點，而非著眼於以英文為母語者。國內工程師在構句時直接地習慣寫出中文的文意，再生硬地翻譯成英文句子。如此一來，使用中文慣用的語法結構硬湊成英文，常會扭曲文章內容含意的表達。因此，將主要強調的主題放於句子之前的建議，事實上是筆者考慮且了解國內作者的文化背景之後而提出的。再者，當工程師寫作時，希望本句與前一句子或前一段的文意相接連時，則可利用連接詞用語。此時，則須將有關前句的資訊放在句首。因此，只要在「將重要主題置於句首」及「連結效果用語」兩者之間，取得使用上的平衡，應有助於國內工程師期望以直接而通順的英文來表達文意。

但更進一步來說，工程師無法達成英文精確寫作及明白寫作二大要求。要把科技英文寫得精確並不是件容易的事情。通常工程師在文稿完成後或投寄發表前，都要不斷反覆修飾原

稿避免辭不達意的窘境，由於這過程是如此的繁複，最後甚至需請專業人士代為編修始能清楚闡述作者原意。而明白寫作原則可使科技英文作者想表達的意思不會被誤解。就是要把文章中的曖昧不清全部去除，使讀者很容易的理解作品的精髓。本文章擬就這二部份逐項分類探討工程英文寫作上的問題，並於每項加以舉例說明讓工程師可以加以比較一目了然。文章最後並就九個中英文句子結構之異同加以分析同時舉例說明。

二、精確寫作及明白寫作

(一) 精確寫作：Write for Conciseness

忙碌的專家們是沒有時間去逐字的閱讀冗長的報告文件，因此很多科技工程師的文稿被拒絕或延遲發表，就是因為他們無法精短的表達文章意念。以下有五點精確寫作的重點：

1. 「常用主動語氣」(Use active voice frequently.)

Original (原句)

The Taguchi method is assessed in this study so that the effect of various factors on performance variation can be understood.

Revised (修改過語句)

This study assesses the Taguchi method to understand how various factors affect its performance variation.

Original (原句)

A description of the layout cost evaluation method is made by introducing the following notations in this section.

Revised (修改過語句)

This section introduces the following notations to describe the layout cost evaluation method.

2. 「動詞替代名詞」(Use verbs instead of nouns.)

Original (原句)

Not only is the variability of the control factors considered by the proposed procedure, but implementation of related tasks is performed by that same procedure.

Revised (修改過語句)

In addition to considering the variability of the control factors, the proposed procedure implements related tasks.

Original (原句)

Solution of environmental problems is heavily dependent on responsiveness of the local community to governmental legislation.

Revised (修改過語句)

Solving environmental problems heavily depends on how the local community responds to governmental legislation.

3. 「強有力的動詞」(Create strong verbs.)

Original (原句)

A stipulation of the agreement is that the parties are in compliance with the rules.

Revised (修改過語句)

The agreement stipulates that the parties comply with the rules.

Original (原句)

The guideline makes it specific that all parties will be notified by the proper authorities when a problem arises.

Revised (修改過語句)

The guideline specifies that the proper authorities will notify all parties when a problem arises.

4. 「避免過度使用It及There開頭句」(Avoid overusing sentences that begin with It and There.)

Original (原句)

There is a need for limitation of the number of users by the systems manager.

Revised (修改過語句)

The systems manager must limit the number of users.

Original (原句)

It is necessary that negotiations on the final conditions be undertaken by both sides

immediately.

Revised (修改過語句)

Both sides must negotiate the final conditions immediately.

5. 「除去重複及不必要的措詞」
(Delete redundant and needless phrases.)

Original (原句)

It is well known that a majority of Taguchi method applications have the capacity for addressing a single-response problem.

Revised (修改過語句)

Most Taguchi method applications can address a single-response problem.

Original (原句)

It is our opinion that Windows 2003 is for all intents and purposes a good operating system in a situation in which the user has many requirements.

Revised (修改過語句)

We believe that Windows 2003 is a good operating system when the user has many requirements.

(二) 明白寫作：Write for Clarity

明白寫作延伸精確寫作指導原則，更進一步把重點放在如何讓作者想表達的意思更明顯。以下有六點明白寫作的重點：

1. 「主詞及動詞必須前後呼應：如果主詞的單複數與動詞不能配合，不僅讀者感到困惑，同時句子的邏輯也會發生問題。」
(Ensure subject and verb agreement.)

Original (原句)

Neither the processing parameters nor the amount of polymer melt injection solely determine a successful gas channel design.

Revised (修改過語句)

Neither the processing parameters nor the amount of polymer melt injection solely determines a successful gas channel design.

Original (原句)

The delay time along with gas injection points are important in producing injection-molded parts of quality.

Revised (修改過語句)

The delay time along with gas injection points is important in producing injection-molded parts of quality.

2. 「代名詞必須清楚的使用：如果代名詞所指的人物或事物不能交待清楚，也是徒增讀者困惑。」 (Ensure that pronoun references are clear in meaning.)

Original (原句)

The machines can process the family of parts, ensuring that it reaches full capacity.

Revised (修改過語句)

Capable of processing the family of parts, the machines reach full capacity.

Original (原句)

The department chairman told the research assistant that she needed to perform the simulations if the experiment fails.

Revised (修改過語句)

The department chairman told the research assistant to perform the simulations if the experiment fails.

3. 「句子的結構須有一致性：科技英文寫作中，句子的建構必須有一致性。」 (Create sentences parallel in structure and meaning.)

Original (原句)

The two-step procedure not only identifies those factors that significantly affect the signal-to-noise (SN) ratio, but also the levels that maximize SN are found.

Revised (修改過語句)

The two-step procedure not only identifies those factors that significantly affect the signal-to-noise (SN) ratio, but also finds the levels that maximize SN.

Original (原句)

The Taguchi approach provides a combination of experimental design techniques with quality loss considerations and that the average quadratic loss is minimized.

Revised (修改過語句)

The Taguchi combines experimental design techniques with quality loss considerations and minimizes the average quadratic loss.

4. 「去除修飾語所造成的問題：修飾語必須放在所要修飾的字之旁。」 (Eliminate modifier problems.)

Original (原句)

Having a large database, much information is contained in the system's network.

Revised (修改過語句)

Having a large database, the system's network contains much information.

Original (原句)

The container held by the experimenter with many leaks must be replaced.

Revised (修改過語句)

Held by the experimenter, the container with many leaks must be replaced.

5. 「再次檢查錯誤的比較詞及粗心的疏漏：不合邏輯及不完整的比較詞造成更多的含糊不清，同時注意不小心漏掉的字。」 (Double check for faulty comparisons and omissions.)

Original (原句)

Our algorithm is more accurate with respect to computational time.

Revised (修改過語句)

Our algorithm is more accurate than conventional ones with respect to computational time.

Original (原句)

The trade school's dropout rate is lower than the

university.

Revised (修改過語句)

The trade school's dropout rate is lower than that of the university.

6. 「避免不必要的句中轉換：作者應避免句中不必要的主詞、時態及語態之轉換。」 (Avoid unnecessary shifts in a sentence.)

Original (原句)

Give consideration to the external factors and the surrounding environment must be assessed.

Revised (修改過語句)

Give consideration to the external factors and assess the surrounding environment.

Original (原句)

Not only can the devices be used to copy CDs in case of damage to the original, but it can also be used for backing up hard drives.

Revised (修改過語句)

In addition to copying CDs in case of damage to the original, the devices can also back up hard drives.

三、分析九個中英文句子結構之異同：

(Avoid Chinese-English Colloquial Habits in Writing)

對從事科技英文寫作的工程師而言，首先要面對的工作便是熟知他自己在寫作表達上的習慣，例如在寫作時直接翻譯中文或過度依賴其它類似文章上的句子，這些句子的意思除了原作者想要表達的以外，通常有其他的引申義。不論如何，過度使用一些連作者自己都不熟知的寫作習性，勢必使得科技文章本身的內容變得含糊不清且在意義表達上造成混淆。雖然每個作者都有他自己的需求，而大部份的寫作模式又都混合不分；但是，不論是對一位寫作科技文章的新手或對極有經驗的工程師而言，上述國人易犯之習性總使得國內工程師所寫的科技論文具有某些共通的缺點。工程師可先從回顧自己以前寫的英文開始，確認那些

詞句已為國人科技論文作者共通特有的寫作習性，然後，以下列九點所建議的寫作方法，再來看看文章的內容是否面目一新，更易瞭解。

1. 「著手寫作論文時，切勿過度使用一些課本中常見而生硬的詞句，儘量使文章中的英文直接而流暢。」(Prevent overuse of traditional textbook phrases.)

Original (原句)

It may be said that computers have the ability to incorporate kinds of equipment in order that the user is in a position to interact with the computer.

Revised (修改過語句)

Computers can incorporate equipment so that the user can interact with the computer.

Original (原句)

There is a chance that the college will install 100Mbps cards notwithstanding the fact that they have served the school well in the past history.

Revised (修改過語句)

The college might install 100Mbps cards although they have served the school well in the past.

2. 「把最重要的主題：、子句等放在句首，以求突顯你主要的意思或重點，而且能容易地為讀者所領會。」(Make your intended meaning more visually accessible.)

Original (原句)

There is no need for the assessment of the production capacity of the factory floor to be undertaken by the foreman.

Revised (修改過語句)

The foreman does not need to assess the production capacity of the factory floor.

3. 「英文已經規定了完整的過去／現在／未來等動詞時態，但是，國內的科技論文寫作者仍然習慣地把一些不必要的時間介系詞置於英文句首。時間介系詞片語常

被用來作為開頭的字有“during”，“until”，“as”，“before”，“after”，“when”，“since”及“whenever”等等。但是，當用來表示事件的順序或當作不同步聚的轉接詞時，時間介系詞的使用就變得適宜而需要了。」(Avoid overemphasis of clauses involving time.)

Original (原句)

Currently, there are more than fifty varieties of bulk pharmaceuticals produced in Taiwan.

Revised (修改過語句)

More than fifty varieties of bulk pharmaceuticals are produced in Taiwan.

4. 「保持如「名詞+動詞+受詞／(介系詞)」的簡單而直接的句型，並且避免把比較性介系詞放在句首。」(Avoid overemphasis of clauses involving comparison.)

Original (原句)

Compared to conventional approaches, the proposed scheme spends less computational time.

Revised (修改過語句)

The proposed scheme spends less computational time than conventional approaches do.

5. 「使用如「名詞+動詞+受詞／介系詞」般的直接簡單句。除非

- (a) 介系詞在如下的句型中(名詞+動詞+名詞+動詞)描述動作，
- (b) 介系詞用作科技條件的限制語，或
- (c) 介系詞作為連接二個句子或段落的轉接語，否則介系詞不擺於句前。」(Avoid overemphasis of “domains” which tend to push the author’s intended meaning towards the end of the sentence.)

Original (原句)

For determination of the optimum conditions for the nominal-the-best robust design problems, this work is conducted to develop a simple procedure to do so.

Revised (修改過語句)

This work develops a simple procedure to determine the optimum conditions for the nominal-the-best robust design problems.

6. 「使用如下的直接簡單句「名詞+動詞+受詞/介系詞」。但是，表示連接性質的介系詞(副詞或其他相關的片語)在連接二個句子或二個段落時，則反而常用且有用。」(Use transitional phrases to link sentences and promote the manuscript's flow.)

Examples:

Under those circumstances,

For such a reason,

In such a case,

In light of above developments,

As mentioned earlier,

According to those results,

Above results suggest that...

If the above condition is satisfied,

7. 「藉著以下的方法達到置換動詞的目標 (a) 在不定動詞和動名詞間取得平衡，避免過度使用不定動詞 (b) 使用動詞的名詞形式 (c) 找出動詞的同義字，利用同義字的替換避免在同一篇文章中一直使用同一個動詞。」(Provide variety in verb form and selection.)

Original (原句)

Our results fit very good with those of Wu et al.

Revised (修改過語句)

Our results (correlate well with OR closely correspond to) those of Wu et al.

8. 「一個句子只表達一或二個主要意思，可以避免句子太長的毛病。以下三個方法可使繁長句子變得簡單易懂：(a) 將一句分為二句，意即第一子句(結果)+第二子句(位置、條件、目的、結果表示等特定的範

圍)。(b) 在句子中間使用分號以區分句子中的二個重點意思使其更清楚 (c) 盡量在一個句子中只表達一個意思，最多不超過二個。」(Avoid excessively long sentences.)

Original (原句)

Since the climate of Orchid Island is relatively hot and humid compared to Taiwan, the research team from the research institute decided to return them to their native habitat on Orchid Island to allow the butterflies to be successfully born.

Revised (修改過語句)

The climate of Orchid Island is hotter and more humid than Taiwan, explaining why the team from the research institute decided to return the butterflies to their native habitat on the island for their successful birth.

9. 「在科技文章中，一般而言使用第二人稱較用第一人稱為佳，其理由為

(a) 研究內容理當客觀的，過度使用第一人稱會讓讀者有內容主觀及具有成見感覺。(b) 通常有將最重要和強調的部份擺在句首的傾向。」(Avoid overuse of first person.)

Original (原句)

From the above literature having been mentioned, we can find that ...

Revised (修改過語句)

Above literature suggests that ...

參考文獻

- [1] 精通科技論文(報告)寫作之捷徑，柯泰德著，清蔚科技股份有限公司發行。
- [2] 科技英文編修訓練手冊，柯泰德著，清蔚科技股份有限公司發行。
- [3] 科技英文編修訓練手冊(進階篇)，柯泰德著，清蔚科技股份有限公司發行。

有效撰寫英文工作自傳



有效撰寫英文工作提案



柯泰德

簡介

國內工程師在撰寫工程英文時常會有的問題，不外乎英文文法錯誤，英文字彙不足或是英文字詞表示不當。然而這些表面的問題都可以自行補救。現在相對重要的一個寫作問題是許多工程師都是在工作方案完成時才開始撰寫相關英文提案，他們視撰寫提案為行政工作的一環，只是消極記錄已完成的事項，而不是積極的規劃掌控未來及現在正進行的工作。如果工程師可以在撰寫英文提案時，事先仔細明辨工作計劃提案的背景及目標，不僅可以確保寫作進度、寫作結構的完整性，更可兼顧提案相關讀者的興趣。

拙著“有效撰寫英文工作提案”即為幫助工程師達成此一寫作目標。

本書主要教導工程師如何建構良好的英文工作提案。書中內容包括：1. 工作提案計劃（第一部份）：背景 2. 工作提案計劃（第二部份）：行動 3. 問題描述 4. 假設描述 5. 摘要撰寫：簡介背景，目標及方法，歸納希望的結果及其對特定領域的貢獻 6. 綜合上述寫成精確工作提案。

此外，相關的「應用英文寫作系列」將針對以下內容逐步協助工程師解決在英文寫作上所遭遇之各項問題：

- A. 寫作型式：把往昔通常習於抄襲的寫作方法轉換成更積極主動的寫作方式，俾使工程師所欲表達的主題意念更加清楚。更進一步糾正工程師寫作口語習慣。
- B. 方法型式：指出國內工程師從事英文寫作或英文翻譯時常遇到的文法問題。
- C. 內容結構：將寫作的內容以下面的方式結構化：目標、一般動機、個人動機。並了解不同的目的和動機可以影響報告的結構，由此，獲得最適當的報告內容。
- D. 內容品質：以編輯、審查委員的要求來寫作此一系列之書籍，以滿足工程師的英文要求。

以下詳細介紹“有效撰寫英文工作提案”一書的內容架構：

A. 工作提案計劃 (第一部份)：背景

1. 工作提案建構：你工作提案的主題是什麼？你的讀者可以明瞭工作提案的內容嗎？

參考範例

- Although a global phenomenon, water shortages in northern Taiwan are especially severe during the summer. In addition to encouraging consumers to reduce water consumption, Taiwan's Environmental Protection Administration has collaborated with academics and engineering professionals to adopt an advanced wastewater treatment technology aimed at upgrading the quality of treated water in order to adhere to the targeted governmental goal of 85% water reclamation.

雖然用水短缺是全球的現象，但北台灣在夏季時的供水短缺情形卻特別嚴重。台灣環保局除了鼓勵消費者節約用水之外，並與學術及工程專家合作，採用先進廢水處理技術，提升處理過後的水質，以達到政府預訂 85% 用水回收的目標。

參考範例

- While conventional construction materials and methods highly prioritize earthquake damage prevention and stringently controlled operating budgets, global and market demands have promulgated the use of enhanced materials and building codes in Taiwanese-built structures.

在傳統建材與方法均以震災防護為優先並嚴格控管營運預算的同時，全球和市場的需求已促使台灣建築結構使用先進建材和建築法規。

參考範例

- Taiwanese reconstruction efforts in the tsunami-stricken area of Aceh province, Indonesia, have been below par.

台灣在印尼亞齊省受海嘯重創地區的重建努力低於標準。

2. 工作問題：你的工作提案裡有你試著要解決或是想更進一步瞭解的問題嗎？

參考範例

- However, conventional industrial wastewater treatment methods fail to comply with the targeted governmental goal because treated water quality falls below stringent water recycling or reuse requirements.

然而，傳統工業廢水處理法均未能達到政府預期的目標，因為經處理後的水質仍低於用水回收或再利用的嚴格規定。

參考範例

- Owing to increasing real estate prices in land and construction materials, low-rise and high-rise buildings significantly differ in structural composition.

由於不動產價格因土地和建材而攀升，低樓層和高樓層建築在結構構成上有顯著的差異。

參考範例

- Eighteen months after the disaster, except for TZUCI, the Taiwanese government still has not distributed funds collected from overseas Taiwanese to the stricken area.

直至災後 18 個月，除了 TZUCI 以外，台灣政府仍未將自海外僑胞募得的款項撥給災區。

4. 問題的量化：你要如何量化問題來讓你的讀者明白之前文獻研究所遇到的量化限制？

參考範例

- Although introduced a decade ago as an advanced wastewater treatment technology that combines ultrafiltration membranes and biological treatment processes, the technology has been prohibitively expensive to gain widespread acceptance, until recently, due to the continuously lowered cost of membrane products.

雖然十年前就引進結合超濾薄膜和生物處理程序的先進廢水處理技術，但這項技術所費不貲，所以一直未獲普遍認同，直到最近薄膜產品成本持續下降，情況才有改善。

參考範例

- For instance, concrete, rebar and steel costs have risen over 50% over the past five years, significantly affecting construction applications in modern commercial and residential buildings. Construction managers and engineers also aggressively search for economical and efficient material substitutes in light of increasing labor costs.

譬如說，混凝土、鋼筋和鋼鐵的成本比過去 5 年高出了 50%，嚴重影響現代商業及住宅大樓的建造應用。基於勞工成本增加，營建經理和工程師亦積極尋找經濟有效的替代建材。

參考範例

- Global response to the disaster was immediate, with 40,000 and 30,000 housing units donated by Canada and the United States, respectively, as well as \$US 80 million dollars in relief from Japan. Despite financial donations from Taiwanese that were deposited in a Taipei bank account, on-site activities in the stricken area have been sparse.

全球對災難即刻做出回應，加拿大和美國各捐贈 40,000 及 30,000 間房舍，日本亦捐出 8 千萬美元賑災。儘管台灣的捐款均存入台北銀行帳戶，但對災區現場的行動卻乏善可陳。

4. 問題的中心：如果問題沒被解決或是充分瞭解，這對工作提案的讀者會有多大的負面衝擊？

參考範例

- The inability to continuously reduce membrane costs and publicize the merits of biological

membrane technology over conventional wastewater treatment methods makes it impossible to fully promulgate this technology and reduce environmental loading.

無力持續降低薄膜成本及宣導生物薄膜技術優於傳統廢水處理法的優點，使得要充分推廣這項技術及減少環境負擔變得是不可能的事。

參考範例

- Given the above predicament, in addition to the inability to secure an adequate supply of all construction materials, engineers fail to comply with building codes and safety measures given the inability to secure alternative construction supplies that are more economic and adhere to global standards.

在上述困境下，除了無力確保所有建材均得到充分供應之外，工程師亦因無力取得更經濟且符合全球標準的其他建築供應品而無法符合建物法規和安全措施。

參考範例

- Despite this relief fund account, no specific organization has assumed responsibility for distributing these funds, thus tarnishing the image of Taiwan.

雖然有這個賑災專戶，但卻沒有特定的組織負責分配賑災款，便因而損害了台灣的形象。

5. 工作提案計劃 (第一部份)：背景參考範例：

- **Setting of work proposal 工作提案建構** Demands on the water supply in Taiwan have skyrocketed owing to the island's increasing population and elevated living standards. **Work problem 工作問題** Eventually, the current reservoir supply will be insufficient if current personal and industrial demand persists. **Importance of problem 問題的中心** Consequently, this surging demand will lead to the increased drilling of new wells to locate groundwater resources, which is extremely expensive.

B. 工作提案計劃 (第二部份)：行動

1. 工作目標：工作提案的目標？

參考範例

- Based on the above, we should examine the merits and limitations of the biological membrane system versus those of conventional wastewater treatment systems to determine which system more aptly complies with Taiwan's water reclamation requirements.

基於以上所述，我們應該審視生物薄膜系統和傳統廢水處理系統二者的優點和限制，以決定哪項系統較符合台灣的用水回收規定。

參考範例

- Based on the above, we should design a standard diagram chart for similar large-scale projects under

various circumstances, capable of displaying the ability and formation of such projects to comply with time and budgetary constraints.

基於以上所述，我們應該針對各種情況下相似的大型工程繪製標準流程圖，流程圖須能顯示此類工程在遵循時間和預算限制方面的能力與型態。

參考範例

- Based on the above, we should develop an optimal operating model capable of executing timely, effective and clearly defined relief efforts to disaster areas regardless of whether domestically or overseas.

基於以上所述，我們應該發展出最理想的運作模式，模型須能及時執行、有效，並且對國內外災區所做的救災努力均能清楚定義。

2. 達成目標的方法：你的計劃中達成目標的步驟？

參考範例

- To do so, wastewater treatment tests can be performed at a local university, using both the conventional biological treatment process and membrane biological process. Both processes can then be compared with respect to water quality after treatment, as expressed in terms of its chemical and biological composition, to determine which process is superior. Next, using a small-scale prototype, a pilot study conducted by an environmental engineering firm can be performed, with the subsequent test results deemed more comparable to a full-scale plant than those from the laboratory test. Additionally, results obtained from the above tests can be tabulated and compared with those published in literature to verify data authenticity. Moreover, a cost-benefit analysis comparison can be made of the biological membrane system and the conventional biological treatment process.

若要這麼做，可在當地大學運用傳統生物處理程序和薄膜生物程序進行廢水處理檢測。二種程序處理後的水質可根據化學與生物成份互作比較，以決定哪種程序較優。然後，運用小型的原型，可執行環境工程公司所進行的前導研究，得出的檢測結果被認為比實驗室檢測所得的結果更與實廠相近。同時，可將以上檢測所得的結果列表顯示，並與文獻數據比較，以證實資料的正確性。此外，生物薄膜系統和傳統生物處理程序亦可進行成本利潤分析比較。

參考範例

- To do so, the construction process and budgetary control mechanisms can be simulated. Construction materials and experience of construction engineers can then be evaluated using a numerical method. Next, designers, construction engineers and company owners can be provided with references via experience from overseas construction projects, local statistics and computer models.

若要這麼做，可模擬營造程序和預算控管機制。建材和營建工程師的經驗可用數值方法評估。然後，可將取自國外營建工程經驗、地區統計資料和電腦模型所得的參考資料提供給設計者、營建工程師和業主。

參考範例

■ To do so, headquartered in Taipei, the Relief Committee of Taiwan (RCT) can be assigned the responsibility for executing relief missions. RCT can then establish its own disaster response system, capable of operating timely and automatically when a disaster occurs. The system can include the following features: committee aims, committee members belonging to the government, citizens and overseas Taiwanese, organization and responsibility of members, operating and monitoring procedures, collection and distribution rescue team data, urgent goods and reconstruction activities and project review.

若要這麼做，可指派總部設於台北的台灣救災委員會負責執行救災任務。台灣救災委員會即可建立自己的災害回應系統，災害發生時，系統必須能及時、自動的運作。系統可包括以下項目：委員會目的、屬於政府、市民和海外僑民的委員會成員、成員的組織與責任、運作與監督的程序、救災小組的資料收集與發送、緊急物資、重建活動和計畫總覽。

3. 希望的結果：你希望達成的結果？

參考範例

■ As anticipated, in contrast to the conventional biological treatment process, the biological membrane system is superior in terms of treated water quality with water reclamation exceeding 85%, and is easier to operate. Although initially costing more than the conventional biological treatment process, for the biological membrane system is more attractive in terms of overall cost, land acquisition costs, civil and structural construction, as well as operation and maintenance.

如同所預期的，生物薄膜系統與傳統生物處理程序相比，在處理過的水質上較為優越，用水回收率超過 85%，且比較容易操作。雖然最初的成本高於傳統生物處理程序，但生物薄膜系統在整體成本、土地取得費用、土木與結構施工及操作與維護上較具吸引力。

參考範例

■ As anticipated, the proposed diagram chart can enable designers and company owners to adhere to project schedule and budgetary constraints, greatly facilitating the decision making process.

如同所預期的，所提出的流程圖可使設計者和公司業主依循工程進度表和預算限制，大大加速決策過程。

參考範例

■ As anticipated, the proposed model can distribute disaster relief timely and satisfy donor/recipient expectations.

如同所預期的，所提出的模式可及時分配救災物品，達到捐贈者／收受者的期望。

4. 領域的貢獻：你的提案對相關工作領域的貢獻？

參考範例

■ Results of this study can demonstrate the effectiveness of the biological membrane technology in treating industrial and municipal wastewater, as well as drinking water. With six treatment plants installed with advanced biological membrane systems already constructed for the opto-electronics industry in Taiwan to treat complex organic wastewater, the results are excellent. This study can further demonstrate the urgency for Taiwanese environmental engineers to publicize the merits of this new technology in order to make governmental agencies and the general public receptive to the notion that wastewater reclamation can ultimately resolve severe water shortages in northern Taiwan.

這份研究結果可證明生物薄膜技術在處理工業和城市廢水及飲用水上的功效。台灣光電業已建造 6 座設有生物薄膜先進系統的處理廠處理複合有機廢水，且成效卓著。這份研究進而可證明目前迫切需要台灣環境工程師將這項技術的優點公開，讓政府機關和大眾明白廢水回收最終可解決北台灣嚴重的用水短缺問題。

參考範例

■ Importantly, the process capability index in the proposed diagram chart can simplify design when complying with Taiwan's building codes and ensure that specifications are achieved efficiently. In addition to increasing project efficiency by 20%, the proposed diagram chart can provide a valuable reference for international suppliers and construction companies.

重要的是，當符合台灣建築法規時，所提出的流程圖上的程序能力指標可簡化設計，並確保有效符合規範。除了工程效率提升 20% 之外，所提出的流程圖亦可提供國際供應商和建設公司有價值的參考資料。

參考範例

■ Via the proposed operating model, a responsible and prompt response will restore the faith of donors and save more lives out of a strong sense of charity, ultimately strengthening foreign relations.

藉由所提出的運作模式，負責、迅速的回應將可重拾捐贈者的信心，發自善心挽救更多的生命，進而鞏固與外國的關係。

5. 工作提案計劃 (第二部份)：行動參考範例：

■ **Work objective 工作目標** Based on the above, we should develop an optimal operating model capable of choosing an effective monitor to control adequately a groundwater system. **Anticipated results 希望的結果** The proposed model can reduce much of the cost and time associated with drilling a new well. **Contribution to field 領域的貢獻** If cost and time can be reduced by 10% of those of conventional models, the proposed model can significantly contribute to the design of a groundwater supply network.

C. 問題描述

1. 工作提案建構：你工作提案的主題是什麼？你的讀者可以明瞭工作提案的內容嗎？

參考範例

- Economic prosperity in Taiwan in recent years has led to a boom in the construction industry, with the demand for construction workers required outstripping the local supply. The subsequently delayed project schedules will not only lead to imposed fines, but also a tarnished image for building contractors.

台灣近年的經濟繁榮使營造業發展興盛，建築工人因而在本地供不應求。因而產生的工程進度延誤，不僅導致罰款，亦造成建築包商的形象受損。

參考範例

- While science-based industrial parks represent the hub of hi-tech development in Taiwan, modern transportation necessitates the construction of a high speed railway infrastructure, which is infeasible for transportation inside of such industrial parks.

當科學園區代表著台灣高科技發展中心的同時，為了交通運輸現代化，必然需建造高速鐵路設施，但這對科學園區內的交通運輸而言卻不可行。

2. 工作問題：你的工作提案裡有你想試著要解決或是想更進一步瞭解的問題嗎？

參考範例

- Large scale rioting among migrant construction laborers from Thailand working on the mass rapid transit system in Kaohsiung in southern Taiwan in August 2005 alarmed the Taiwanese public, making them resistant to live in close proximity to this migrant group. Additionally, renting affordable and comfortable dormitory living that complies with legal standards for these migrant laborers in Taipei is extremely difficult.

2005年8月，南台灣高雄捷運工程泰籍勞工的大規模暴動震驚台灣民眾，使得民眾不願與外籍族群比鄰而居。同時對這些外籍勞工而言，在台北要租到符合法律標準又負擔得起、舒適的宿舍，是十分困難的。

參考範例

- In addition to interfering with manufacturing quality within a science park, vibrations from a high speed railway system may subsequently discourage enterprises from establishing their operations inside of such parks.

高鐵系統的震動除了會干擾科學園區內的製造品質之外，亦可能會使企業因而打消在園區設廠的念頭。

3. 問題的量化：你要如何量化問題來讓你的讀者明白之前文獻研究所遇到的量化限制？

參考範例

- The inability of the CEC to provide dormitory facilities that satisfy the above requirements will increase expenditures for other legal housing arrangements, subsequently increasing labor costs of migrant laborers by 6%.

CEC 無力提供符合以上要求的宿舍，安排其他合法房舍的支出便會增加，外籍勞工費用將因而增加 6%。

參考範例

- For instance, a high speed railway system induces ambient ground surface vibrations exceeding 50dB, *i.e.*, intolerable manufacturing conditions for hi-tech companies, adversely impacting revenues by science parks, which are currently valued at around 500 billion New Taiwanese dollars.

譬如說，高鐵系統會造成周遭地表超過 50dB 的震動，也就是說，這對高科技公司來說是無法忍受的製造環境，對科學園區的收益有不利的影響，目前收益估計約為新台幣 5 仟億元。

4. 問題的中心：如果問題沒被解決或是充分瞭解，這對工作提案的讀者會有多大的負面衝擊？

參考範例

- The inability of the CEC to resolve this predicament will lead to protests from neighboring residents, further obstacles in securing licensed dormitory facilities and dissatisfaction among migrant laborers, ultimately jeopardizing project schedules.

CEC 無力解決此項困境，將導致鄰近居民的抗議，進而造成取得許可宿舍的阻礙和外籍勞工的不滿，最終將損及工程進度。

參考範例

- The inability to reduce vibrations induced by high speed railway systems to less than 50 dB on the ambient ground surface will reduce the annual production value of companies within science-based industrial parks, ultimately stagnating development inside of such industrial zones.

無力將高鐵系統對週遭地表的震動減至 50dB 以下，會降低科學工業園區內公司每年的產值，工業區內的發展最終將會停滯不振。

5. 計劃需求：根據以上問題，最迫切的計劃需求是什麼？

參考範例

- Therefore, an effective means of locating legally compliant and comfortable dormitory accommodations for migrant laborers must be developed.

因此，必須要制定有效的辦法為外籍勞工設置合乎規定、舒適的宿舍。

參考範例

- Therefore, a vibration mitigation method must be developed to eliminate/eradicate adverse influences incurred by a high speed railway system.

因此，必須發展減緩震動的方法，以消弭／根絕高鐵系統產生的不利影響。

問題描述參考範例：

- **Setting of work proposal 工作提案建構** Although quantifying residual non-aqueous phase liquid (NAPL) contamination in the subsurface has received considerable attention, Work problem 工作問題 Conventional methods such as core sampling and geophysical logging near contaminated sources can neither acquire sufficient samples nor identify where contaminants are distributed. **Quantitative specification of problem 問題的量化** Consequently, the lack of effective predictive tools, an objective testing procedure and simulated models lead to inefficiency and high overhead errors. **Importance of problem 問題的中心** Furthermore, improper use of those methods will yield inadequate/unsatisfactory/insufficient results and severe losses of time and cost money in industry. **Project need 計劃需求** Therefore, an efficient hypothesis testing procedure for NAPLs must be developed, capable of assessing the amounts of residual NAPL contamination.

D. 假設描述

1. 工作目標：工作提案的目標？

參考範例

- An effective means of locating legally compliant and comfortable dormitory accommodations for migrant laborers can be developed.

可以制定有效的辦法為外籍勞工設置合乎規定、舒適的宿舍。

參考範例

- A vibration mitigation method can be developed to eliminate/eradicate adverse influences incurred by a high speed railway system.

可以發展減緩震動的方法，以消弭／根絕高鐵系統產生的不利影響。

2. 達成目標的方法：你的計劃中達成目標的步驟？

參考範例

- To do so, legality of dormitories introduced by real estate agents can be determined. Terms of dormitory rental under budgetary constraints and mandated conditions can then be discussed with the property owner. Next, a discussion among pertinent/relevant employees can be held regarding accommodations for Thai migrant laborers. Additionally, the landlord/tenant property owner and CEC can sign a rental contract, with CEC remitting a check for rental. Moreover, repair and interior design of the dormitory can be made.

若要這麼做，可將房地產經紀人所仲介的宿舍確立合法性。宿舍租賃標的物條款，在預算限制和明令條件下，可以和房地產所有人討論。隨後，有關外籍泰勞的宿舍，可與相關／有關的員工進行討論。同時，成為房東／房客的不動產所有人和 CEC 可簽訂租賃契約，由 CEC 開立支票承租。此外，宿舍的維修與室內裝潢亦可安排。

參考範例

■ To do so, vibrations induced by a high speed railway system can be observed in all aspects of jobsite operations. The vibrations can then be observed all day long at the jobsite, with estimations made accordingly. Next, the vibration properties can be analyzed, including frequencies, velocities and various vibration sources from the ambient ground surface. Additionally, properties involving the geology, topography and related soil indexes can be analyzed on all estimated lines. Moreover, above data and related project purposes can be integrated and perused to design the intended mitigation infrastructure.

若要這麼做，可在現場由各方面觀察高鐵系統所造成的震動。可在現場整日觀察震動，並據此評估。隨後再分析震動的特性，包括頻率、速率和週遭地表的各項震動源。同時，牽涉到地質學、地形學和相關土壤指標等的特性，亦可經所有估計模式進行分析。此外，亦可整合上述資料和相關工程目的予以研究，以設計研擬中的減震基礎建設。

3. 希望的結果：希望的結果你希望達成的結果？

參考範例

■ As anticipated, the proposed method can enable Thai migrant laborers to focus on their work, with project schedules strictly adhered to and CEC able to obtain new commercial opportunities.

如此一來，所提出的方法可使泰籍勞工專心工作，工程完全遵照進度表，CEC 亦可取得新的業務機會。

參考範例

■ As anticipated, the proposed method can pave the way for achieving the effectiveness of vibrations mitigation from a high speed railway system, thus eliminating concerns of high technology industrial-based parks.

如此一來，所提出的方法為高鐵系統有效減震的成功鋪設了一條道路，因而消除了高科技工業園區憂慮的問題。

4. 領域的貢獻：你的提案對相關工作領域的貢獻？

參考範例

■ The proposed method can reduce expenditures involving Thai migrant laborers personnel by 6%. Moreover, complying with the accommodation requirements of Thai migrant laborers can promote CEC's image.

所提出的方法可降低泰籍勞工人事相關支出 6%。此外，遵循泰籍勞工宿舍規定，亦可提升 CEC 的形象。

參考範例

- Effectiveness of the proposed vibration mitigation method can be helpful in determining the feasibility of implementing vibration phenomena-related projects. Consequently, manufacturing production will reach an acceptable rate and generate revenues in high technology industrial-based parks.

所提出的減震方法的有效性，有助於決定執行震動現象相關工程的可行性。高科技工業園區的產量將會因此達到可接受的比率，繼而產生收益。

假設描述參考範例

- **Objective of work proposal 工作提案目標** An effective water resource distributed optimization model can be developed not only to reflect accurately how multi-objectives compete with each other, but also to estimate the available releases of multi-reservoirs. **Methodology to achieve objective 達成目標的方法** A simulation model can be developed to distribute the releases among reservoirs based on the operating rules of multi-reservoirs. These releases can then be used to evaluate the agricultural and non-agricultural objectives. Finally, a multi-objective genetic algorithm can be used to estimate the non-inferior solution set that reflects the impact on the relationship between agricultural and non-agricultural objectives. **Anticipated results 希望的結果** As anticipated, the proposed model can determine when to transfer irrigation water from the irrigation association to non-agricultural areas, based on the non-inferior solutions, to offset water shortages during the dry season. **Contribution to field 領域的貢獻** The proposed optimization model provides a valuable reference for governmental authorities when drawing up water resource-related management strategies.

E. 摘要撰寫：簡介背景，目標及方法，歸納希望的結果及其對特定領域的貢獻

1. 工作提案建構：你工作提案的主題是什麼？你的讀者可以明瞭工作提案的內容嗎？

參考範例

- Responsible for 80-90% of all public construction projects, construction companies and engineering consultancy firms lack personnel with art-related backgrounds, explaining the absence of an aesthetic quality in project design.

建設公司和工程顧問公司承辦所有公共建設工程的 80-90%，但卻缺少藝術相關背景的員工，這可解釋為什麼工程設計缺乏美學特質。

參考範例

- Ministry of Interior statistics demonstrate an annually declining birth rate in Taiwan, from 2.44% in 1979 to 0.96% in 2004.

內政部的統計資料顯示台灣的出生率逐年下降，從 1979 的 2.44% 下降至 2004 年的 0.96%。

參考範例

- Civil engineering associations lack adequate goal management skills to remain competent in the modern era.



土木工程協會缺乏在現代維持競爭力的適當目標管理技巧。

2. 工作問題：你的工作提案裡有你試著要解決或是想更進一步瞭解的問題嗎？

參考範例

- The lack of such design considerations can prevent a city from emitting a unique landscape or image.
缺少上述設計考量，會讓城市無法表現獨特的景觀或形象。

參考範例

- Although governmental authorities have attempted to address this issue through various incentive programs, the number of annual births significantly declined by 206,999 from 1979 to 2004.
雖然政府機關一直企圖藉由各項獎勵計劃處理這個問題，但是每年出生的人口數自 1979 年至 2004 年仍明顯下降 206,999。

參考範例

- The scope of the civil engineer's daily tasks is increasingly diminished, with less than 5% of all occupations belonging to civil engineering.
土木工程師的每日工作範圍愈見狹隘，低於所有土木工程所屬職業的 5%。

3. 工作目標：工作提案的目標？

參考範例

- Therefore, this study attempts to incorporate additional aesthetic planning in public construction projects to revitalize the city landscape and instill residents an appreciation of art.
因此，這份研究試圖將附加的城市美學規劃與公共建設工程結合，使城市景觀更有生氣，將藝術欣賞的觀念注入居民心中。

參考範例

- Therefore, this work presents an optimal model, capable of devising an effective policy aimed at mitigating declines in population by maintaining the annual birth rate at above 0.5%.
因此，這篇文章提出一個最理想的模型，能訂定有效的政策，藉由將每年出生率維持在 0.5% 以上，以緩和人口數下降趨勢。

參考範例

- Therefore, this work presents a strategic model to enhance the goal management competency of civil engineers.
因此，這篇文章提出了一個策略模型，以提升土木工程師的目標管理能力。

4. 達成目標的方法：你的計劃中達成目標的步驟？

參考範例

■ An exploratory landscape group governing public construction projects is established, whose members have art-related backgrounds. Those members then decide how to incorporate an aesthetic quality in public construction projects. Next, design and construction are undertaken by incorporating the group recommendations. Additionally, the group functions in an advisory role for public construction projects to clearly plan out the landscape setting.

成立成員具藝術相關背景的景觀探究小組來主掌公共建設工程。然後，成員決定如何將美學特質融入公共建設工程。接下來，融合小組建議後進行設計與施工。同時，小組的功能對公共建設工程而言，是一個替景觀配置作明確規畫的諮詢角色。

參考範例

■ A special committee of academics is organized, comprising mathematicians, economists, physicians, chemists and governmental officials. The performances of eight different test functions, including unimodal, multimodal and constrained optimization problems, are then compared using a self-adaptive hybrid genetic algorithm (SAHGA), non-adaptive hybrid genetic algorithm (NAHGA) and simple genetic algorithm (SGA).

成立由數學家、經濟學家、醫師、化學家和政府官員所組成的學術特別委員會。使用自適性混合式基因演算法 (SAHGA)、非適性混合式基因演算法 (NAHGA) 和簡單基因演算法 (SGA) 對單模型、多模型和受限最佳化問題等 8 項不同測試功能的表現進行比較。

參考範例

■ A goal management committee is established. The means by which board members are elected is then improved. Next, progress is made regarding opinions on the election. Additionally, opinions regarding goal management are discussed freely. Moreover, forecasted goals are debated. Furthermore, annual goals are established. Next, the feasibility of how goals are executed is examined. Additionally, member satisfaction is assessed. Finally, effectiveness of the proposed strategic model is re-evaluated.

成立目標管理委員會。改善委員會成員遴選方法。接下來針對遴選發表意見。同時自由討論與目標管理有關的意見。此外亦對預測的目標進行辯論。隨後訂定每年的目標。然後檢視目標執行的可行性。同時評估成員的滿意度。最後重新評估所提出的策略模型的有效性。

5. 希望的結果：你希望達成的結果？

參考範例

■ The proposed exploratory landscape group can reduce concerns of incompatibility between landscape setting and city construction by integrating an aesthetic quality in urban planning.

所提出的景觀探究小組，藉由將美學特質融入城市規劃，可減少景觀配置和城市建設間不相容的問題。

參考範例

- By incorporating use of SAHGA, NAHGA and SGA, the proposed optimal model can provide an appropriate strategy for mitigating the declining birth rate.

所提出的最理想的模型，藉由使用自適性混合式基因演算法 (SAHGA)、非適性混合式基因演算法 (NAHGA) 和簡單基因演算法 (SGA)，可為減緩出生率下降提供合適的策略。

6. 領域的貢獻：你的提案對相關工作領域的貢獻？

參考範例

- Doing so can significantly improve the urban landscape and instill residents an appreciation of art.

如此一來，可以顯著改善城市景觀，並將藝術欣賞的觀念注入居民心中。

參考範例

- In addition to providing a valuable reference for population policies, the proposed method can alleviate concerns over labor shortages in Taiwan and overseas.

除了提供有價值的人口政策參考資料之外，所提出的方法亦可緩和台灣及海外勞力短缺的問題。

參考範例

- The proposed strategic model can help civil engineers to establish goal management skills, further advancing the civil engineering field.

所提出的策略模型可以幫助土木工程師建立目標管理技巧，進而提升土木工程業。

摘要撰寫參考範例

- **Setting of work proposal 工作提案建構** While science-based industrial parks represent the hub of high tech development in Taiwan, modern transportation necessitates the construction of a hi-speed railway infrastructure, which is infeasible for transportation inside of such industrial parks. **Work problem 工作問題** Constructing such an infrastructure may hinder park operations in some ways. In addition to interfering with manufacturing quality within a science park, vibrations from a high-speed railway system may subsequently discourage enterprises from establishing their operations inside of such facilities. **Work objective 工作目標** Therefore, this work presents a novel vibration mitigation method to mitigate the adverse impact of a high-speed railway system. **Methodology to achieve objective 達成目標的方法** Vibrations induced by a high-speed rail-way system are observed in all operational aspects. Vibrations are then observed continuously at the jobsite, with estimations

correspondingly made. Next, the vibration properties are analyzed, including frequencies, velocities and various vibration sources from the ambient ground surface. Additionally, properties involving the geology, topography and related soil indexes are analyzed on all estimated lines. Moreover, above data and related project objectives are integrated and perused to design the intended mitigation infrastructure. **Main results of the project 希望的結果** The proposed vibration mitigation method can ultimately mitigate the adverse impacts of mitigation from a high-speed railway system, thus eliminating concerns of administrators in hi-tech industrial-based parks. Effectiveness of the proposed vibration mitigation method can facilitate the implementation of vibration phenomena-related projects. **Contribution to field 領域的貢獻** Consequently, manufacturing production will reach an acceptable rate and generate projected revenues in hi-tech industrial-based parks. Achieving the above goals requires that practitioners and academics integrate their efforts to reach an efficient solution.

F. 工作提案撰寫 (750-1000 words)

1. 由以上規劃，撰寫 750 至 1000 字的工作提案，包括五個段落：

第一段落：Setting of work proposal 工作提案建構

參考範例

■ An efficient time schedule is of priority concern in civil engineering projects, with company owners and contractors often struggling to reach a consensus on schedule deadlines and constraints, requiring that regulations, construction practices and a schedule be clearly agreed upon in the contract.

有效的進度表是土木工程案的優先考量，公司業主和包商通常很努力的在進度最後期限和限制上達成共識，要求在合約內對法規、施工標準和進度表均明確表示同意。

(請由以上主題延伸多寫 5 至 7 個英文句子)

第二段落 Work problem 工作問題

參考範例

■ While the time schedule outlined in a contract is defined according to calendar dates, working days and project phases, actual construction tasks are often complex and can often not comply with antiquated time schedules.

合約內容所示的時間進度表多按日曆天、工作天和工程階段定義，但實際的營建作業通常很複雜，通常無法遵照預訂的進度表。

(請由以上主題延伸多寫 5 至 7 個英文句子)

2. Quantitative specification of problem 問題的量化

參考範例

■ For instance, although scheduled for completion in three years, the Taipei Mass Rapid Transit project lasted more than four years. This discrepancy between forecasted and actual project completion time required more capital and resources than originally forecasted.

譬如說，雖然台北捷運工程預計在3年內完工，但是卻持續了4年多。工程預定完工時間和實際完工時間二者間的差異，就需要比原來預測還多的資本和資源。

(請由以上主題延伸多寫5至7個英文句子)

第三段落 Importance of problem 問題的中心

參考範例

■ The inability to resolve constant contractual disputes is owing to unacceptable schedule completion time.

進度完工時間無法令人接受，會導致一直無力解決合約上的爭議。

(請由以上主題延申多寫5至7個英文句子)

第四段落 Work objective 工作目標

參考範例

■ Based on the above, we should develop an enhanced contract time schedule that incorporates calendar dates, working days and project phases. As duration of a contract includes many circumstances, using only one time framework to determine the entire project schedule time is an unreliable approach that will create friction between the company owner and contractor. All foreseeable circumstances must be integrated into the contract schedule.

基於以上所述，我們應該結合日曆天、工作天和工程階段來擬定寬綽的合約時間進度表。由於合約期間內有各種情況發生，所以僅用一種時間大綱來決定整個工程的進度時間，是不可靠的方法，會造成公司業主和包商之間的摩擦。一切可預見的情況均須納入合約進度表內。

3. Methodology to achieve objective 達成目標的方法

參考範例

■ To do so, the scope of the project's activities can be determined. A time schedule for each work task can then be confirmed. Next, weather conditions during the project can also be forecasted. Additionally, the role of alternative design and administrative assignments during implementation of the contract can be evaluated. Furthermore, other ways in which the contractor influences this contracted work can be assessed. Finally, the above influences on this contract can be considered to determine the actual project schedule time.

若要這麼做，可決定工程活動的範圍。隨後可確認各項工程作業的時間進度表。然後可預測計劃期間內的天候狀況。同時亦可評估合約執行期間內的替代設計和行政工作。隨後可評估包商可能影響約定工程的其他狀況。最後，考量以上對合約產生的影響後決定工程的實際進度時間。

第五段落 Anticipated results 希望的結果

參考範例

- As anticipated, the proposed contract time schedule can more accurately determine time constraints in a construction project than conventional methods can. In addition to achieving a more accurate budget than the originally forecasted one, the proposed schedule can ensure a higher quality than previous ones.

如此一來，所提出的合約時間進度表可比傳統方法更正確的決定營建工程的時間限制。除了完成比原來預測還正確的預算之外，所提出的進度表亦可確保比先前更好的品質。

(請由以上主題延伸多寫 5 至 7 個英文句子)

4. Contribution to field 領域的貢獻

參考範例

- In addition to accurately predicting project completion, the proposed time schedule can determine budgetary constraints precisely.

除了正確預測工程的完工之外，所提出的時間進度表亦可準確的確定預算限制。

(請由以上主題延伸多寫 5 至 7 個英文句子)

柯泰德先生自 1989 年即在國立交通大學及清華大學任教研究所科技英文寫作課程。目前柯先生是元培技術學院外文組的講師。著有五本科技英文寫作系列及十本應用英文寫作系列叢書。同時他也是數本科技期刊的英文編輯。柯先生目前正在攻讀英國東安格利亞大學的教育博士學位。柯泰德線上英文論文編修訓練服務 www.chineseowl.idv.tw

參考文獻

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工程英文口語簡報

如何有效進行工程英文口語簡報

柯泰德

簡介

本篇文章主要介紹如何有效進行工程專業類的口語簡報，包括簡介、主體及結論部份的相關詞彙。本篇文章也同時介紹不同型式的口語簡報，包括：預測市場趨勢、產品或服務研發、專案描述、公司或組織介紹及產業介紹。

口語式演講報告的結構要素為：

(1) 開場 (2) 組織架構 (3) 結論

(1) 開場：

- (a) 問候致意和演講主題介紹
- (b) 演講報告的大綱摘要
- (c) 致意和演講主題介紹

(a) 問候致意和演講主題介紹

Good afternoon, ladies and gentleman. I would first like to thank the organizational committee for inviting me to be here with you today.

各位先生、女士們，下午好。我首先要感謝機構的委員會，能在今天邀請我來這裡和大家見面。

I am delighted to have the opportunity to be with you today and provide a general overview of ...

我很高興在今天能有這個機會，能在這裡為大家提供一個概念是關於...

I would like to thank you for giving us the opportunity to visit your company and discuss with you...

我必須要感謝各位提供我們這個機會來這裡拜訪大家，以及共同探討...

(b) 演講報告的大綱摘要

I will give this presentation in five parts.

我把今天的演講內容分成五個部分

I'll divide today's talk into four parts.

今天討論的內容分成四個部分

Today's presentation will be given in five parts.

今天的演講報告將會被切割成五個部分

(c) 致意和演講主題介紹

Next, I would like to focus on...

緊接著，我將會把重點放在...

Moving on, I'd like to briefly touch on...

接下來，我將會概要性的帶到...

Next, I will discuss why...

接下來，我將會討論為什麼...

(2) 組織架構：

- (a) 第一個論點 (b) 第二個論點
- (c) 附加的論點 (d) 內建式的摘要
- (e) 最後的論點

(a) 第一個論點

Before I get into the main subject, would you allow me to briefly introduce...?

在我們還沒有進入討論的重點以前，請允許我先大致上的簡單介紹一下

I'd like to begin by making some introductory remarks about...

我希望能先以重點式的介紹來討論這個主題

It would be best to start off by making some general comments about...

如果以一般社會大眾的意見來開始這個主題最好不過的了

(b) 第二個論點

Let's now take a closer look at...

就讓我們現在一起深入討論...

Now let's turn to some of the specific areas that...

現在讓我們開始轉入一些更加明細的主題範圍

This now brings us up to the second part of today's presentation...

這將會帶領我們大家進入演講報告主題的第二個部分...

(c) 附加的論點

Shifting to the next part of today's presentation, I'd like to briefly touch on...

接下來，將轉移到今天這個演講報告的重點，我將概要性的帶到...

I would like to provide you with some extra information about...

我想要提供你一些關於（某主題）額外的資訊...

Of course, all of this has special significance when applied to my third point:

當然，這些所有的重點都有他們的意義，尤其是套用在我的第三個論點時

(d) 內建式的摘要

At this point, I'd like to sum up the results of ...

在這個論點，我想要將所有的結果做個總合...

Before going further, I'd like to summarize what we have already covered.

在繼續下一個部分之前，我想要把之前的討論做個概括總結。

(e) 最後的論點

Before closing, I would like to sum up...

在結束之前，我想要總合一下...

Before I close, I must say a few words about...

在我結束之前，我必須先說明一下關於...

Before concluding today's presentation, I would like to briefly mention...

在為今天的演講報告做出總結之前，我想簡單的提一下...

(3) 結論：

(a) 將所有重點做出概要

(b) 感謝各位觀眾

(c) 邀請在場人士發問

(a) 將所有重點做出概要

In concluding my presentation today, I would like to emphasize the following.

在為我今天的演講報告做出結論前，我希望能強調一下關於以下...

From the developments reported above, I would like to make some concluding remarks for today's presentation, which will hopefully shed some light on...

從今天所有談到的報告內容中，我想要把重點做出些結論來指出些許方向...

Finally, I would like to make some closing remarks for today's presentation.

最後，我希望能為今天的演講報告做一個總結。

(b) 感謝各位觀眾

Thank you for your kind attention.

謝謝你們的專注。

Thanks for the opportunity you have given me to be here with you today.

謝謝你們給我這個機會來和大家見面。

Ladies and gentlemen, it has been a great pleasure for me to be here today.

女士和先生們，今日能站在這裡是我至高無上的榮譽。

(c) 邀請在場人士發問

I see that we have a few minutes remaining on the program. I welcome your comments or suggestions.

我想我們現在還剩下幾分鐘，歡迎在場的各位提供寶貴的觀感和意見。



If you have any questions, please feel free to ask.

如果您有任何問題，請自由發問。

I'd now be happy to answer any of your questions.

不論任何問題，我都樂於答覆。

口語簡報的型式

(A) 預測市場趨勢

(1) 開發此產品的原因：科技層面 (a) 相關產品 (b) 潛在利潤

A growing elderly population will lead to an increase in the rate that individuals retire, with a shrinking younger generation to support the elderly. Therefore, understanding how the quality of life of the elderly and the retail housing market for this age group are related has received increasing attention given current trends in Taiwan's aging society.

老年人口逐漸成長，將導致退休人數的比率增加，撫養老年人的年輕一代人數銳減。因此，在台灣目前高齡社會的趨勢下，了解老年人的生活品質和此年齡層族群的住宅市場之間有何種關連，已逐漸受到重視。

(2) 財務層面：開發領域的市場趨勢

While Taiwan's elderly individuals over 65 years old in 2003 comprised 9.2% of the entire population, this figure will increase to 15.9% by 2021. To effectively respond to this population shift, policy makers and various health care professionals are concerned with how to effectively coordinate available resources.

2003年，台灣65歲以上的老年人口佔總人口的9.2%，預計2021年將上升至15.9%。為了有效因應此項人口變化，政策制定者和各類醫療保健專家專注於如何有效的協調可利用的資源。

(3) 產品開發的組織策略和方案：(a) 策略的界定（包括最高目標及主要重點）(b) 執行策略方案的界定

Effectively promoting the use of solar energy requires an emphasis not only on its continuous development to gain public confidence in its ability to provide for energy consumption in the future, but also on its applicability in a diverse array of product appliances and facilities.

要有效推廣使用太陽能，所須強調的不僅是太陽能未來提供能源消費的能力，而且亦須強調太陽能在各類產品設備和設施的適用性。

(4) 市場調查：(a) 產品的商業潛力 (b) 產品運用的範疇

According to Taiwan's Annual Real Estate Report, an increasing number of individuals will live independently in rented apartment units located in housing complexes where the elderly live exclusively. While such a trend is aimed at upper income elderly, marketing efforts should be made to promote this future living trend among this growth sector in Taiwan and gain societal acceptance in a traditional society where the younger generation is normally expected to care for the elderly.

根據台灣年度不動產報告顯示，有意在老人公寓租屋的人數將會增加。此種趨勢是針對高收入的老年人，行銷重點應是在此項台灣的成長產業中推廣此種未來的生活趨勢，並在期望年輕一代照顧老年人的傳統社會中，得到認同。

(B) 產品或服務研發

(1) 產品開發的現階段狀況

Despite the increasing number of solar energy construction projects in Taiwan, island wide development of this energy alternative is still in its preliminary phase, making it still impractical for satisfying daily consumption needs. Still, overseas solar energy firms have successfully transferred relevant technologies that will ultimately make Taiwan less dependent on non-renewable energy sources.

雖然台灣的太陽能營造工程逐漸增加，但此種能源替代方式在全國仍屬初步階段，要滿足每日的消耗需求仍言之過早。國外太陽能廠已成功轉移相關技術，使台灣不那麼依賴不可再生能源資源。

(2) 市場的評價

Market growth has shifted from industrialized countries to developing ones in South America, Eastern Europe and Asia (especially China), with the compound annual growth rate exceeding 10.4% over the past five years.

市場成長已從工業化國家轉移至南非、東歐和亞洲（特別是中國）的開發中國家，其過去5年的年複合成長率已超過10.4%。

(3) 產品開發的獨創性和特色

Recent surveys on consumer preferences in the digital camera market confer that lightweight, handy and portable products with a large size display screen are of priority concern. Such preferences provide a valuable reference for design specifications when Taiwanese manufacturers create innovative products.

消費者數位相機偏好調查顯示，產品輕巧、易操作、可攜帶、大螢幕是優先考量。這樣的偏好對台灣製造商設計創新產品時，提供在規格設計方面價值性參考。

(4) 台灣同類產品的主要製造廠商

Domestically, Run-tai Construction Company is collaborating with Chang Gung Memorial Hospital in establishing an elderly community based on the above principles. Given Taiwan's growing elderly population, elevated living standards, and preference of more elderly individuals to live independently of their children, the potential for this growth sector is enormous.

在國內，潤泰建設公司和長庚紀念醫院根據以上的原則合作興建老年社區。由於台灣老年人口數成長、生活水準提高、更多老年人偏好離開子女獨立居住，因而提昇此類成長中產業龐大的發展潛力。

(C) 專案描述

(1) 專案的背景

The fiercely competitive management environment has necessitated that enterprises initiate many innovative plans, including organizational restructuring or personnel reductions. Likewise, outsourcing is a major industrial trend aimed at ensuring corporate survival.

極度競爭的管理環境使得企業必須開始進行許多創新計畫，包括組織重組或人事縮編。外包同樣也是為了確保公司存續的一項主要產業趨勢。

(2) 市場的訊息

With consumer demand expected to grow continuously, according to expert forecasts, solar energy use will increase at a rate of 33% the future, with its output value targeted at \$US 1,400,000,000.

在消費者需求預期逐漸成長的情況下，根據專家預測，未來太陽能的使用將會增加33%，產值將達到14億美元。

(3) 專案的目標

More than an alternative to petroleum, as an unlimited power source that does not extract an environmental cost, solar energy represents a growing environmental consciousness aimed at protecting the world's natural resources.

太陽能不僅是石油的替代品，它是不耗費環境成本的無限量能源，亦代表在保護世界自然資源目的下逐漸成長的環保意識。

(4) 專案的重要特色：專案的策略

Under the BOT scheme, the Taiwanese government initially holds the property rights of an infrastructure project and then transfers them to the private sector. The private sector is then responsible for investing in the project and implementing it for an agreed upon period. Once the period expires, the private sector transfers the project assets to the government with or without compensation.



根據 BOT 計畫，台灣政府先持有基礎建設工程的財產權，然後再轉移給私人單位。該私人單位隨後在約定的期間內負責工程的投資和執行。約期截止時，該私人單位則將工程資產以有償或無償的方式轉移給政府。

(D) 公司或組織介紹

(1) 簡要陳述組織所屬之產業的概況

Elderly individuals in Taiwan over 65 years old account for 9.4% of the total population, surpassing the United Nations' definition of an aging society. Given this trend, market opportunities for senior citizen residential communities island wide are estimated at more than \$US 100,000,000 annually.

台灣 65 歲以上的老年人口佔總人口的 9.4%，已超過聯合國所定義的高齡社會。在此趨勢下，全國老年人住宅區的市場機會估計每年超過 1 億美元。

(2) 組織的使命：組織的發展沿革

Whereas older correctional facilities focused on isolating inmates from the general population without much concern for their rehabilitation, modern correctional facilities adopt a more humanistic approach towards orienting and reforming the incarcerated so that they will have practical skills upon re-entering society.

較早的監獄強調的是將囚犯與一般大眾隔離，對他們的重建較少關心，而現代的監獄則採用比較人道的的方式引導、改造受監禁的人，這樣當他們重新踏入社會時才具備實用技能。

(3) 組織的架構

While the Taiwan headquarters consists of computer, printing, business and accounting departments, the Chinese branch comprises computer, printing, quality control, processing, business and accounting departments.

台灣總公司由電腦、印刷、業務和會計部組成，中國分公司由電腦、印刷、品管、加工、業務和會計部組成。

(4) 組織最新的科技成就

Regardless of the urgency of a customer's query regarding application needs or trouble-shooting assistance, IEI currently replies to 93% of incoming queries related to sales within 12 hours and queries related to technical support within 24 hours. Finally, to ensure on-time delivery, IEI has successfully established a highly integrated supply chain and logistics system to allocate key components efficiently in order to increase manufacturing efficiency.

客戶有關申請需求或排難解紛的詢問，不論緊急程度為何，目前 93% 關於銷售方面的詢問，IEI 已於 12 小時內回覆，關於技術援助的詢問，則於 24 小時內回覆。最後為了確保準時交貨，IEI 成功建立高度整合的供應鏈和物流系統來有效分配主要零件，以提升製造效率。

(E) 產業介紹

(1) 此種產業在台灣的一般特色

Characterized as low polluting and capital intensive, the biotechnology industry employs highly qualified personnel from multidisciplinary fields and develops product technologies with a high economic return. Given those characteristics, R&D budget accounts for a large proportion of the company's operating budget, which is understandable if a company wishes to enhance its competitiveness.

生技產業具低污染和強勢資本的特色，從多種領域聘請高度合格的人員，並發展具高經濟報酬的產品技術。由於前述特色，研發預算佔公司營業預算大部分，這在公司希望提升競爭力下，是可以理解的。

(2) 產業所面臨的困境

A rapidly aging population, advances in medical technology that increase average life expectancy and the increasing availability of medical services have contributed to a situation in which increased medical fee expenditures exceed the amount of National Health Insurance premiums collected.

由於老年人口快速成長、進步的醫療技術使平均壽命增加、醫療服務愈來愈容易獲得，因而使得增加的醫療費用超支全民健保保費。

(3) 簡述一或二個目前活動的重點

The Taiwanese government has recently promoted a new policy entitled "Broaden the sources of National Health Insurance generated income to reduce medical expenditures" as an incentive for hospital administrators to increase productivity and efficiency, as well as assure the general public of the continued provision of high quality medical care.

台灣政府近來推行名為「擴展全民健保資源，增加所得降低醫療支出」的新政策，作為醫院行政官員提升生產力和效率的激勵，且確保大眾持續獲得高品質的醫療照顧。

(4) 產業採用的科技

In terms of the development of GPS navigational systems, domestic manufacturer capacity is nearly equivalent to that of overseas automakers although locally developed automotive security systems and wireless on-line network capabilities still lag behind overseas counterparts. Given rapid scientific and technological advances, the automotive industry will heavily emphasize wireless on-line network capabilities, GPS navigational features and foolproof security systems.

在 GPS 導航系統發展方面，國內製造商的能力幾乎等於國外汽車製造業者，但當地發展的汽車安全系統和無線上網路能力仍落後國外業者。在科技快速發展下，汽車業將會大力強調無線上網路能力、GPS 導航特性和簡易安全系統。

(5) 台灣相關的研究發展設備

Among the numerous new knowledge economy-oriented ventures underway, nanotechnology plays a leading role in scientific and technology-related research. For instance, after Taiwan University Research Group (TURG) commercialized its nanoparticles product, many local enterprises followed suit in entering the nanotechnology market, including the Industrial Technology Research Institute (ITRI) and Textile Technology Research Institute. As the local nano-paint solvent manufacturing sector continues to expand, many industries have expressed interest in expanding their product lines to this area. Ultimately, R&D activities will determine whether domestic nano-paint solvent manufacturing sector can compete globally.

在眾多新知識經濟導向的事業中，奈米技術在科技相關研究上扮演主要的角色。例如：台灣大學研究團隊 (TURG) 在市場提供奈米微粒產品之後，許多當地企業跟著進入奈米技術的市場，包括工業技術研究院 (ITRI) 和紡織技術研究院。由於當地奈米塗料溶劑製造業持續擴張，許多產業因而均表達有意將產品系列擴展至這個領域。最後，研發活動將決定國內奈米塗料溶劑製造業是否可在全球競爭。

參考文獻

柯泰德 (2004)，「做好英文口語簡報」，工業技術研究院。

英文電子郵件

有效海外工程 英文 交流一

探討工程師如何有效的與海外專業人士交流英文 (上)

柯泰德

本文分上下二期刊登，主要教導國內工程師如何建構以下相關專業英文信函，以用來和國外工程相關專業人士有效溝通。本期內容包括：(一) 科技訓練請求信函：某人學歷及工作經驗概述，科技訓練申請，讚揚提供科技訓練的機構，科技訓練細節解釋及表達對科技訓練機會的樂觀態度。(二) 資訊交流信函：資訊流通關係的提呈，為資訊流通而提供個人或機構經驗，為資訊流通而讚揚某機構或某人，資訊流通關係的細節詳述，表達對資訊流通關係的樂觀態度及開始資訊流通關係。其餘內容(三) 科技訪問信函、(四) 演講者邀請信函、(五) 旅行安排信函、(六) 資訊請求信函，將於下期刊登。

以下為詳細內容：

Seeking Technical Training/ 科技訓練請求信函

1. Summarizing one's academic or professional experiences 某人學歷及工作經驗概述

參考範例

- The attached resume and recommendation letters provide further details of my solid academic background and professional experiences.

附上的履歷表及推薦信詳細敘述了關於我的完整學歷背景及專業上的經驗。

- Relevant project experiences have significantly strengthened my independent research capabilities as well as statistical and analytical skills.

相關的專案經驗大大地加強了我獨立研究的能力，以及在數據上與分析上的技巧。

- Intensive on-the-job training enabled me to handle various requests and difficult situations, enabling me to resolve problems efficiently.

密集的在職訓練讓我可以處理各種不同的要求及困難的情形，也讓我可以有效率地解決問題。

■ Performing independent research has definitely made me more receptive to accepting new challenges.

進行獨立的研究的確使我更能夠接受新的挑戰。

■ In addition to these academic and professional activities, I often read supplemental literature to remain abreast of the latest technological trends.

除了學術上及專業上的活動外，我常常研讀一些補充資料以便和最新的科技趨勢保持同步。

練習 1

以下每句為用來訓練有關科技訓練請求信函：某人學歷及工作經驗概述。請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. My graduate school research focused on designing and applying relevant marketing strategies to the civil engineering sector,	A. I will complete my master's degree requirements from the Institute of Civil Engineering at National Chiao Tung University in the spring of 2005.
2. First exposed to civil engineering during undergraduate school,	B. the need to continuously grow academically and professionally, albeit with a cordial and earnest attitude.
3. I received my undergraduate training in the Department of Civil Engineering at National Chiao Tung University,	C. personal resume, university academic transcripts and letter of recommendation from our university president.
4. The attached resume will give you a better idea as	D. as evidenced by my ranking among the top five scholastically in related courses.
5. University instructors equipped me with strong academic fundamentals in civil engineering,	E. to how my personal strengths match the needs of your research group.
6. I view myself as a responsible individual that highly prioritizes	F. which further spurred my interest in this area of research.
7. Please find enclosed my	G. with a subsequent Master's degree in Construction Engineering from National Taiwan University of Science and Technology.
8. Civil engineering has interested me immensely throughout undergraduate and graduate school,	H. with those findings submitted to an international journal for publication.

2. Requesting technical training 科技訓練申請

參考範例

■ My academic advisor, Dr. Cheng, recommended that I contact you regarding the possibility of a guest researcher stay in your laboratory.

我的學術指導教授是張博士，他建議我和你們連絡，詢問是否有機會可以在貴實驗室，擔任客座研究生。

- Eager to strengthen my knowledge expertise in this field, I hope to serve in your laboratory as a guest worker to compensate for my lack of training and practical laboratory experiences in this area.

由於急切地想拓展我在這領域的專業知識，我希望可以在貴實驗室擔任客座工作者，以便彌補我個人較缺乏的訓練，以及這領域在實驗室的實戰經驗。

- Eager to understand the dynamic environment that your work involves, I would like to arrange for a three-month stay in your laboratory as a self-supported guest researcher, hopefully this upcoming summer.

由於急切地想了解您的工作所充滿活力的環境，我希望可以安排約三個月在貴實驗室，作一位自立的客座研究生，希望會是即將到來的這個夏天。

- The opportunity to serve in a self-supported guest researcher position in your laboratory would further orient me on how to become more proficient in this line of research.

在貴實驗室擔任一個自立客座研究生的機會，將更進一步引導我，在這條研究路上，更精通與熟練。

- To build upon the above academic and professional experiences, I would like to serve as a self-supported guest researcher in your company's Civil Engineering Department for a three-month period, hopefully during my upcoming summer vacation.

建立在上述的學術及專業經驗，我希望可以在貴公司的土木工程部門，作一個自立的客座研究生，為期三個月，希望是在即將到來的暑假。

3. Commending the organization to receive technical training from 讚揚提供科技訓練的機構

參考範例

- As your laboratory has devoted much time in researching the above topics, I would greatly benefit from the opportunity to work in your laboratory as a self-supported researcher during my upcoming summer vacation.

因為貴實驗室已經對上述的研究題目貢獻良多，我很希望藉著在貴實驗室工作的機會而受益，能夠在即將到來的暑假，作一位自立的研究生。

- As a leader in this field of research, your laboratory could allow me to further refine my professional skills in civil engineering.

作為一位在這研究領域的組長，貴實驗室可以讓我更進一步磨練我在土木工程領域上的專業技巧。

- While searching for pertinent research literature in my field, I often come across your findings published in several reputed international journals.

當尋找個人領域的相關期刊文獻時，我常常在一些著名的國際期刊中發現您發表的作品。

- As is well known, your research group has devoted considerable time and resources to researching civil engineering-related topics.

眾所皆知，您的研究團隊已經花費相當多的時間及資源，來研究土木工程相關的題目。

■ From your laboratory's online introduction, I am impressed with the comprehensive strategies that you adopt in the workplace.

從貴實驗室的網路線上介紹，我對於您在工作場合上所採用的廣泛策略印象相當深刻。

練習 2

以下每句為用來訓練有關科技訓練請求信函：讚揚提供科技訓練的機構。請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. After thoroughly reviewing your online literature and promotional materials, I am especially drawn to the marketing strategies for the civil engineering sector that your organization has adopted,	A. in holding the 12th International Conference on Civil Engineering, I am most interested in learning from your rich experience in this area.
2. Having read upon your organization's research findings in the proceedings of several international medical conferences and globally renowned journals, I also am anxious	B. civil engineering research for quite some time, developments that I have closely followed for quite some time.
3. Given your organization's recent success	C. as evidenced by the publishing of your research findings in several internationally renowned journals.
4. I am especially drawn to your corporation's emphasis on customization that	D. the most appropriate place.
5. Your country has pioneered	E. as well as its globally recognized products and services for improving the lives of urban dwellers.
6. Your company has distinguished itself in	F. in researching civil engineering-related topics.
7. As is well known, your research group has made considerable progress in adopting the latest construction engineering approaches,	G. orients consumers on the reliability of your products and services.
8. Your division is widely recognized as a leader	H. progressive policies in welfare of its elderly population, including the construction of state-of-the-art facilities.
9. Given my research interests, your laboratory appears to be	I. explaining why I am eager to work in your organization as a guest researcher during my upcoming summer vacation.
10. I hope to perform advanced research in your center owing to its highly skilled personnel, state-of-the-art equipment and facilities,	J. which are quite compatible with my current research interests.

4. Explaining the details of the technical training 科技訓練細節解釋

參考範例

- Specifically, we are concerned with how to effectively adopt the latest construction engineering approaches.
更明確地，我們關心的是如何有效地採用最先進的營造工程技術。
- If given the opportunity, I would like exposure to the following topics:
如果有機會，我會想要探討下列的主題
- As for my accommodation during the guest stay, I would like to lease a single-room hotel, at a range between US\$150 to US\$200 daily.
至於我在客座期間的住宿，我會想要在旅社租賃一間單人房，租金約每日 150 美元到 200 美元。
- If granted this opportunity, I am open to investigating related topics with your highly skilled staff.
如果我得到這個機會的話，我並不排斥於和您們技術精進的員工，一起研究相關的題目。
- If possible, I hope to work directly under your supervision.
如果可能的話，我希望能您的指導下工作。

5. Expressing optimism in the possibility of technical training 表達對科技訓練機會的樂觀態度

參考範例

- I look forward to hearing from you soon as to whether such cooperation would be feasible.
我很期待聽到您的消息，得知是否這樣的合作是可行的。
- I am confident in my ability to work under your supervision in a research fellowship with your highly skilled research personnel, an opportunity that would greatly advance my competency as a civil engineer.
我對我的能力很有信心，可以在您的指導下工作，和一群技術很棒的研究同僚們一起，這樣的機會將大大地增進我的能力，成為一位土木工程師。
- The opportunity to work in a practicum internship in your company would provide me with an excellent environment not only to fully realize my career aspirations, but also to upgrade my own technological expertise.
有機會可以在貴公司擔任實習生，將會提供一個很棒的環境，讓我不止可以實現我的生涯抱負，也會提升我個人在技術上的專業知識。
- Exposure to the way in which your department applies the latest civil engineering concepts in a practical context would give me a clearer direction not only my graduate level research, but also my chosen career path as well.
有機會接觸到貴部門所採用的，將最新的土木工程技術應用於最實際的環境中，不僅提供我在研究領域的方向，也有助於我將來的職業生涯。

■ My previous experience in applying theoretical concepts to analysis and related applications will hopefully prove to be an asset to any effort that I belong to in your laboratory.

希望以前我在應用理論性概念於分析及其他相關的經驗，有助於成為我的一項資產，讓我有機會在貴實驗室工作。

練習 3

以下每句為用來訓練有關科技訓練請求信函：表達對科技訓練機會的樂觀態度。
請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. Somewhat familiar with the scope of your company's civil engineering activities, I am confident that my previous	a. matches that of your research group, I am anxious to look for potentially collaborative activities that would be mutually beneficial.
2. Such an opportunity would compensate	b. to any collaborative effort that I belong to in your company.
3. I would greatly appreciate your comments	c. regarding this proposal.
4. I am confident that my previous academic and professional experiences will prove valuable	d. context for the concepts learned in class.
5. I bring to your corporation a solid understanding of	e. academic and professional experiences will prove valuable to any collaborative effort that I belong to.
6. Given that the research direction of our laboratory closely	f. as an aspiring researcher in this field, as I search for a more practical context for the academic concepts taught in class.
7. Working in your organization would give me a practical	g. research design and methodology that will hopefully contribute to your company's efforts to enhance operational quality.
8. The opportunity to work in your laboratory would mature me	h. in applying theoretical concepts to survey research and statistics.
9. More than the opportunity to receive technical training, this four month technical visit	i. for my lack of formal professional experience in this area.
10. I hope that I can contribute my previous experience	j. will hopefully initiate a long-term collaborative relationship between our two laboratories.

Exchanging Information/ 資訊交流信函

1. Proposing an information exchange relationship 資訊流通關係的提呈

參考範例

- I'd like to propose an academic information exchange regarding current research trends in civil engineering in Taiwan and the United States.

我想要提議關於在台灣與美國之間土木工程相關的研究趨勢方面，作一種學術上的資訊交流。

- Given your laboratory's innovative research in product marketing strategies, I would like to propose an information exchange relationship between our two organizations, hopefully beginning with my visit to your laboratory this upcoming July.

由於貴實驗室在推銷產品的行銷策略方面的創新研究，我想要提議在敝人及貴實驗室之間作一種資訊交流的關係，希望可以在今年七月，我去參觀貴實驗室時開始。

- Since our goals closely match those of your organization, we would like to develop a partner relationship with you, for information exchange and for possible future collaboration.

因為我們的目標與貴實驗室的目標相符合，我們想要和貴實驗室建立一種合作關係，作資訊交流以及未來合作的可能性。

- Miss Hu recommended that I contact you regarding the possibility of an information exchange opportunity with your company with respect to potential technology transfer opportunities between our two organizations.

胡小姐建議我和您聯絡，看是不是有機會可以和貴公司作資訊交流，是關於我們兩個組織間作潛在性的技術轉移。

- I look forward to exchanging laboratory data with your laboratory as part of a collaborative venture on designing long-term residential complexes for the elderly.

我很期待和貴實驗室交換實驗結果，當作是合作性的合資事業，來設計一些老人可以長期居住的複合屋。

2. Introducing one's professional experience or that of one's organization in relation to the proposed information exchange relation 為資訊流通而提供個人或機構經驗

參考範例

- I belong to the Institute of Civil Engineering at National Taiwan University Hospital, a leading research center in this field in Taiwan.

我屬於台大醫院的土木工程所，在台灣是這方面首屈一指的研究中心。

- In line with consumer demand, we continuously improve upon and streamline civil engineering-related research methods.

和消費者的需求同步，我們持續不斷地改善和設計出土木工程相關領域的研究方法。

- As a governmental supported research organization, our Center maintains state-of-the-art instrumentation for clinical use.

身為受政府贊助的研究組織，我們中心保持最現代的儀器設備，供臨床使用。

- While aspiring to become a globally leading research institute, our Institute hopes to participate in the activities of universal civil engineering organizations.

當有志成為全球屬一屬二的研究機構，我們機構希望可以參與國際性土木工程團體的一些活動。

- I am currently involved in a research effort aimed at developing a process model by mining text-based information that will optimize management of customer relations in the civil engineering sector.

我現在正從事的研究，為藉由降低以文字為基礎的資訊來發展一套過程模式，可以在土木工程領域極大化管理顧客關係。

練習 4

以下每句為用來訓練有關資訊交流信函：為資訊流通而提供個人或機構經驗。請把左邊及右邊的每一片語連結成一個完整句子。解答在本文最後部份。

1. While focusing on teaching, research and service, National Taiwan University has accumulated	a. my professor in a National Science Council-sponsored research project aimed at increasing the efficiency of civil construction projects.
2. As a graduate student in the Institute of Civil Engineering at National Chiao Tung University, I am collaborating with	b. improve upon and streamline civil engineering-related research methods and laboratory procedures.
3. The project that we are currently engaged in focuses on	c. I am involved in various stages of implementing National Science Council-sponsored research projects.
4. In line with consumer demand, we continuously	d. have yielded numerous benefits for the Taiwanese construction industry.
5. As a member of the technical staff in the Department of Civil Engineering at National Taiwan University,	e. which are largely concerned with how to increase work productivity in a civil engineering project.
6. Enclosed please find a document that will hopefully give	f. to develop inexpensive yet high quality products for the burgeoning civil engineering sector.
7. Let me briefly let you in on our ongoing projects,	g. the best research personnel and technologists in Asia, explaining its strong emphasis on teaching.
8. The work results generated so far in our project	h. branch office strives to offer a line of quality products to satisfy consumer demand, both locally and abroad.
9. Established in 1998, our company strives	i. providing relevant information that would facilitate a construction site manager's decision making process.
10. As TFT-LCD technology continuously advances, our	j. further insight into the missions of the company which I belong.

3. Commending the organization or individual to exchange information with
為資訊流通而讚揚某機構或某人

參考範例

- The Civil Engineering Center of Stanford University is globally renowned for its pioneering research for practical applications.

史丹福大學的土木工程中心為全世界知名，因為它在實務應用上的領先研究。

- Given your institution's state-of-the-art technology and advanced expertise in neurology,

因為貴機構最新的技術及在神經學上的先進專業知識，

- Given your headquarters' vast knowledge of consumer trends and technological developments in this area, we would like to exchange product information and manufacturing technology expertise with your R&D unit.

因為貴組織總部在消費者趨勢方面廣泛的知識及該領域在科技上的發展，我們想要和貴組織的研發部門交流產品資訊及製造的科技知識。

- The achievements that your closely-knit staff has achieved are quite impressive.

貴組織層層分工的員工所達到的成就相當地令人耳目一新。

- Your recent research on Internet marketing has been extremely helpful in my graduate school research in the Institute of Business Management at Yuanpei University of Science and Technology, especially your unique strategies adopted to analyze the market potential for online commerce.

您在網路行銷上的近期研究對我所就讀的元培科技大學企管研究所的研究，已經是非常有幫助，尤其是貴組織使用獨特的策略在電子商業上，來分析市場潛力。

4. Outlining details of the information exchange relation 資訊流通關係的細節詳述

參考範例

- Through this relationship, we could freely exchange our views and approaches towards achieving the best available options for our customers.

透過這樣的關係，我們可以自由地交換想法和方法，來達到可以提供我們顧客最好的選擇。

- As for the intern position offered at your organization on an annual basis, I could offer relevant data from Taiwan and the Pacific Asian region.

至於貴組織每年可以提供的內部實習生人選，我可以提供台灣及亞太地區的相關資料。

- We are interested in what opportunities for technological cooperation are available between our two organizations in the area of developing forecasting models for the civil engineering sector.

我們對於兩個組織之間可以在技術上合作的機會很感興趣，發展在土木工程領域的預測模式。

■ During our information exchange, we hope to collaborate with your laboratory in exploring current trends in the civil engineering sector, hopefully enabling us to identify areas of mutual interest that would lead to a technology transfer or joint venture.

在我們的資訊交流期間，我們希望可以和貴實驗室合作，來探索在土木工程領域的流行趨勢，希望讓我們找出彼此的共同利基，進一步作技術轉移或合資。

■ Our collaborative relation would hopefully allow us to share information on the latest advances in online auctioning for marketing segmentation purposes.

彼此的相互關係希望可以讓我們在最先進的線上拍賣方面分享資訊，以達到市場區隔。

練習 5

以下每句為用來訓練有關資訊交流信函：資訊流通關係的細節詳述。
請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. To initiate this information exchange relation, we suggest not only	a. to share pertinent data involving risk assessment, customer loan policies, database management and the transfer of business capital.
2. As our department actively engages in National Science Council-sponsored research in this area, we hope that the exchanging of relevant data between our two organizations will lead to	b. skills in evaluating the success factors of a civil engineering project.
3. The information exchange between our two organizations will hopefully allow us	c. a joint venture aimed increasing the efficiency of the construction industry in Taiwan.
4. We hope to share our professional	d. of mutual interest, possibly leading to a technology transfer or joint venture.
5. I hope that our staff will have the opportunity to exchange	e. I could offer relevant data from Taiwan and the Southeast Asian region.
6. While you could provide valuable information on current trends in consumer behavior analysis,	f. that our personnel receive intern training on management planning in your institution, but also that your staff offer lectures and clinical demonstrations in Taiwan.
7. I hope that through our technological information exchange, we will be able to identify areas	g. data and experiences in the field of customer management in the civil engineering sector.

5. Expressing optimism in the anticipated information exchange relation
表達對資訊流通關係的樂觀態度

參考範例

- Familiar with the scope of activities in your marketing department, I am confident that our organization's similar methodologies and strategies will enable us to easily engage in a collaborative effort in the near future.
熟悉貴公司的行銷部門所從事的活動範圍，對於我們組織間相似的方法論及策略會讓我們在未來的合作努力輕鬆上手，我很有信心。
- We believe that such a relation would be a mutually beneficial one.
我相信這樣的關係將會是互惠的一種。
- We are anxious to develop long-lasting cooperative relationships with an institution such as yours.
我們很迫切地想和貴機構發展出長期的合作關係。
- I look forward to your thoughts regarding the possibility of such collaboration.
我很期待聽到您對未來這樣合作的可能性有怎樣的看法。
- Such an exchange would enable us to acquire new perspectives towards the experimental process.
這樣的交流會讓我們對於實驗的過程得到新的觀點。

6. Initiating the information exchange relation 開始資訊流通關係

參考範例

- Would you please send me introductory information as well as other pertinent literature that analyzes consumer behavior in the above areas?
您可以寄給我一些簡介以及其他相關的文獻，以供分析上述領域的消費者行為。
- Exchanging related information, e.g., methodologies, strategies, corporate missions and objectives, would appear to be the starting point for such cooperation, followed by visits to each other's marketing departments and, eventually, collaboration on a joint venture.
交流相關的資訊，像是方法、策略、企業使命及目標，將會為這樣的合作起頭，接著便是到彼此的行銷部門參觀，最終，在合資上互相合作。
- Please carefully consider my request and inform me of your decision at your earliest convenience.
請仔細地考慮我的要求，並儘快讓我知道您的決定。
- I look forward to hearing your suggestions on how to initiate this information exchange relation, perhaps a visit to your marketing department to discuss relevant strategies and areas of mutual interest.
我期待聽到您的建議，如何開始進行資訊交流的關係，也許到貴行銷部門參觀，以討論相關的策略及彼此有興趣的領域。
- If you find such an arrangement agreeable, please notify me as to which dates are most convenient for you.
如果您同意這樣的安排，請通知我哪一天對您最方便。

(待續)

有效海外工程英文交流

探討工程師如何有效的與海外專業人士交流英文 (下)

柯泰德

本文分上下二期刊登，內容主要教導國內工程師如何建構相關專業英文信函，以用來和國外工程相關專業人士有效溝通。上期內容包括：(一)科技訓練請求信函：某人學歷及工作經驗概述，科技訓練申請，讚揚提供科技訓練的機構，科技訓練細節解釋及表達對科技訓練機會的樂觀態度。(二)資訊交流信函：資訊流通關係的提呈，為資訊流通而提供個人或機構經驗，為資訊流通而讚揚某機構或某人，資訊流通關係的細節詳述，表達對資訊流通關係的樂觀態度及開始資訊流通關係。本(下)期內容：(三)科技訪問信函：科技訪問許可申請，闡述科技訪問的目的地，介紹某人的能力或機構經驗，對訪問機構的讚揚，詳述科技訪問的細節及科技訪問核准的確認申請。(四)演講者邀請信函：邀請演講者，描述演講目的地，詳述演講的細節，詳述交通及住宿的細節，演講者行前必知指導及對演講者強調訪問的重要性。(五)旅行安排信函：行程細節列表及對行程細節列表的建議。(六)資訊請求信函：解釋請求資訊的目的地及說明學術專業經驗。

以下為詳細內容：

C. Making Technical Visits Overseas/ 科技訪問信函

1. Requesting permission to make a technical visit 科技訪問許可申請

參考範例

■ Although I strongly desire to receive an extensive period of training from your research group on the latest technological developments in this area, arranging such a large block of time is impossible, given my hectic schedule at work. I would therefore like to arrange a three-day visit to your laboratory next month.

雖然我非常想要一個較寬限的時段，到貴研究團隊接受這領域最新技術發展的訓練，但是依我現在緊湊的行程，無法配合這樣大的時間範圍。因此我希望可以安排下個月到貴實驗室作為期三天的參訪。

■ As I will be attending an international conference in New York with my colleague next month, we would like to visit the ABC Research Center in Los Angeles on February 15.

因為我在下個月會和我的同事一起到紐約出席一場國際性會議，我們會想要在 2 月 15 日到洛杉磯參訪 ABC 研究中心。

■ Given our interest in your technological developments in this field, we would like to visit your company to more thoroughly understand the progress that you have made.

因為我們對貴公司在這領域的科技發展感到興趣，我們想要參觀貴公司，以便可完全地了解貴公司目前的進度。

■ Arranging for a five-day technical visit to your laboratory would appear to be the best way of beginning this discussion.

安排為期五天到貴實驗室的參訪將會是開始這個討論的最好方法。

■ We would like to meet with members of your working group regarding details of our cooperative agreement, as well as tour your facilities.

我們想要和貴工作團隊的成員碰面，討論我們之間的合作協議，以及參觀貴單位的設備。

練習 B

以下每句為用來訓練有關科技訪問信函：科技訪問許可申請。
請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. Given the recent formation of this research group, I would like to arrange	a. discuss with you some of these topics in more detail.
2. Given my above interests, I would like to visit your research laboratory and	b. to tour your facilities and share our related experiences in product development.
3. I will be accompanied by	c. technical visit with the technical staff. in your Civil Engineering Department.
4. Given your corporation's committing to adopting the most advanced environmental protection technologies in your manufacturing processes,	d. for twenty days of technical instruction and consultation on the latest construction engineering trends in your department.
5. I would like to arrange for a five day	e. as well as discuss the details of our cooperative agreement.
6. Given your company's expertise in this area, we would like to arrange for a technical visit next month	f. two environmental protection experts in this area.
7. As mentioned in our previous correspondence, we would like to visit your new computer testing facilities,	g. I would like to arrange for a three-day technical visit to your product development division to learn of the operational aspects and theoretical applications that you adopt in production.

2. Stating the purpose of the technical visit 闡述科技訪問的目的地

參考範例

- We would like to observe a clinical demonstration of the latest computer software that can reduce examination time as much as possible.

我們想要觀察那套可以減少檢查時間的最新電腦軟體之臨床展示。

- The ability to integrate the advances of your unique research program with the unique aspects of image fusion would significantly contribute to our ongoing efforts.

用影像融合最獨特的部分，來導入您獨特的研究計畫先進的能力，將會大大地對我們現在的努力有貢獻。

- In addition to touring your facilities, we hope to discuss with you some potential areas of mutual interest, as outlined below.

除了參觀您的設備外，我們希望可以和您討論一些雙方利基的潛在領域，如下：

- The opportunity to consult with you in person will hopefully yield mutually beneficial results for both of our laboratories.

可以私下向您請教的機會希望達到對雙方實驗室皆可互利的結果。

- I am eager to learn of the potential implications of this new technology for ongoing research efforts already underway island wide.

我很急切地想要學習這個最新技術的潛在應用方法，因為現在全島都已經在為進行這樣的研究而努力。

3. Introducing one's qualifications or one's organizational experiences 介紹某人的能力或機構經驗

參考範例

- Our company's Product Development Division is committed to adhering to the Taiwanese government's aggressive policy towards promoting the use of environmentally friendly practices in manufacturing.

我們公司的產品開發部門已經謹守台灣政府積極的政策，推廣對環境無害的製造業實例。

- Let me brief you on our ongoing projects.

讓我為您介紹我們現在正進行的專案計畫。

- Technological advances in quantitative analysis and computer software have greatly facilitated our laboratory's efforts in researching marketing approaches adopted in the global network and their implications for marketing strategies aimed at the Great China sector.

在量化分析及電腦軟體上的先進技術，已經大大地助長了我們實驗室在全球網絡的行銷手法上努力，以及應用行銷策略於大中國。

- My graduate school research attempted to elucidate the actual mechanism that is present during ischemia.

我們研究所的研究在嘗試說明局部缺血時存在的真正機制。

- With aspirations of becoming a "Green Silicon Island," Taiwan has actively encouraged its enterprises in recent years with numerous incentives to be more socially responsible in its manufacturing practices.

有心成為「綠色矽谷」，台灣這幾年正積極地以無數的誘因鼓勵企業，來成為一個能夠在生產製造業上擔負社會責任。

4. Commending the organization to be visited 對訪問機構的讚揚

參考範例

- I found the results from your recent article to be extremely helpful to my own research direction.

從您近期的文章中所找到的研究結果對我自己的研究方向非常有幫助。

- As is well known, your company pioneered the use of natural plant oil to refine crude oil for use in daily goods and appliances.

眾所皆知，貴公司率先使用天然的植物油，來提煉原油，使用於日常生活用品及器具上。

- As a global leader in developing medical instrumentation, your laboratory definitely has much to contribute to our country's efforts to elevate its research capacity in this area.

身為在發展醫療用品的國際先驅，貴實驗室絕對會對我們國家在努力提高這領域的研究能力上有貢獻。

- In this area, your laboratory has acquired much expertise and relevant data, explaining why I am eagerly looking forward to this upcoming technical visit.

在這領域中，貴實驗室已經獲得許多專業知識及相關領域，這解釋了為什麼我會熱切地期待即將到來的科技參訪之旅。

- Your products conform to the most stringent environmental standards through the use of ingredients that are phosphate-free and environmentally friendly.

您的產品因為使用了不摻磷酸鹽的成分，對環境無害，而符合了最嚴苛的環境標準。

5. Outlining details of the technical visit 詳述科技訪問的細節

參考範例

- I am especially interested in learning of your successful cases of treatment to reduce the likelihood of a stroke from occurring.

我對學習您在治療減少腦中風發生的成功個案特別感興趣。

- To give you time to prepare in advance for our discussion, I would like to briefly summarize some of the points that we hope to cover during our time together.

為了讓您在討論前事先有時間準備，我想要簡短地摘錄幾個我們預定見面時要討論的主題。

- I would like to pose the following questions before our discussion on November 12 so that you will have sufficient time to prepare your responses :

我想要在 11 月 12 日預定討論前提出以下的問題，所以您可以有充裕的時間準備答案。

- We are especially interested in discussing this concern with you, particularly the current technological status of investigating transgenic animals.

我們對討論您切身相關的事情特別感到興趣，尤其是目前在調查遺傳基因工程動物的技術現況。

- I am open to any suggestions you might have regarding the itinerary or any materials you would like me to prepare prior to my visit.

我對於您可能有的問題並不設限，包括旅行計畫或是您會希望我在訪問前事先準備的任何資料。

6. Requesting confirmation for approval of the technical visit 科技訪問核准的確認申請

請參考以下範例：

- If this visit is agreeable with you, please notify me as to which dates are convenient for you.

如果您也同意此訪問，請通知我您最方便的日期。

- To arrange for the upcoming research visit in order to consult with you on the above topics, I need to set up an itinerary and time schedule to report to my superiors.

為了安排即將到來的研究訪問，來向您請教上述的幾個主題，我需要排定行前計畫及時間表，以便向我的長官們報告。

- Quite some time has passed since I originally proposed the idea of our technical visit to your country without any response from you so far.

距離我上次向貴國提出關於我們的科技參訪已經一段時間了，目前還未收到您的消息。

- Prior to our visit, we would appreciate any introductory information that you could pass on to us regarding transportation arrangements and a list of hotels near our meeting place.

在我們的參訪前，如果您可以先提供任何介紹的資訊給我們，我們會很感激，關於交通的安排以及一些接近我們碰面地點的飯店資料。

- A suggested itinerary would also be most appreciated, including our discussion time, tour of research facilities and accommodations.

如果有一份建議性的行前計畫將會是最好的，包括我們的商議地點、研究設備參訪以及住宿。

D. Inviting Speakers and Consultants/ 演講者邀請信函

1. Inviting a speaker 邀請演講者

參考範例

- Given your renowned research and contributions in the field of cell culture technologies, we would like to formally invite you to serve as an Invited Speaker at the upcoming Food Health Symposium.

由於您在細胞文化技術方面著名的研究及貢獻，我們想要正式地邀請您在即將舉行的食物健康座談會擔任我們邀請的講師。

- Having extensively read upon your published research on chitin, I find these results most helpful to my own research direction.

已經廣泛地研讀您出版在蟹殼質上的研究，我發現這些研究結果對我的研究方向最有幫助。

- We also hope that you could chair a roundtable discussion on a related topic.

我們也希望您可以主持一個圓桌討論會議，探討一個相關的主題。

- Given your distinguished research on the *Helicobacter pylori* full genome, I would like to invite you to speak at the upcoming Ninth Symposium on Recent Advances in Cellular and Molecular Biology.

由於您在幽門桿菌全基因組上的研究表現，我很想邀請您在即將舉行的第九屆討論會中演講，關於在細胞與分子生物學上近期的突破。

- Given your organization's extensive experience in implementing long-term care programs, we hope that you could recommend a consultant that could instruct our hospital staff on the following topics :

由於貴組織在執行長期性看護計畫上的豐富經驗，我們希望您可以推薦一位顧問，可以就下列幾個主題來教育我們醫院的同仁。

2. Describing the purpose of the lecture 描述演講目地

參考範例

- Your lecture will hopefully include a summary of recent developmental trends in medical science, relevant governmental policy and current status of medical education.

您的講課希望可以涵蓋在醫療科學方面的近期發展趨勢、相關的政府法令及醫學教育的現況。

- The theme of this seminar will coincide with efforts to develop product technologies in this area.

這次研討會的主題將是一起努力來發展這領域的產品技術。

- Despite the above aspirations, our hospital is lacking in many of the above areas, explaining the lack of confidence among patients and their relatives in the quality of medical care offered in Taiwanese hospitals.

儘管上述的抱負，我們醫院欠缺上述的領域，解釋了病人及其親友對台灣地區的醫院所提供的醫療照顧缺乏信心。

- With more than 200 practitioners and academics anticipated to attend the symposium, participants hope to learn of the latest medical imagery trends in this area.

由於超過 200 位實習生及學術先進參與此討論會，與會者希望能藉此得知在此領域最先進的醫療願景趨勢。

- The seminar will focus on recent advances in molecular biology-related technologies.

此次研討會將強調分子生化相關科技的近期發展。

3. Explaining details of the lecture 詳述演講的細節

參考範例

- Each lecture will last two hours, with the consultant reimbursed with a speech honorarium.

每場講課約長 2 小時，每位顧問將可得到一份補助的謝禮。

- I am pleased to announce that a seminar on DNA mutation, methylation, repair and recombination will be held at Yuanpei University of Science and Technology in July of 2005.

我很高興地宣布，一場基因突變、甲胺、修復及重組的座談會將於 2005 年 7 月在元培科技大學舉行。

- As February is normally a busy month in preparation for the Chinese New Year's holiday, I would suggest rescheduling the symposium for March the 22nd.

因為 2 月通常是繁忙的月份，忙著準備傳統中國農曆新年假期，我建議重定日期，將討論會於 3 月 22 日舉辦。

- Perhaps you could also recommend a speaker who could discuss the features of Internet-based technology applications.

也許您也可以推薦一位講師，來討論以網路為基礎的應用科技。

- My colleagues will contact you regarding details of the symposium and travel arrangements.

我的同事將會與您聯絡，關於討論會的細節及旅程安排。

- As the Symposium will coincide with the Christmas holidays, we will also arrange a special Christmas dinner and related activities.

因為討論會碰巧遇上耶誕假期，我們也將安排一場特殊的耶誕晚餐及相關活動。

- I need to know which dates are the most convenient for you to give this lecture.

我需要知道您最方便講課的日期。

4. Describing transportation and accommodation details 詳述交通及住宿的細節

請參考以下範例：

- We will provide roundtrip airfare and accommodations during your visit.

我們將提供您此次參訪的來回機票及住宿。

- Besides providing accommodations and transportations arrangements during your stay, we would also like to show you some of Taiwan's cultural and historical places of interest.

此外，在您停留期間，我們會安排住宿及交通，也會帶您參觀一些您有興趣的台灣文化及歷史景點。

- All accommodation and transportation arrangements will be made in advance.

所有住宿及交通將會事先安排好。

- I advise that you stay here for an additional week or so to see some of Taiwan's scenic spots and places of historical significance.

我建議您額外停留一週，以便在這裡參觀台灣的著名景點及具歷史意義的地方。

- In addition to the symposium, we will arrange several trips to enjoy some of the sights that Taiwan has to offer.

除了討論會之外，我們將安排幾趟旅程，以享受幾個到台灣一定要參觀的旅遊勝地。

練習 7

以下每句為用來訓練有關演講者邀請信函：詳述交通及住宿的細節。
請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. As for compensation of this event, please pay	a. for a single room averages between DM\$ 130 to DM\$250 daily.
2. Please allot extra time besides your involvement in the conference	b. I need your formal name, current address and passport number.
3. To reserve your air ticket and hotel accommodations at the Taipei Spring Leisure Resort,	c. a roundtrip train ticket and hotel accommodations in Hsinchu for the evening of May the 15 th .
4. In addition to an honorarium for your lecture, the organizing committee will also provide	d. that you will be able to tour some of Taiwan's natural scenery.
5. Incidentally, hotel accommodations in Taipei	e. in advance for the roundtrip airfare ticket, and other incidental expenses.
6. Please inform us of your arrival time to the Hsinchu	f. reserve a room for you and your wife.
7. I hope that you can allot extra time to see some	g. of the cultural wonders that Taiwan offers.
8. Once your schedule is confirmed, I will	h. to enjoy some of the island's cultural and natural wonders.
9. I advise you to lengthen your visit until March 26 so	i. train station so that we can meet you.

5. Instructing the speaker what to prepare before the visit 演講者行前必知指導

參考範例

- Please send us your lecture titles and related handouts before January 10, 2005 so that we will have sufficient time to make copies and appropriate arrangements.

請在 2005 年 1 月 10 日前寄給我們您的講課主題及相關的講義，以便讓我們有充裕的時間準備影本及適當的安排。

- Please e-mail us your curriculum vitae and course materials before December 24, 2004 so that we will have sufficient time for translation and printing.

請在 2004 年 12 月 24 日前寄給我們您的履歷表及課程資料，以便讓我們有充裕的時間翻譯及列印。

- I need your curriculum vitae, with contents to include the following name, date of birth, place of birth, nationality, address, e-mail address, telephone number, marital status, academic qualifications, professional experience, scientific achievements, current scientific activities, other science-related activities and selected publications.

我需要您的履歷，內容要包括名字、出生日期、出生地點、國籍、住址、電子郵件住址、電話號碼、婚姻狀態、學術資格、專業經歷、科學上的成就、正從事的科學活動、其他科學相關的活動及挑選出來的出版品。

- Please send us the text of your talk before December 5.

請於 12 月 5 日前將您講課的內文寄給我們。

- Let us know if you have any special requirements prior to your presentation or on the day of the seminar.

在您的演講前或座談會前，讓我們知道您是否有任何特殊的需求。

E. Arranging Travel Itineraries/ 旅行安排信函

1. Acknowledging the upcoming visit 旅行安排信函

參考範例

- Thank you for your response regarding Mr. Smith's visit to our Taiwan branch office.

謝謝您對史密斯先生到台灣分公司參訪時所作的回應。

- Thanks for your recent reply that Mr. Robbins has agreed to participate in our academic discussion on intellectual capital-related topics in Taiwan.

謝謝您近來對羅賓斯先生已經同意出席討論台灣智慧財產相關主題的學術討論之回覆。

- Thank you for agreeing to serve as an invited speaker at the upcoming seminar to be held at Yuanpei University of Science and Technology, November 22-30, 2004.

謝謝您同意在 2004 年 11 月 22-30 日於元培科技大學舉行的座談會中擔任客座講師。

- Your participation in the upcoming symposium will definitely benefit all of the attendees.

您在即將到來的討論會中出席絕對有益於所有的參與者。

- Thanks for your positive reply to our invitation of Dr. Kanbinsky as a guest speaker at the PIDA technical seminar on current trends in laser technology.

對於我們所邀請的堪賓斯基博士 (Dr. Kanbinsky) 在 PIDA 科技座談會中擔任客座講師，探討雷射技術現今趨勢，感謝您的回覆。

2. Listing details of the travel itinerary 行程細節列表

參考範例

- Meet with R&D staff in the Taiwan branch office and discuss Mr. Smith's schedule.

和台灣的研發部門同事見面，並討論史密斯先生的行程。

- Tour the northern coast of Taiwan and experience the island's art of drinking tea.

參觀台灣北海岸，並體驗本島的飲茶藝術。

- Deliver an introductory lecture on cyclotron and synchrotron.

講一堂有關粒子迴旋加速器和同步加速器的開場白。

- Discuss areas of cooperation in developing innovative product technologies.

討論發展創新產品技術可合作領域。

- Continue with discussion on areas of cooperation between our two organizations.

在我們兩個組織間，繼續討論可合作的領域。

- Tour the campus of National Tsing Hua and National Chiao Tung Universities.

參觀國立清華大學和國立交通大學的校園。

- Spend free time sightseeing Taipei.

花點時間遊覽台北。

3. Welcoming suggestions about the proposed itinerary 對行程細節列表的建議

參考範例

- The above itinerary and consulting topics are only tentative.

上述的行程及諮詢的主題只是暫時預定的。

- Any comments or suggestions regarding the aforementioned proposal would be highly appreciated.

歡迎提供任何關於上述提議之意見或建議。

- Let us know if you have any suggestions regarding the above schedule.

讓我們知道是否你對上述的行程表有任何的建議。

- The agenda and consulting topics can be changed, if necessary.

必要的話，討論的議題及諮詢的主題都是可以修改的。

- If you have any valuable suggestions regarding the above agenda and lecture topics, please do not hesitate to contact me.

如果你對上述議題及課程題目有任何寶貴的建議，惠請不吝告知。

F. Requesting Information / 資訊請求信函

1. Explaining why contact was made to request information 解釋請求資訊的目地

參考範例

- While speaking with your products manager Mr. Li over the phone regarding the purchase of your company's electronics equipment, he suggested that I directly contact you to obtain your company's latest products catalog.

當和您的產品經理林先生透過電話談論過關於購買貴公司的電子設備時，他建議我直接和您聯絡，以獲取貴公司最新的產品目錄。

- After I talked to Mr. Yang over the phone regarding your line of TFT- LCD products, he suggested that I contact you.

在我和楊先生在電話上談論過關於薄膜液晶產品的生產線時，他建議我可以和您聯絡。

- Thank you for sending us your latest company catalogue and product samples. Your product offerings are in line with our organizational needs.

謝謝您寄給我們有關貴公司最新產品的目錄及產品樣本。您提供的產品正好可符合我們公司的需要。

- Given your pioneering work on the decision theory, Analytic Hierarchy Process (AHP) and the Analytic Network Process (ANP), I have read many of your published articles and am well aware of your more than twelve books on these topics.

由於您在決策理論的領先地位 — 分析性層級過程 (AHP) 以及分析性網絡過程 (ANP)，我已經拜讀了許多您發表的文章，我也很熟悉您超過 12 本的著作，談論這些主題。

- Your recent presentation on the database system containing long term care-related information, as developed by your company, was most informative.

您近來關於資料庫系統的簡報包括長期性看護的相關資訊，由貴公司所研發的，相當具有教育性。

2. Describing one's organizational need for information 資訊請求信函

參考範例

- Our company is currently involved in a project to develop slide systems that involves the use of TFT- LCD panels.

我們公司目前從事一項專案，來發展幻燈片系統，牽涉到薄膜液晶面板的使用。

- The project we are participating in is part of a government-sponsored collaborative effort with U.P.O. Company, aimed at contributing to our country's information technology infrastructure.

我們現在正參與的專案，部分是接受政府補助、和豐榕生化科技公司 (U.P.O.) 的合作，主要是對我們國家的資訊科技基礎建設有所貢獻。

- Although such data for Taiwanese hospitals is scarce, I am actively engaged in researching related topics.

雖然台灣醫院擁有這樣的資料非常有限，我仍很積極地參與研究相關的主題。

- We are interested not only in mining the text information with content analysis method, but also in integrating the information to construct the data warehouse for the same analytical purposes.

我們不但對使用內容分析和方法來減少文字資訊很有興趣，也對整合資訊，以建構資料儲藏庫，為的是同樣的分析性目的。

- In addition to our institution, several other universities have expressed to us their interest in incorporating your system into their daily operations and would like to acquire further information on purchasing, installation and customer service.

除了我們的機構，有幾個大學也都有興趣，要將您的系統加入他們日常的營運中，而且想要獲取更進一步在採購、架設及顧客服務方面的資訊。

3. Directly requesting information 資訊請求信函

參考範例

- Does your company have a sales representative in Taiwan? If so, please ask him/her to contact me.

貴公司在台灣有業務代表嗎？如果有的話，請他／她和我連絡。

- Having gone thoroughly read your article, I was wondering whether you would send me pertinent literature or materials of the following areas :

在仔細地研讀您的文章後，我很想知道您使否可以寄給我與下列領域相關的文獻或題材。

- In light of our budget constraints, we would appreciate it if you would reconsider your original quotation.

因為我們預算有限，如果您可以考慮您原始的報價，我們會很感激的。

- I hope that you will be able to provide us with some of the above detailed information.

我希望您可以提供給我們一些上述的資料細節。

- Could you provide us with information from your statistical database on health care in the United States?

您是否可提供我們在貴公司統計資料庫中，關於美國醫療保健方面的一些資訊？

解 答

練習 6	1	D	2	A	3	F	4	G	5	C	6	B	7	E
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練習 7	1	E	2	H	3	B	4	C	5	A	6	I	7	G	8	F	9	D
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英文職涯經歷

工程師專業英文工作經歷撰寫(上)



柯泰德

本 主題分上下二期刊登，主要探討工程師如何撰寫專業的英文工作經歷，內容共分為六個部份，分別是：(一) 表達工作相關興趣、(二) 興趣相關產業描寫、(三) 描述所參與方案裡專業興趣的表現、(四) 描述學歷背景及已獲成就、(五) 介紹研究及工作經驗、(六) 描述與求職相關的課外活動。工程師們可以經由參考研究他人寫作範例及相關輔助的 5 個練習，逐步強化本身對於英文工作經歷的寫作能力，以成為個人追求專業競爭力的一項利器。

以下為詳細內容

Expressing interest in a profession / 表達工作相關興趣

1. Stating how long one has been interested in a particular field or topic 描述專業興趣所延續的時間

參考範例

■ Although deeply interested in computers since childhood, I gradually became interested in a civil engineering career out of empathy for the seemingly endless number of potential homeowners who seek quality living accommodations at affordable prices.

雖然我從小對電腦就有濃厚的興趣，但是感到似乎有眾多具潛力的購屋者在尋找價格負擔得起的高品質住宅，這樣的移情作用便使我的興趣逐漸轉向土木工程。

■ My deep interest in this profession manifested itself in a recent collaboration with urban planners to establish more recreational areas for Taipei urban dwellers.

在和都市計劃者合作為台北市民建立更具休閒性的地區時，我對這份專業濃厚興趣也與日俱增。

■ An architecture course I enrolled in as an undergraduate student sparked my interest in civil engineering. Becoming aware of how construction design significantly impacts our daily lives motivated me to diligently study civil engineering.

我在大學所修的建築課程，燃起了我對土木工程的興趣。發覺營造設計對日常生活具有多麼重大影響力，激起了我認真修讀土木工程的動機。

■ Devotion to a career requires compassion, sincerity and determination. Much of my devotion to a career in civil engineering goes back to childhood, when I helped my parents in their small construction firm.

對事業的熱愛，需要同情、真誠和決斷力。我對土木工程的熱愛，要回溯到我小時候在父母的小型營造廠幫忙的時候。

■ My deep concern since childhood over overcrowded urban areas has transformed me into an environmentally conscious individual concerned with equitable living conditions for all Taiwanese residents.

我從小對市區過度擁擠就非常關心，這使我成為一個有環境意識的人，關心全台灣居民公平的居住條件。

練習 I

以下每句為用來訓練有關表達工作相關興趣：描述專業興趣所延續的時間。請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. Integrating many topics such as architecture, civil engineering and sustainable development has	A. and eventually a Master's degree in the same field from the same institution.
2. Having immersed myself in the civil engineering field for quite some time,	B. successful completion of a Master's degree in Civil Engineering from National Cheng Kung University.
3. I have aspired to become a construction engineer since childhood, explaining why I acquired a bachelor's degree in the Department of Civil Engineering at National Taiwan University,	C. the Council of Labor Affairs.
4. Having fascinated me since high school, civil engineering encompasses a diverse spectrum of related subjects,	D. to undergraduate school, in which a civil engineering course aroused my curiosity to acquire more knowledge.
5. Commercial development planning has enthralled me since I took part in a business management training course sponsored by	E. enthralled me since undergraduate school.
6. Civil engineering-related curricula have fascinated me since I can remember, eventually leading to my	F. since childhood because educators can closely interact with the younger generation.
7. My fascination with construction management can be traced back	G. on in my academic studies fostered my interest in graduate study and a civil engineering-related research career.
8. The teaching profession has strongly interested me	H. with construction management-related topics that emphasize sustainable development.
9. While studying in the Department of Civil Engineering as an undergraduate student at National Chiao Tung University, I became intrigued	I. I am especially interested in researching construction management-related topics.
10. Exposure to research early	J. including architecture, construction management, mechanical engineering and materials science.

2. Describing the relevance of one's interest to industry or society 描述興趣與產業及社會的相關性

參考範例

- With Taiwan's recent entry in the World Trade Organization, the recent deregulation of Taiwan's market will provide a diverse array of financial services, thus necessitating that domestic companies possess a high level of financial expertise in global markets.

因應台灣最近加入世界貿易組織，台灣市場的管制規定最近撤銷後將提供多樣的金融服務，國內公司因而在全球市場必須具有高度的金融專門知識。

- I remain ever optimistic that civil engineering-related technologies can lead to the establishment of senior residential communities that will help care for Taiwan's rapidly aging population.

土木工程的相關技術，可帶動老年人住宅區的建立，將對照顧台灣快速成長的高齡人口有所助益，對此，我持相當樂觀的態度。

- Taiwan currently lacks technology professionals who are proficient in the use of such advanced instrumentation, of which, I am quite proficient in using.

台灣目前缺少精通使用此類先進儀器的技術專業人員，而我，對此卻相當熟稔。

- While pursuing this interest, I slowly began to realize how civil engineering encompasses many disciplines, such as architecture, construction management and materials science to name a few.

埋首此項興趣的同時，我也慢慢開始了解到土木工程包含了許多學科，例如：建築學、營造管理和材料科學等。

- Although the general public is alarmed over potential radiation harm, carefully controlled amounts of radiation can benefit humans, such as in medical treatment or for industrial use such as construction of residential complexes.

雖然一般大眾對潛在的輻射傷害感到驚慌不安，但是若仔細管制輻射量，則可加惠人類，例如：醫療或住宅營造工業用。

- While cancer ranks as one of the leading causes of mortality in Taiwan, advanced technologies are constantly adopted to monitor the radiation emitted from building construction materials.

當癌症名列台灣主要死亡原因之一時，先進技術則時常用於監控大樓建材所散發的輻射。

3. Stating how one has pursued that interest until now 描述興趣形成過程

參考範例

■ This career aspiration has persisted until now, with my recent completion of a Master's degree in the Institute of Civil Engineering from National Cheng Kung University.

這份事業抱負一直持續至今，而我現已取得國立成功大學土木工程所碩士學位。

■ Given my interest in this profession, I have collaborated with several construction firms in developing software programs to incorporate the use of environmentally friendly building materials.

由於我對此份專業的興趣，我曾和數家營造公司合作發展軟體程式，以期使用不傷害環境的建材。

■ Having recently completed my master's degree requirements from the Institute of Civil Engineering at National Taiwan University, I hope to bring my technical expertise and extensive laboratory experience to a renowned consulting firm such as yours.

我最近已在國立台灣大學土木工程研究所完成碩士學位，希望能將我的技術專業和豐富的實驗室經驗帶到像貴公司一樣知名的顧問公司。

■ To cultivate my interest in this profession, I learned how to perform computer analyses in efficiently handling experiential results, such as compiling statistics to identify unforeseen circumstances in construction projects and to determine the significance of those results.

為了培養在這份專業上的興趣，我學習如何執行電腦分析和有效處理從經驗得出的結果。例如：彙整統計資料以求辨識出營造專案中預料之外的情況，並對所得的結果確定其重要性。

■ The more time spent in studying construction management-related procedures and pertinent industrial-related research has enabled me to more full grasp the application of civil engineering concepts towards this field.

花在研究營造管理相關程序和適當工業相關研究的時間，讓我更能充分掌握土木工程觀念對此領域的應用。

4. Stating how finding employment related to one's interest would benefit the applicant and/or the company 描述興趣與工作的配合對勞資方都有利

參考範例

■ I am confident of my ability to pursue a research career in this area and, in doing so, significantly contribute to society. Your organization would provide me with such an opportunity.

我確信自己具備在此領域追求研究事業的能力，且憑此能力可貢獻社會。而貴機構可提供我這樣的機會。

■ If fortunate to secure employment in your organization, I am confident that your company would offer comprehensive training and challenging experiences that would greatly enhance my professional skills. In addition to your solid training for civil engineers, your company offers an attractive salary and benefits package that I am drawn to.

如果有幸在貴機構任職，我確信貴公司可提供可大幅提升我專業技術的多樣訓練和挑戰經驗。除了貴公司為土木工程師提供的紮實訓練外，貴公司所提供的薪資和福利制度也相當吸引我。

■ I bring to your company a unique background in Civil Engineering and Business Management, disciplines that will prove to be valuable to any research effort that I belong to.

我帶到貴公司的是土木工程與企業管理的獨特教育背景，我參與的研究會證明我所受的訓練對該研究是有價值的。

■ I firmly believe that your engineering consulting firm will find my above academic and professional training to be a valuable asset in your highly respected organization.

我堅決相信貴工程顧問公司將會發現我以上的學術與專業訓練是貴公司一項有價值的資產。

■ My gradual maturation as a proficient researcher during graduate school and subsequent employment will hopefully prove to be a valuable asset in your laboratory, allowing me to contribute significantly to any of your team's research efforts.

我在研究所和隨後的工作當中逐漸成長為熟練的研究員，希望可證明是貴實驗室有價值的資產，讓我对貴團隊的研究成果作出卓越貢獻。

練習 2

以下每句為用來訓練有關 表達工作相關興趣：描述興趣與工作的配合對勞資方都有利。
請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. As a member of your organization,	A. but also further enhanced my sensitivity towards various governmental regulations in the construction industry. These are hopefully assets that your research institute is looking for.
2. This diverse education not only strengthened and broadened my solid knowledge base,	B. an attribute which I believe that your organization looks for in its research staff.
3. With my solid academic background and extensive professional experience in Taiwan's industry, I feel	C. combination as a valuable asset to any research effort that your staff undertakes.
4. Overall, my diligent study in the civil engineering field has made me more patient and attune to minute details when conducting independent investigations,	D. to further pursue my professional interests.
5. Given my strong academic background and numerous work experiences, I hope to gain	E. offers an excellent environment to further pursue this career path.
6. Given my research emphasis on civil engineering and construction management, I believe that your company will find this unique	F. business transactions models, a system which will equip me with the competence to more significantly contribute to your organization's excellence in marketing.
7. Your engineering consultancy firm would definitely provide me with the opportunity	G. I hope to contribute to your innovative efforts to develop construction materials for governmental infrastructure projects.
8. Working in your organization would give me a practical context for theoretical concepts	H. employment in your company owing to its commitment to excellence in construction engineering. In addition to my technical expertise, I am also interested in enhancing my management proficiency within your organization.
9. I believe that your organization	I. learned in graduate school, giving me a clearer idea of the direction in which my career is taking.
10. I am attracted to your company's advanced financial information system for analyzing	J. equipped to serve as a researcher in civil engineering or architecture-related fields, areas that your company is renowned.

Describing the field or industry to which one's profession belongs 興趣相關產業描寫包括

1. Introducing a topic relevant to one's profession 介紹業界所關心的相關主題

參考範例

- Despite the tremendous number of research personnel in the civil engineering field, the role of sustainable development in construction engineering requires further study, an area of research that I am deeply interested in.

雖然土木工程領域中有眾多研究人員，但是營造工程的持續發展需要進行更深層的研究，而這正是我非常有興趣的研究領域。

- Rapid industrial expansion, environmental pollution, and the increasing quantity of processed foods have all dramatically impacted individual lifestyles, leading to serious illnesses and carcinoma cancer.

工業快速擴展、環境汙染以及愈來愈多的加工食品，使每個人的生活型態均受到重大衝擊，嚴重的疾病和癌症則因而產生。

- Following its rapid industrial development in recent decades, Taiwan has experienced an unusually high amount of natural calamities and emergency situations. For instance, the mortality rate for traffic accidents in Taiwan is around 62 individuals out of 100,000 involved.

台灣在近數十年的工業快速發展下，歷經數量多得不尋常的自然災難和緊急情況。譬如說，台灣交通意外的死亡率為每 100,000 人次中就約有 62 人。

- Regardless of whether for medical care or building construction purposes, measuring radiation dosage levels and providing necessary protection are vital concerns.

不論是為醫療保險或大樓營造，測量輻射劑量的程度以及提供必要的防護，是極其重要的事。

- Biotechnology companies and related academic institutions are actively researching ways in which to develop reagents for biochip, gene and protein applications.

生物工藝公司和相關的學術機構，正積極研究生物晶片、基因和蛋白質應用方面研發試劑的方法。

2. Describing the importance of the topic within one's profession 強調主題的專業性

參考範例

- With the increasing number of human diseases, cancer and human genetics research disciplines have subsequently expanded rapidly, raising concern even among urban planners concerned with environmentally friendly construction materials.

隨著愈來愈多的人類疾病和癌症，有關人類基因的研究學科亦已快速擴展，都市計劃者所關心的事甚至也包括不傷害環境的建材。

- For instance, in Taiwan, roughly 34,000 individuals died in 2002 because of malignant diseases. Radiation therapy, surgery, and chemotherapy are three conventional means of treating cancer. 50% to 60% of all individuals diagnosed with cancer will require radiation therapy, some of which are for curative, while others are for palliation.

譬如說，2002年在台灣約有34,000人次因致命疾病死亡。輻射療法、外科手術和化學療法是治療癌症的三項傳統方法。經診斷罹患癌症的人，有50%到60%要求輻射療法，其中有些是為了治療，有些則是為了緩和病情。

- Taiwan's current lack of instrumentation and trained personnel explains why no serial study has yet been performed island wide.

台灣目前缺乏操作儀器和經過訓練的人員，這就解釋了為什麼全國各地尚未進行序列探討。

- Many Taiwanese researchers involved in developing screen tests lack clinical experience, subsequently preventing the commercialization of product technologies such as those in the construction industry.

發展螢幕測試的許多台灣研究員均缺乏臨床經驗，因而形成產品技術商業化的阻礙；例如：營造工業產品技術。

- Taiwan's aspiration to join the World Health Organization necessitates that medical personnel continually upgrade their professional skills – even in broad ranging areas such as radiation monitoring on construction sites and the creation of environmentally friendly spaces for the growing urban sprawl.

台灣加入世界衛生組織的熱切期望，使醫療人員不斷提升專業技術一範圍甚至擴展至都市發展下的工地輻射監測和建立不傷害環境的空間。

3. Complementing the company on its commitment to excellence in this area of expertise

讚美公司對專業的自我期許

參考範例

- Having frequently held large-scale public discussions on the latest civil engineering trends, your company has equipped itself with state-of-the-art equipment and knowledge of pertinent issues for future development.

貴公司時常針對最新的土木工程趨勢召開大型的公共討論，亦具備在未來發展相關議題的最先進設備和知識。

- As your company continuously develops, technological developments in advanced construction engineering materials will usher in prosperity, not only for your company but society as well. This explains why I hope to join your corporate family as a researcher.

貴公司持續發展，而先進營造工程材料的技術發展，不僅對貴公司而言，對社會而言，也將邁向興盛。這解釋了我為什麼希望加入貴公司這個大家庭擔任研究員。

■ As a leader in the construction management field, your company offers an impressive number of wide ranging training courses for your employees so that they remain competent in the field.

貴公司位居營造管理領域的領導者，亦為員工提供令人印象深刻、範圍廣泛的訓練課程，使員工可在該領域維持一定能力。

■ Your company has adopted an integrated approach towards learning by adopting multi-disciplinary approaches towards construction management. Such exposure would allow me to interact with professionals from different fields.

貴公司對營造管理藉由多重訓練的方法，採用整合學習的方式。處於這樣的環境當中可讓我和來自不同領域的專業人員產生互動。

■ Your engineering firm highly prioritizes offering not only excellent consultancy services for its clients, but also comprehensive on-the-job training for new employees, explaining why I most eager to secure employment at your company in a management-related position.

貴工程公司不但優先為客戶提供優秀的顧問服務，也為新進員工提供綜合的在職訓練，這解釋了為什麼我極盼在貴公司擔任管理相關的職位。

練習 3

以下每句為用來訓練有關 興趣相關產業描寫包括：讚美公司對專業的自我期許。
請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. Your company offers an excellent	A. but also working in a management capacity in the near future.
2. As Taiwan aspires to become a 'Green Silicon Island', your company's research group has distinguished	B. as evidenced by its creativity in using standard operating procedures to create state-of-the-art product technologies.
3. Moreover, your company's sound reputation can help me to attain my career aspirations of not only enhancing my technical expertise,	C. to develop and commercialize product technologies locally.
4. The quite impressive training courses that your company offers for its employees	D. the opportunity to further pursue my professional interests in the above area.
5. Your company has also distinguished itself in the civil engineering sector,	E. confident of my ability to contribute to your corporate goals.
6. In addition to continually upgrading its operational performance, safety and security,	F. me, given my considerable technical expertise in this field.
7. Your reputed biotech firm would provide me with	G. working environment to pursue this research path.
8. Your company's decision to pursue this line of product technology development is what attracts	H. reflect your excellence in leadership and commitment to staff excellence.
9. As your organization has committed itself to providing quality engineering consultancy services for several years, I am	I. your company concentrates heavily on controlling the institute's property and centralizing data management practices. Those strategies have largely contributed to the solid management team at your company.
10. I am especially impressed with how your company has collaborated with overseas strategic partners	J. itself for its contribution to this field, especially in developing advanced construction materials.

4. Stating anticipated contribution to company in this area of expertise if employed there
所期望對公司的專業貢獻

參考範例

■ The opportunity to work at your company would allow me to hopefully contribute to the development of the latest construction engineering products, hopefully furthering your company to unprecedented levels of growth.

這個可在貴公司工作的機會，讓我希望可對最新的營造工程產品的發展有所貢獻，願能協助貴公司邁向史無前例的另一個成長階段。

■ I believe that your company will find my experience in adopting different approaches to enhancing the quality of engineering consultancy services as a valuable asset in any strategic planning that is undertaken to enhance your organization's competency in the intensely competitive.

我相信貴公司會發現我具備採用不同方法提升工程顧問服務品質的經驗，而這項經驗在任何策略籌劃上都是一項保證在激烈競爭下可提升貴組織競爭能力的重要資產。

■ Working in your engineering consultancy firm would hopefully allow me not only to pursue some of my above research interests, but also to contribute to the overall welfare of elderly individuals seeking quality living accommodations.

在貴工程顧問公司工作，我希望不只可追求以上的研究興趣，並且也可對尋求高居住品質的老年人的整體福利有所貢獻。

■ If successful in securing employment at your company, I bring to your organization a strong scholastic background and practical knowledge, which will hopefully be in line with your company's innovative technological developments.

如果順利在貴公司工作，我帶給貴組織的是優秀的學術背景和實務知識，希望符合貴公司創新的技術發展。

■ If I am successful in gaining employment in your company, both my solid academic training and research on information system development will make me a strong asset in your efforts to upgrade e-business operations, such as in online queries, payments and account transfers.

如果我可順利在貴公司任職，我在資訊系統發展上紮實的學術訓練和研究，將會讓我成為貴公司提升諸如線上詢問、付款和轉帳等電子商務交易的有力資產。

練習 4

以下每句為用來訓練有關興趣相關產業描寫包括：所期望對公司的專業貢獻。
請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. I am also confident that my previous work experience will enable me to more fully realize clients'	A. but also enhance my research and knowledge skills.
2. I hope that my entry	B. a valuable opportunity to contribute my background expertise in civil engineering to your innovative research efforts.
3. Working at your company would not only advance my professional capabilities,	C. efforts to increase managerial efficiency and to optimize the productivity of your company's personnel.

4. If successfully employed at your corporation,	D. me with the necessary skills to provide a diverse array of newly offered services to the community conveniently.
5. Employment at your company would give me	E. needs to maintain their loyalty, an area that your organization is especially concerned with.
6. Following the development of my expertise in business management during graduate school, I can contribute to	F. upon my professional and academic skills in order to become more competent in daily work tasks.
7. Moreover, your company's professional training program for new employees will equip	G. a wealth of technological expertise and experience in the above area.
8. As a member of your construction company, I would continuously build	H. into your organization will ultimately contribute to increased commercial activity and profits.
9. As a member of your corporation, I would bring to your organization	I. I will dedicate my efforts to contributing to the success of the corporate family.
10. Through my previous work and academic experiences, I have acquired specialized skills that	J. make me receptive to novel concepts and diversity in a workplace culture.

Describing participation in a project that reflects interest in a profession

描述所參與方案裡專業興趣的表現包括

1. Introducing the objectives of a project in which one has participated 介紹此方案的目標

參考範例

■ My deep interest in the radiotechnology profession led to my active participation in a project aimed at developing a more sound quality assurance system for use in public construction projects.

我對無線電技術專業的濃厚興趣，讓我積極參與公共建設專案用之品質健全保證系統發展專案。

■ My active participation in a project aimed at assessing the quality of a construction firm's services reflects my avid interest in strategic marketing. This undertaking involved collaborating with other marketing planning personnel, quality management employees and educational training staff.

我積極參與營造公司的服務品質評估專案，反映出我對策略行銷濃厚的興趣。這項工作涵蓋了與其他行銷企劃人員、品管人員和教育訓練人員的合作。

■ My recent research emphasis on implementing quality control measures in construction management allowed me to grasp the theoretical and practical concepts related to this discipline as well as future trends.

我最近的研究重點在於營造管理品管措施的實施，這讓我可以掌握與該學科相關的理論和實務觀念以及未來的趨勢。

■ Although research on construction management practices in long-term residential communities initially began overseas, I was able to extend those results and make them applicable to the needs of Taiwan's growing elderly population.

雖說是國外首先進行長期住宅區營造管理實務的研究，但我能推展結果，將其適用於台灣逐漸成長的老年人口的需要。

■ Given my commitment to the civil engineering profession, I actively participated in graduate level research to optimize work productivity on a construction site, having collaborated with others in related projects.

由於我有志於土木工程的专业，所以我積極參與研究所的研究，以期工地的工作生產力得以充分運用，此外，我亦與他人合作相關專案。

練習 5

以下每句為用來訓練有關描述所參預方案裡專業興趣的表現包括：介紹此方案的目標。請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. I have spent considerable time in construction project evaluation not only to reduce overhead costs,	A. exposure to construction management practices in the sustainable development of urban areas.
2. Owing to my deep interest in civil engineering,	B. participated in a project aimed at establishing affordable housing for low-income elderly residents.
3. My recent collaborations have allowed me to gain immense	C. with others in developing a simulation model for construction managers involved in governmental-subsidized projects
4. My recent research effort allowed me to become proficient in not only the use of many radiation detection methods, but	D. in our consulting firm's efforts to accelerating project completion without sacrificing quality.
5. As evidence of my strong interest in this specialized field, I actively	E. but also to avoid the risk of loss valuation.
6. Given my strong desire to thrive within this profession, I collaborated	F. during graduate school attempted to organize an administrative unit that would encourage independently-owned construction firms to form a strategic alliance.
7. My sincere commitment to elevating quality control standards in the construction sector is reflected in my active participation	G. so that staff could enhance client services while conserving overhead costs.
8. A proposal for an engineering consultancy firm that I wrote	H. also an understanding of how such methods can be applied to evaluated building construction materials.
9. I recently participated in a cost-benefit analysis project for a construction firm	I. in which quality control management was of primary emphasis.
10. As evidence of the strong desire to strengthen my research fundamentals, I participated in a civil engineering research project,	J. I am especially interested in adopting construction management practices in long-term care residential communities.

2. Summarizing the main results of that project 概述該方案的成果

參考範例

■ Our collaborative efforts led to the discovery of ...

由於我們共同的努力，因而發現 ...

■ Our results further allowed us to clarify how ...

我們的成果進而使我們闡明如何 ...

- My recent research enabled me to discern between ...
我最近的研究讓我分辨 ... 和 ...
 - The results of that project confirmed the effectiveness of our procedure.
專案的結果確定了我們程序的有效性。
 - Those project results demonstrated the feasibility of ...
專案的結果證明了 ... 的可行性
 - The results of that project confirmed the ability of our system not only to evaluate precisely bottlenecks in construction, but also to evaluate immediately the manufacturing system's status with respect to re-scheduling delayed tasks.
專案的結果確定我們系統的能力不只在精確評估營造瓶頸，也在將延誤的工作重新排進時間表時立即評估製造系統的相關狀況。
3. Highlighting the contribution of that project to the company or the sector to which it belongs
強調該方案對公司或部門的貢獻

參考範例

- Results of that research effort clarified/elucidated/shed light on/paved the way for/provided a valuable reference for/facilitated the assessment of/ effectively addressed specific problems relating to/contributed to efforts to ...
研究的結果說明 ... / 闡明 ... / 清楚解釋 ... / 為 ... 鋪路 / 為 ... 提供有價值的參考資料 / 促進 ... 的評估 / 有效說明與 ... 有關的特定問題 / 對 ... 的努力有貢獻。
 - Based on the results of that research effort, several engineering firms attempted to modify their services in order to increase their competence in the highly competitive construction sector.
數家工程公司基於那項研究的結果，嘗試調整它們的服務，以提升它們在競爭激烈的營造業中的能力。
 - Results of that study demonstrated that successfully adopting knowledge management practices among employees enhance the ability of company executives to interact with all staff members.
研究結果證明：成功採用員工的知識管理實務，可加強公司執行者與全體員工的互動能力。
4. Complimenting the company or organization at which one is seeking employment on its efforts in this area
讚美公司對業界的專業努力

參考範例

- Your company, a leader in this field of research, could greatly enhance my capabilities in construction management-related topics in civil engineering.
貴公司—此項研究領域的領導者—可大幅提升我土木工程營造管理相關專題上的能力。

- Given your company's considerable experience in developing construction engineering products for national infrastructure projects, I am especially impressed with your ability to evaluate the potential commercialization of various technologies in the Taiwan market.

由於貴公司在國家基礎建設專案營造工程產品發展上具有豐富經驗，我對貴公司評估台灣市場多項技術潛在商業化的能力特別印象深刻。

- Given my professional experiences, your company offers a competitive work environment and highly skilled professionals: these ingredients are essential to continually upgrading knowledge skills and expertise in my chosen career path.

由於我具專業經驗，而貴公司提供具競爭性的工作環境和具高技術性的專業人員：這些要素對我要在所選的事業路途上持續提升知識技術與專門知識而言是必要的。

- While offering renowned product brands in the Taiwan market from the United States, your franchise highly prioritizes quality assurance and professionals in a diverse range of engineering fields.

在台灣市場供應知名美國產品品牌的同時，貴經銷商優先重視工程領域各範圍的品管和專業人員。

- My profound interest in radiation detection explains my active participation in a project aimed at developing a novel method and promoting public awareness of radiation protection in public buildings and residential complexes.

我對輻射偵測極有興趣，這解釋了我為什麼積極參與公共大樓與住宅輻射防護新法發展與公共認知專案。

解 答

練習 1	1	E	2	I	3	A	4	J	5	C	6	B	7	D	8	F	9	H	10	G
練習 2	1	G	2	A	3	J	4	B	5	H	6	C	7	D	8	I	9	E	10	F
練習 3	1	G	2	J	3	A	4	H	5	B	6	I	7	D	8	F	9	E	10	C
練習 4	1	E	2	H	3	A	4	I	5	B	6	C	7	D	8	F	9	G	10	J
練習 5	1	E	2	J	3	A	4	H	5	B	6	C	7	D	8	F	9	G	10	I

柯泰德先生自 1989 年即在國立交通大學及清華大學任教研究所科技英文寫作課程。目前柯先生是元培技術學院外文組的講師。著有五本科技英文寫作系列及十本應用英文寫作系列叢書。同時他也是數本科技期刊的英文編輯。柯先生目前正在攻讀英國東安格利亞大學的教育博士學位。柯泰德線上英文論文編修訓練服務 www.cc.nctu.edu.tw/~tedknoy

參考文獻

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工程師專業英文工作經歷撰寫(下)

柯泰德

本 主題分上下二期刊登，主要探討工程師如何撰寫專業的英文工作經歷，內容共分為六個部份，分別是：(一) 表達工作相關興趣 (二) 興趣相關產業描寫 (三) 描述所參與方案裡專業興趣的表現 (四) 描述學歷背景及已獲成就 (五) 介紹研究及工作經驗 (六) 描述與求職相關的課外活動。工程師們可以經由參考研究他人寫作範例及相關輔助的 11 個練習，逐步強化本身對於英文工作經歷的寫作能力，以成為個人追求專業競爭力的一項利器。上期刊登至 (三) 描述所參與方案裡專業興趣的表現之內容，本期由其練習開始。

練習 B

以下每句為用來訓練有關 描述所參與方案裡專業興趣的表現包括：讚美公司對業界的專業努力。請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. Your company's heavy emphasis on ensuring that each new target	A. with other businesses in undertaking innovative public construction projects.
2. Your company can provide me with	B. offers a valuable opportunity for me to advance my knowledge skills.
3. Your company provides a highly collaborative environment	C. upgrade my knowledge expertise and research capabilities through your solid employee training curricula.
4. In this area of development, your company provides a highly	D. reflected in your outstanding human resources and state-of-the-art facilities.
5. Your laboratory, a leader in this field of research,	E. my professional interests.
6. As a leader in the civil engineering field, your company would provide me with me with many collaborative opportunities to continually	F. can reach its goal successfully ensures a major breakthrough in product technology development.
7. Your commitment to excellence in product innovation is	G. company possesses many highly skilled employees.
8. The opportunity to work at your company would provide me with an excellent environment not only to fully	H. realize my career aspirations, but also allow me to apply theoretical concepts taught in graduate school in the classroom to a practical work setting.
9. Your engineering firm would definitely provide me the opportunity to further pursue	I. a unique opportunity to build upon my previous experiences in the above areas.
10. Besides providing an excellent work environment in the highly competitive construction engineering sector, your	J. competitive work environment and is home to highly skilled professionals.

Describing academic background and achievements relevant to employment 描述學歷背景及已獲成就

1. Summarizing one's educational attainment 總括個人的學術成就

參考範例

- My graduate level research in the Institute of Civil Engineering at National Cheng Kung University focused on the effectiveness of advanced simulation models in increasing the efficiency of public construction projects.

我在國立成功大學土木工程研究所進行的研究，著重在可提高公共營造專案效率的先進模擬模型的有效性。

- The nature of my previous work led to my recent completion of a Master's degree in Business Administration at National Taiwan University, in which I diligently strived to identify what theoretical and academic principles can be applied to my workplace requirements.

我的工作成果使我完成國立台灣大學企業管理碩士學位，在當中，我努力找出適用我工作場所要求的理論和學術原則。

- Graduate school allowed me to increase my intellectual capacity by reading the latest engineering publications, conducting research independently, consulting with civil engineering experts and familiarizing myself with advanced computer languages.

研究所讓我可以閱讀最新的工程刊物、進行獨立研究、向土木工程專家求教並熟悉先進的電腦語言，使我因而增加智識。

- Having received a bachelor's degree in Atomic Science and a master's degree in Civil Engineering, I am well aware of the theoretical and practical issues involving the assessment of radiation levels in residential complexes.

我具有原子科學學士學位和土木工程碩士學位，對有關住宅輻射程度評估的理論與實務上的問題相當了解。

- My graduate level research in construction management focused on increasing on-site productivity, equipping me with sufficient expertise to contribute significantly Taiwan's civil engineering sector.

我在研究所進行的營建管理研究，著重在現場生產力的提升，使我具備充分的專門知識對台灣的土木工程領域作出卓越貢獻。

2. Describing knowledge, skills and/or leadership qualities gained through academic training 描述學術訓練所獲得的技能及(或)領導特質

參考範例

■ While serving as a research assistant in the Institute of Environmental Engineering at National Taiwan University, I learned how to coordinate different aspects of a research project, whether it be filling out weekly progress reports, managing financial affairs, or organizing regularly held seminars and report contents.

我在國立台灣大學環境工程所擔任研究助理時，在一週進度報告纂寫、財務管理、定期召開討論會和報告內容當中，學習到如何協調研究專案下相異的觀念。

■ Despite the rigorous challenges of academic research, my professional experiences reinforce my dedication to laboratory work and ability to develop pertinent research questions and experimental designs, which facilitate data analysis.

雖然學術研究的挑戰嚴峻，但我的專業經驗強化了我對實驗室工作的付出，以及對相關研究問題和實驗設計的發展能力。

■ Competency skills such as designing a study, evaluating data and communicating my results orally are essential for civil engineers. Graduate school thus refined my writing and presentation skills while designing a research project.

諸如研究設計、資料評估和口頭結果報告等能力技巧，對土木工程師來而言不可或缺。研究所精鍊了我在設計研究專案時的寫作與表達技巧。

■ With competitiveness among individuals increasing as society advances rapidly, strong analytical skills and the ability to solve problems logically in theory and practice are highly desirable attributes, explaining why I equally prioritize professional and academic experiences.

隨社會快速發展所提高的個體競爭力、優秀的分析技巧、具邏輯解決理論與實務問題的能力，是極值得追求的特質，這解釋了我為什麼優先重視專業以及學術經驗。

■ Research competency acquired during graduate school definitely enhanced my knowledge of the field, hopefully enabling me to look beyond the role of assisting others in the laboratory to that of leading other research collaborators.

研究所期間需要的研究能力，明顯增進我在此領域的知識，希望可使我超越在實驗室協助他人的角色，擔任領導其他共同研究者的角色。

練習 7

以下每句為用來訓練有關 描述學歷背景及已獲成就：描述學術訓練所獲得的技能及（或）領導特質。
請把左邊及右邊的每一片語連結成一個完整句子。解答在本文最後部份。

1. Graduate school instilled in me	A. thus motivating me to adopt a more meaningful strategy towards learning, especially how seemingly polar fields can be integrated.
2. Classroom and symposium lectures enabled me to observe how to effectively publish one's research results orally,	B. university instilled in me a theoretical and practical understanding of the latest concepts in civil engineering.
3. Remaining abreast of current trends in construction engineering allowed me to fully engage in discussion with my graduate school advisor	C. including the logical format of the presentation, its deliberate delivery and unique perspectives that are adopted in approaching a research problem.
4. Academic study made me aware that study is more than not just for securing employment,	D. advancing Taiwan's civil engineering sector.
5. My academic advisor encouraged me tremendously, especially when I encountered difficulties during the academic year.	E. but also to conceptualize problems in different ways.
6. Attending several academic conferences and publishing my research findings in internationally renowned journals	F. to understand what research results must be generated in the laboratory to yield a successful outcome.
7. Graduate school equipped me with much knowledge and logical competence so I that I can devote all of my energies to further	G. proficient in using numerous analytical skills, but also nurtured my problem-solving skills.
8. Critical thinking skills developed during graduate studies enabled me not only to explore theoretical concepts and delve into their underlying implications for the civil engineering profession,	H. the necessity of harmony among research collaborators to achieve a desired outcome.
9. In addition to helping me to nurture skills necessary for the workplace,	I. allowed me to expand the scope of my research activities as well as grasp many helpful concepts on the latest technological trends in civil engineering.
10. Graduate school not only made me	J. This encouragement made me resolute to overcome the rigorous challenges of graduate study, explaining my confidence in persevering despite the intensely competitive nature of the civil engineering field.

3. Emphasizing a highlight of academic training 強調一個學術訓練的特定領域

參考範例

■ Although extremely taxing, the project instilled in me a sense of confidence in meeting the rigorous challenges of such an undertaking. Although research of this topic initially began overseas, I was able to extend those results and make them applicable to Taiwan's circumstances.

這項專案雖極度艱鉅，但也讓我對面對此類嚴酷的工作挑戰時逐漸產生自信。雖說是國外首先進行此項專題研究，但我能推展結果，將其適用於台灣環境。

■ I served as a research assistant in the Society of Civil Engineers, R.O.C., which allowed me not only to see the connection between theoretical knowledge and actual commercial practices, but also to realize how results from academic investigations can influence governmental policies.

我在中華民國土木工程學會擔任研究助理時，不只明白了理論知識和實際商業實務間的關連，亦瞭解到學術研究的結果可以如何的影響政府政策。

■ While a course in Statistics focused on how to analyze the effectiveness of the latest software applications, another course in English Writing oriented me on how to organize and write a research paper, as well as increase my academic reading comprehension.

統計學課程著重在如何分析最新軟體應用的有效性，另一門英語寫作課程的方向則在於如何組織、繕寫研究報告以及提升閱讀學術文章的理解力。

■ Given the importance of detail and sequential order when working in a laboratory, I carefully wrote down the details of experimental steps to be followed. Upon completion of the experiment, I compared the data generated from the experiments with those results anticipated beforehand. Despite the occasional bottlenecks in research, I remained calm to avoid experimental failure.

由於在實驗室工作，細節和後續次序很重要，我仔細寫下實驗步驟的細節供作依循。實驗完成後，我將實驗產生的資料和事前預期的結果做比較。雖然研究中有時會有瓶頸，但我仍維持冷靜，避免實驗失敗。

■ In addition to providing me with several opportunities to corroborate what I had learned from textbooks in the classroom, several field studies on air pollution at Linyuan Industrial Park in Kaohsiung allowed me to extend my knowledge skills to an entirely different field to achieve innovative solutions.

在高雄林園工業區實地進行的數項空氣污染研究，除了提供我驗證課堂教科書所學的機會之外，亦讓我將知識技術擴展至全然不同的領域，得出創新的解決辦法。

4. Stressing how academic background will benefit future employment 強調學術背景對未來求職的利處

參考範例

■ Combining academic concepts with my knowledge expertise from previous employment will enable me to rise to the arduous challenges of working in the intensely competitive hi-tech sector for a renowned corporation such as yours.

結合學術觀念和從以前工作中獲得的知識專業，使我能擔負在像貴公司此類著名公司內部競爭激烈的高科技部門任職的艱鉅挑戰。

■ The professional knowledge acquired from graduate school will also strengthen my intellectual capacity to give me a clearer picture of my career path, hopefully at your company.

從研究所獲得的專業知識也增加了我的智識，使我對自己的事業前途有更具體的景象，希望能在貴公司實現。

■ Feeling somewhat unprepared for the demands of the workplace, graduate school allowed me to further strengthen my knowledge skills in management, thus enabling me to more effectively apply my strong academic background in order to enhance my work competence.

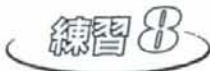
感到對工作上的要求尚未作好準備，而研究所則進一步的增進我在管理上的知識技術，因此讓我更有效的憑優秀的學術背景提升工作能力。

■ I am absolutely confident that my academic background and experimental as well as professional experiences in food science and biotechnology will allow me to succeed in your company's many collaborative product development projects.

我在食品科學和生物工藝學的學術背景以及實驗和專業經驗，將可讓我在貴公司成功完成多項產品發展合作專案，對此，我有絕對的自信。

■ Through graduate school research, I contributed to efforts to elevate the quality of affordable housing units for the elderly living in residential communities. I hope to continue this line of work upon employment in your organization.

藉由研究所時的研究，我盡力為年長者在可負擔的住屋價格下提升住宅區住屋品質。我希望在貴機構的工作仍維持此類工作方向。



以下每句為用來訓練有關 描述學歷背景及已獲成就：強調學術背景對未來求職的利處。

請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. My outgoing character and aggressiveness towards completing tasks completely	A. during graduate school towards any research effort that I belong to at your company.
2. I will apply the same responsible attitude instilled in me	B. I feel equipped to serve as a researcher in construction management or civil engineering fields, areas that your consulting firm is renowned.
3. I would thus like to build upon my solid	C. valuable assets for your company's product development efforts.
4. The opportunity to work at your company would provide me with an excellent environment not only to fully realize my career aspirations,	D. but also allow me to apply theoretical knowledge management concepts taught in graduate school to a practical work setting.
5. I am absolutely confident that my strong academic background will prove invaluable to your company's highly	E. fostered in graduate school when approaching bottlenecks in research during the project implementation phase.
6. I bring to your company the same level of intuitiveness	F. of my professional occupation, but also potential employment opportunities in the rapidly evolving field.
7. Given my solid academic training,	G. to understand any changes that may occur in the civil engineering field, but also to find answers on how to resolve the problem at hand.
8. Given my strong knowledge skills in analyzing the successful components of a successful engineering project, I am in a better position not only	H. will definitely prove to be assets in any research effort that I contribute to, hopefully at your company.
9. In addition to the departmental curricula, I fostered practical working skills in order to familiarize myself not only with the demands	I. academic training and relevant work experiences by securing employment in your reputed civil engineering firm.
10. Hopefully, my strong writing and presentation skills will prove to be	J. demanding product development projects as a researcher who can effectively respond to the latest changes in the rapidly evolving civil engineering field.

Introducing research and professional experiences relevant to employment 介紹研究及工作經驗

1. Introducing one's position and/or job responsibilities, beginning with the earliest position, and ending with the most recent one 介紹個人歷年至今所任工作職位及職責

參考範例

■ I most recently served as the chief engineer of a national infrastructure project, where I was responsible for coordinating personnel and streamlining inter-departmental activities to effectively implement the construction schedule according to stringent environmentally friendly building code standards.

我之前擔任國家基礎建設專案總工程師，負責人員協調和簡化部門間的活動，以期符合嚴格的環境友善建築法標準，有效執行營造計畫。

■ When my university department established a continuing educational degree program in 2001, I worked during the daytime and went to class during the evenings. Despite the difficulty of holding down a job and pursuing a bachelor's degree simultaneously, I acquired much professional knowledge in civil engineering.

我的大學系所在 2001 年成立推廣教育學位學程時，我便白天工作，傍晚上課。雖然在顧及工作之餘亦須同時修讀學士學位是件辛苦的事，但我也獲得許多土木工程的专业知識。

■ My work as an administrative assistant in a construction company in Puli of central Taiwan, following my graduation from business vocational school, allowed me to apply theories taught in the classroom to actual working situations.

我自商職畢業後，便在中台灣埔里的一家營造公司擔任行政助理，讓我可將課堂教授的理論應用於實際的工作情況。

■ After completing our country's compulsory military service of nearly two years, I began my career working in an information integration company, where I first learned how to maintain hardware systems and construct a network, followed by orientation with the different functions of manufacturing-oriented information systems.

我服完我國 2 年的義務兵役後，便在一家資訊整合公司工作，在那裡，我首次學習到如何維修硬體系統和架構網路，隨後再進行多功能導向資訊系統各功能定位。

■ While diligently striving to familiarize myself with state-of-the-art information technologies, I was eventually promoted to section manager in 1999, a role in which I became adept in accumulating information, evaluating data, negotiating prices and reviewing budgets.

我努力讓自己熟悉最新式的資訊技術，終在 1999 年晉升為部門經理，在該角色，我對資訊累積、資料評估、價格協商和預算審查均很熟稔。

練習 9

以下每句為用來訓練有關介紹研究及工作經驗：介紹個人歷年至今所任工作職位及職責。
請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. After leaving the semiconductor industry,	A. much theoretical and practical training in practicum internships during the summer and winter breaks.
2. As a graduate student, I acquired	B. the past five years.
3. I worked while receiving my professional license in civil engineering,	C. explaining why effective communication and a congenial attitude are essential.
4. I have acquired substantial work experience in construction engineering management over	D. I returned to an information integration company, where I was responsible for system analysis as a project manager, acquiring a breadth of experience in dealing with complex management issues.
5. As for my professional experiences, I have acquired much knowledge	E. to commence my career in civil engineering.
6. After receiving my Master's degree in Power Mechanical Engineering from National Tsing Hua University and professional license as a civil engineer, I started	F. my horizons as to the dynamics of working in the construction management sector.
7. After completing our country's compulsory military service of nearly two years, I started working in an engineering consultancy firm	G. enabling me to acquire hands-on and theoretical knowledge simultaneously.
8. The company's comprehensive operations broadened	H. rapidly emerging civil engineering profession, explaining why I returned to university for a graduate level education.
9. My job demands that I closely interact with others,	I. of civil engineering-related methods, especially with respect to construction project management.
10. While finding this work highly stimulating and rewarding, I realized how unprepared I was for the	J. working in an engineering consultancy firm in Taipei, where I received two years of rigorous training on how to effectively implement governmental-sponsored infrastructure projects.

2. Describing acquired knowledge, skills and/or leadership qualities 描述個人所獲得的知識，技能及(或)領導特質

參考範例

■ Acquiring the above knowledge skills enabled me to more creatively discuss current developments in my research with other collaborators.

取得以上知識技術後，使我在與其他共同研究者討論我目前的研究發展時更具創造力。

■ In addition to nurturing my problem-solving and basic knowledge of software engineering, the complexities of interacting with other information specialists profoundly impacted my career direction.

我與其他資訊專員間的互動，除了培養我在軟體工程方面解決問題和基本的知識之外，亦深深影響我的事業方向。

■ In addition to refining my ability to coordinate engineering construction projects, I became highly adaptive to change, responsive to sudden fluctuations in user requirements and flexible in acquiring diverse skills demanded in a competitive corporate climate.

除了具有精鍊的工程營造專案協調能力之外，我對種種改變也有很強的適應力，並可因應使用者突然改變的要求作出回應，對在競爭的公司氣氛下所要求具備的各項技術亦具彈性。

■ Strategic decision making skills, clear headed thinking, the ability to convey my concerns through effective communication with colleagues and confidence in myself – all of these attributes allow me to significantly contribute to the task at hand.

策略性的決策、頭腦清晰的思考、將關注的事項以有效溝通的方式傳達給同事，以及對自己的自信—上列特質讓我可為手中的任務貢獻甚多。

■ By constantly pursuing my research interests, I try to remain abreast of the latest developments in pertinent literature and strive diligently to grasp their practical implementations.

憑著對研究興趣的不斷追求，我盡力使自己跟上相關文獻內述的最新發展，努力了解發展項目的實際進展。

練習 10

以下每句為用來訓練有關介紹研究及工作經驗：描述個人所獲得的知識，技能及（或）領導特質。請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. Although extremely taxing,	A. but also learning how to think independently and deliberately.
2. Related project experiences have greatly strengthened	B. abreast of the latest developments in this area.
3. In addition to refining my ability to coordinate construction-related activities,	C. my independent research capabilities and statistical as well as analytical skills.
4. The occasional frustrations of slow progress in research have strengthened my resolve	D. refine my interpersonal skills so that I could effectively lead a development team and achieve on-time delivery of our company's products and services.
5. Laboratory research definitely nurtured my skills that were previously lacking in	E. matured me as an individual.
6. I refined my ability to resolve bottlenecks in research, which required not only absorbing the perspectives of other research collaborators,	F. the project instilled in me a sense of confidence in meeting the rigorous challenges of such an undertaking.
7. More than integrating information technologies in the company through software development, I had to	G. work assignments enabled me to face rigorous challenges of the management sector.
8. By placing a large number of responsibilities on my shoulders, this project greatly	H. to excel in the laboratory, making me more tenacious in spirit.
9. Interacting with other researchers in my field allowed me to remain	I. experimental design, data evaluation and collaboration within a research group.

Describing extracurricular activities relevant to employment 描述與求職相關的課外活動

1. Introducing an extracurricular activity that one has participated 曾參加的相關課外活動介紹

參考範例

■ Community service is an integral aspect of scouting activities, with club members looking forward to activities such as working with area youth through physical exercise and extracurricular activities.

社區服務是一項由童軍活動構成的整體概念，社團成員期盼的活動，舉例來說，是藉由體育活動或課外活動和地區青年合作。

■ As for my extracurricular activities, I participated in campus wide anti-smoking activities sponsored by Taiwan's Bureau of Health Promotion Department. In addition to offering general orientation on the dangers of smoking, the activities also inform students on tobacco manufacturers' deceptive motives and marketing approaches.

關於課外活動方面，我曾參與行政院衛生署國民健康局發起的校園反菸活動。除了提供抽菸產生的一般危險之外，此活動亦讓學生瞭解菸草製造商的詭騙動機和行銷手法。

■ Most extracurricular activities I participated in were construction management-oriented out of concern to keep my academic scholarship for studies in civil engineering.

出於取得獎學金攻讀土木工程的考量，大多數我所參與的課外活動均屬營造管理方面。

■ While certain individuals may view me as being overanxious to assimilate much information, I constantly distinguish between academic/work reading and pleasure reading.

有些人可能認為我過度急切想要吸取大量資訊，但我一直都能夠將學術／工作閱讀和休閒閱讀做出區隔。

■ Getting along with others, especially with classmates in the university's extracurricular activities, was a large part of my daily campus life, regardless of whether I was collaborating on a project or spending leisure time with others.

不論是和他人合作專案或共度空閒時光，和他人相處，特別是大學課外活動的同學，佔據了我每日校園生活的絕大部分。

■ My classmates elected me monitor, which is a unique leadership opportunity that increased my self-confidence in leadership skills while striving for harmony among classmates and coordination with the classroom instructor.

同學選我做班長，這是獨特的領導機會，讓我在致力於班級合諧和教師聯繫時增加自己在領導技巧上的自信。

- I tried to balance my academic studies with extracurricular activities during university.

大學時期，我盡力平衡我的課業和課外活動。

- As evidence of my friendly, responsible and communicative nature, I participated in our department's volleyball team during university.

我大學期間參加系上排球隊，顯示出我友善、負責、擅溝通的特質。

- As for extracurricular activities, individuals need an outlet for expressing their spiritual side and remove themselves from the weariness of daily work.

關於課外活動，每個人都需要紓發情緒的出口，消除日常工作的煩累。

2. Highlighting the acquired knowledge, skills or leadership qualities that are relevant to employment 強調和求職相關的已有知識技能或領導特質

參考範例

- Extracurricular activities nurtured my communicative skills by requiring that I closely collaborate with other club members to ensure that everything ran smoothly.

課外活動當中，需要和其他社團成員密切聯繫以確保每件事順利進行，故而培養出我的溝通技巧。

- Organizational responsibilities included drawing up a schedule for construction engineering-related activities, encouraging members to actively participate in those activities, leading discussions during meetings and evaluating the success of our activities.

組織內的責任包括擬定營造工程活動時間表、鼓勵人員積極參與活動、會議間主導討論進行以及評估活動的成功性。

- Scouting activities have profoundly impacted my life, making me more socially conscious, responsible, courageous, independent, aggressive, honest and willing to help others.

童軍活動影響我的生活至深，使我更圓融、負責、勇敢、獨立、積極、誠實、樂於助人。

- Extracurricular activities and recognition for my contributions greatly added to me character, thus equipping me for the challenges of graduate school and ability to more fully grasp human resource management concepts.

課外活動和對我貢獻的認可，在我個性上有極大助益，使我有能力面對研究所的挑戰，亦更能充分掌握人力資源管理的觀念。

- Language is a vital part of our life's experiences, something that I am devoted to in my leisure time in order to build upon my solid academic background and to acquire a better position at work.

語言是生活經驗不可少的部份，是我在空閒時為了作為紮實學術背景的基石並進而獲得較佳工作職位而致力以求的項目。

練習 II

以下每句為用來訓練有關介紹研究及工作經驗：描述個人所獲得的知識、技能及(或)領導特質。
請把左邊及右邊的每一片語連結成一個完整句子。解答在本文章最後部份。

1. Volunteering in the scouting organization greatly impacted my life	A. extracurricular activities enabled me to systematically apply logical reasoning to solve academic problems, such as in operations research, statistics and econometrics.
2. This club not only equipped me with much knowledge expertise on photographing still and moving objects,	B. opinions in order to spur creativity.
3. In addition to equipping me with strong organizational and management skills,	C. accommodate myself within a group to contribute to a team effort.
4. As I enjoy sharing what I have learned with my friends, interacting with others can supplement my	D. opportunities that gave me a broader perspective on the larger global picture.
5. The experience instilled in me the importance of planning in the early stages so as to incorporate all members'	E. to handle personal crises.
6. While training with many classmates from diverse backgrounds, I learned how to easily	F. by making me more conscious of others' needs and aware of my societal responsibilities.
7. Extracurricular activities not only developed my self-reliance skills, but also strengthened my ability	G. knowledge and cultivate interpersonal and communication skills.
8. Extracurricular activities offered diverse educational experiences and opportunities to apply knowledge skills and acquire leadership	H. but also instilled in me an aesthetic quality on how to identify beautiful objects in daily life.

解答

練習 6	1	F	2	I	3	A	4	J	5	B	6	C	7	D	8	H	9	E	10	G
練習 7	1	H	2	C	3	F	4	A	5	J	6	I	7	D	8	E	9	B	10	G
練習 8	1	H	2	A	3	I	4	D	5	J	6	E	7	B	8	G	9	F	10	C
練習 9	1	D	2	A	3	G	4	B	5	I	6	J	7	E	8	F	9	C	10	H
練習 10	1	F	2	C	3	G	4	H	5	I	6	A	7	D	8	E	9	B		
練習 11	1	F	2	H	3	A	4	G	5	B	6	C	7	E	8	D				

柯泰德先生自 1989 年即在國立交通大學及清華大學任教研究所科技英文寫作課程。目前柯先生是元培技術學院外文組的講師。著有五本科技英文寫作系列及十本應用英文寫作系列叢書。同時他也是數本科技期刊的英文編輯。柯先生目前正在攻讀英國東安格利亞大學的教育博士學位。柯泰德線上英文論文編修訓練服務 www.cc.nctu.edu.tw/~tedknoy

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柯泰德 有效撰寫英文工作自傳, 揚智文化事業股份有限公司: 2003

Exercise 1

Correct the following sentences using the copyediting marks on page **XIV**.

1. All inputs are combined by engineers to create a product.
2. Three phases of analysis are included in their approach.
3. A statistical comparison is made of the proposed procedures with Taguchi's two-step procedure.
4. A more efficient combination among the factor levels is achieved when the control factor is continuous.
5. Factors causing saturation include temperature, volume and weight.
6. The Taguchi approach entails minimizing the average quadratic loss.

Exercise 1

7. There has been a considerable amount of studies on robust design.
8. There is a significant difference in control levels for the parameter settings.
9. The committee made a decision on the question as to using an individual mouse or a trackball would be more productive.
10. As a general rule, mice and trackballs serve the function of being both used for the same reason.

Exercise 4

Put the following sentences in active voice by using the copyediting marks on page **XIV**.

1. Modification of the heuristics was made by Lacksonen and Ensore (1993) to solve the dynamic layout problem.
2. Minimization of total operating costs is achieved by a planning horizon.
3. A description of the layout cost evaluation method is made by introducing the following notations in this section.
4. Precise measurement of neural networks by practitioners is a heavy emphasis of computer vision systems.
5. Numerical analysis is performed in this study on the effects of the inflation rate and the deterioration rate on stock inventory.

6. The manager can be assisted by the proposed model so that the order size can be precisely determined.
7. The temperature is increased by uncontrollable factors, as indicated in the experimental results.
8. The proposed model can be extended in a future study so that more realistic assumptions can be incorporated.
9. A more detailed description of the three design types is provided in Kackar and Phadke (1991).
10. The GRG algorithm may be difficult for users with limited statistical training to implement.
11. The server is notified by the website manager that retrieval of the data must be performed by the account holder.

Exercise 8

Correct the following sentences using the copyediting marks on page **XIV**.

1. Difficulty is encountered in explanation of the method to inexperienced engineers owing to its computational complexity.
2. Simulation of the program is performed in this study.
3. A slight increase occurs in the deposition rate
4. Knowledge of how the variables are distributed is not required by novice engineers.
5. Not only is the variability of the control factors considered by the proposed procedure, but implementation of related tasks is performed by that same procedure.
6. A recommendation of using iterative least squares (ILS) as a simple method for analysis of censored data was made by Schmee and Hahn(1990).

7. Normalization of operations is achieved by a simple calculation of the scores.
8. Improvement of the condition is achieved by variation of the control factors
9. A recommendation is made here that the program be simulated by the engineer.
10. The operator made a reservation of the ticket for me.
11. The system performs an assignment of the weights to the variables.
12. The next phase performed an examination of the unknown factors.
13. Assessment of a student's willingness to study by an instructor is possible through the close examination of his or her academic performance.

Exercise 12

Correct the following sentences using the copyediting marks on page XIV.

1. No significant difference in production occurred between the two factories.
2. The industrial output was not significantly different between the two age groups.
3. The temperature is only a little affected by fluctuation of the value.
4. An increase in parameter k causes the optimal ordering quantity to decrease.
5. The larger the TOPSIS value, the better the product quality is implied.
6. The larger the target, the higher the accuracy.

7. The engineer must make an adjustment of the parameters so that accuracy can be ensured.
8. This article makes a comparison of several industrial strategies in order to ensure market competitiveness.
9. Modification of the process by the engineer is required so that completeness can be ensured.
10. Networks are prevalent throughout society.
11. Network topology is a reference to how the computers are physically attached to each other.
12. The board of directors must take action based on its authority.

Exercise 16

Correct the following sentences using the copyediting marks on page XIV.

1. It is possible that the price of a laser printer is higher than that of an ink jet printer.
2. There is a need for limitation of the number of users by the systems manager.
3. It is important that cooperation with each other be the focus of the study group.
4. It could happen that a decision to cancel the exhibition is reached by the committee.
5. There is a necessity for an agreement on the delivery terms by both parties.
6. It is necessary that negotiations on the final conditions be undertaken by both sides immediately.

7. It is critical that consideration is made by the systems manager on the current status of the program.
8. It is crucial that assessment of the control strategy be performed by the site manager.
9. It is imperative that arrangement of the class schedule be done by the academic advisor.
10. It is not necessary for the coordination of the tasks to be the responsibility of the department manager.
11. There is no need for the responsibility for all of the assignments to be that of the team leader.
12. There is no need for corrections of the incomplete tests to be done by the teacher.

Exercise 20

Correct the following sentences using the copyediting marks on page **XIV**.

1. It is well known that a majority of Taguchi method applications have the capacity for addressing a single-response problem.
2. It may be said that computers have the ability to incorporate kinds of equipment in order that the user is in a position to interact with the computer.
3. It is a fact that the network cards have the opportunity to be upgraded to meet the connection speeds in the event that the campus upgrades to 100Mbps hubs and routers.
4. It is evident that the college is able to make an informed decision through means of understanding the capabilities and cost difference for both 10Mbps and 100Mbps.

5. It has been found that any error that might happen will be more destructive in light of the fact that XYZ applications is in a position to make direct calls to the hardware.
6. It has long been known that the logon between the workstation and NT server is encrypted considering the fact that an eavesdropper actually wants to gain the ID and password.
7. It is our opinion that Windows 95 is for all intents and purposes a good operating system in a situation in which the user has many requirements.
8. It is possible that the error affects the necessary requirements when attempting to ascertain the location of the variables.
9. It is noted that 10Mbps network cards are basically becoming obsolete for the reason of their slow data transfer rates.

Exercise 1A

Correct the following sentences using the copyediting marks on page 1.

1. The number of banks charging their customers ATM user fees are increasing.
2. The majority of the committee feel that the right decision was made.
3. Time as well as temperature are important during the batch process.
4. The professor told the student that he needed to finish early.
5. The graduate assistant conducted the experiment. Time and the amount of pressure applied to the conductive material were essential to success; however, it lasted too long.
6. Different criteria often conflict with each other, which implies that simultaneously optimizing different objectives is relatively difficult.

7. The Taguchi approach combines experimental design techniques with quality loss considerations and the average quadratic loss is minimized as well.
8. Engineers must either combine all inputs to create the output of a product or the parameter values must be set so that the product's performance remains unaffected.
9. The notions can be simply modified by implementing the following procedure:

Select the levels that maximize SN.

Estimate the slope of the linear regression model.

The control factors and the adjustment factors must be identified.

Identify the control factors that significantly affect the variables.

The target must be adjusted as much as possible.

Exercise 4

Circle the correct form of the verb or pronoun in the following sentences. Make any other necessary corrections.

1. A number of innovative developments (has , have) been made in the multi-component injection molding process in recent years.
2. A gas channel design that (guides , guide) the gas flow to the desired locations (is , are) one of the key factors that determine a successful application.
3. The delay time along with gas injection points (is , are) important in producing injection-molded parts of quality.
4. Neither the processing parameters nor the amount of polymer melt injection solely (determine , determines) a successful gas channel design.
5. To select the number and locations of gas injection points and to determine the amount of polymer melt injection (is , are) essential to a successful application.

6. Ergonomics (aim , aims) to integrate worker comfort and productivity.
7. Each of the factors (contribute , contributes) to a successful design.
8. The simulation in which the polymer melt flow (occurs , occur) in thin cavities (provides , provide) accurate predictions.
9. Establishing a general model or empirical formula in addition to describing the thickness variation of the skin melt that exists between the gas/melt interface and the cavity wall (appear , appears) to be necessary for further development.
10. The number of gas injection points (are , is) important in producing quality injection-molded parts.
11. The majority of factors heavily (influences , influence) product performance.
12. Accurately determining the interface shape of a bubble nose and properly selecting the film thickness (is , are) of primary concern.

Exercise 8

Correct the following sentences using the copyediting marks on page 1.

1. The machines can process the family of parts, ensuring that it reaches full capacity.
2. All parts have the same transportation costs, which limits the effectiveness of traditional approaches.
3. The team attempts to optimize the thickness by minimizing the variation and maintaining the desired mean. This accounts for why the effects of process parameters on the silicon nitride deposition process are studied.
4. In previous literature, they do not examine the feasibility of incorporating PS into SA to develop a more efficient stochastic optimization approach at such time as the variables are constant.
5. The department chairman told the research assistant that she needed to perform the simulations in the event that the experiment fails.

6. Deterioration is set to a constant fraction of the stock level, which implies that shortages are not permitted and the demand rate is assumed to decrease exponentially.
7. When a machine is assigned to a manufacturing cell, it attempts to reduce the total cost.
8. The posterior objective concentrates on balancing intracell and intercell machine loadings, which allows us to formulate the cell formation problem as follows.
9. Factors C, D, F, G and H significantly affect the response average. This indicates that F can be adjusted based on the target value.
10. You should maintain a constant cutting speed even though the effective diameter of the cutting changes during machining.

Exercise 12A

Correct the following sentences using the copyediting marks on page 1.

1. It is a fact that engineers select an appropriate variable and the transformed observations are treated as though they are normally distributed with a constant variance.
2. Those methods neither require previous knowledge of how the variables are distributed nor are the censored data stipulated to be available.
3. The procedure for analyzing singly censored data in a replicated experiment is as follows:

Step 1: Distinguish the experimental results as the uncensored (complete) data and the censored (incomplete) data.

Step 2: The relationship between the two values must be found by performing regression analysis.

Step 3: Estimate the two variables.

Step 4: The estimated censored data must be ranked.

Step 5: Find the regression models for response average and standard deviation for each trial.

Step 6: The factors that significantly affect the response average and standard deviation must be identified.

Step 7: The optimal factor/level combination must be determined.

4. The derived model provides an extension of an earlier concept [1] and helping industrial managers in determining a feasible number of replenishments.
5. Experimental design is used in this method to arrange the design parameters and noise factors in the orthogonal arrays and computing the signal-to-noise (SN) ratio based on the quality loss for each experimental combination.

Exercise 16A

Correct the following sentences using the copyediting marks on page 1.

1. To succeed in the laboratory, diligence is essential due to the fact that many experiments are necessary.
2. Before submitting a graduate school application, the institution should be selected.
3. Pressing the start button, the machine turned on.
4. While simulating the environment, the outcome yielded some surprising results.
5. The program contains the proposed itinerary that was implemented yesterday.
6. The container held by the experimenter with many leaks must be replaced.

7. To select the levels of the design parameter, the effects of the noise factors must be minimized.
8. Analyzing the SN ratios, the optimal settings can be determined.
9. When taking an examination, the questions should be answered as thoroughly as possible.
10. To excel in academics, determination is necessary.
11. While conducting an experiment, the timer went off and Jeff took the sample from the oven.
12. Taking into account all of the circumstances, the decision on how to deal with the issue was reached by the academic committee.

Exercise 20A

Correct the following sentences using the copyediting marks on page 1.

1. Our algorithm is more accurate with respect to computational time.
2. The chemistry department cooperates with local industry more than their department.
3. The novel material is as strong, if not stronger than, available ones.
4. The research department's productivity is higher than the administrative division.
5. The two step-procedure assumes that the sample standard deviation is proportional the sample mean.
6. The novel material described herein has a higher withstanding temperature.

7. The university stresses discipline more than the institute.
8. The peak is as high, if not higher than, other ones.
9. The form of the fitting function should be defined in advance adopt the regression method effectively.
10. The trade school's dropout rate is lower than the university.
11. Temperature more significantly affects the product's shape.
12. Our laboratory manager emphasizes punctuality more than our division director.

Exercise 24 A

Correct the following sentences using the copyediting marks on page 1.

1. When a student is preparing for an examination, you should get plenty of rest before the test despite the fact that intelligence plays a major role.
2. The graduate student recorded the data and then writes a summary report.
3. Turn on the machine if conditions are such that a hazard might occur and the valve should be closed.
4. It is noted that the academic advisor asked the graduate student if the paper was completed and is it ready to send to the journal for review.
5. It is interesting that the laboratory manager arranged the meeting and the discussion was led by him.

6. It is possible that the researcher completes the experiment when you can not obtain any more valid results.
7. The architect gives each program its separate address space and, in doing so, prevented an error that causes one program to fail from interfering with other programs running concurrently.
8. The consumer realizes that the trackball is the ideal choice to make when they purchase a user interface of this type.
9. Execute the necessary commands provided that they are valid and the program should be reviewed.
10. The manager instructed the employees to arrange the final details and also is the final program ready to print.
11. The speaker commented on the importance of participating in international events and then the meeting was adjourned by him.

Exercise 27A

Correct the following sentences by using the copyediting marks on page 1.

1. Modification of environmental technologies transferred from abroad for the local industrial sector is performed by the research institute.
2. Accurate prediction of the boundary parameters by mathematicians is of heavy emphasis.
3. An outline of how to install the software program is made in the following section.
4. A more thorough description of the environmental impact on the ozone layer was made by Smith (1985).
5. Contributing factors to rainforest depletion include overpopulation.
6. Awareness of external factors that contribute to industrial pollution must be known by the urban planner.

7. No significant variation between the two temperatures occurred.
8. It is impossible to forecast all potential workplace hazards.
9. There is no need for the assessment of the production capacity of the factory floor to be undertaken by the foreman.
10. Carpooling can be arranged by means of a designated driver if conditions are such that commuters to the same workplace live in close proximity to each other.
11. A definite decision about future plans should not be made until a major breakthrough in product development occurs.
12. It is well known that telecommunications technologies happen to be expanding rapidly for the purpose of satisfying the growing consumer demand.

英文備忘錄

有效撰寫工程英文備忘錄—調查性與建議性報告

柯泰德

簡介

工作備忘錄是台灣工程師和國外相對合作對象溝通的必須文件，本文章描述二種常見的工作備忘錄：調查性報告及建議性報告。調查性報告分析必須解決的工程問題，建議性報告則概述目標，方法論及預期的結果。

1. 調查性報告

調查性報告告知讀者特定工程問題的背景及合乎邏輯的需求回應 主要寫作論點:

A. 簡介:您的機構跟這個主題的相關程度多大？

範例 i.

During our most recent board meeting, engineers expressed concern over slope mitigation in civil engineering projects. More specifically, the inability of slope stability analyses to determine the actual degree of saturation of soil slope during dry and wet seasons.

在我們最近的董事會裡，工程師對土木工程建設的道路邊坡防塌工作表示關切。特別是無法用邊坡穩定性分析來決定乾燥季節和潮濕季節時實際的土壤邊坡飽和度。

範例 ii.

At a recent CEC meeting, members discussed contractual disputes in the construction industry.

在最近的 CEC 會議裡，成員對營建業的契約爭議進行討論。

範例 iii.

In our working group meeting last week, we discussed the limitations of linear analysis and other methods in enhancing the performance of building structures

to withstand the seismic force of earthquakes.

在我們上週的工作小組會議裡，我們針對提升大樓結構表現以強化地震強度承受力方面，討論線性分析和其他方法的限制。

B. 目前的工程界情勢: 工程問題後的工業背景

範例 i.

Slope mitigation efforts in many countries, including Taiwan, have focused on rainfall induced, shallow type landslides of lateritic soil.

許多國家，包括台灣，對道路邊坡防塌工作均著重在降雨引起的紅土土石流。

範例 ii.

As is well known, inflated steel costs in Taiwan over the past two years have increased construction costs and lowered industrial profits.

如同大家相當明白的，台灣過去二年來鋼的價格暴漲，使得營建成本增加、業界利潤降低。

範例 iii.

Structural damage incurred by earthquakes poses more than safety risks and expensive building repairs. Structural damage can severely disrupt the local economic infrastructure, emergency relief responses and reconstruction operations. Although an earthquake can not be prevented, its destructive impact can be mitigated by establishing stringent building codes and specifications. Earthquake resistant design must thus produce a structure that can resist a certain level of ground tremors without incurring excessive damage.

地震引起的結構損壞，造成的不僅僅是安全風險和昂貴的大樓修繕工作。結構的損壞會嚴重危及地區的經濟基礎建設、緊急救濟的反應和重建的行動。雖然地震無法避免，但可藉由訂定嚴格的建築法規和規格來減輕地震破壞的影響。

工程問題: 您的機構要解決什麼樣的問題?

範例 i.

Although saturated soil mechanics is conventionally adopted to analyze slope stability, many slopes remain unsaturated during ordinary weather and stormy conditions.

雖然依慣例用飽和土壤力學分析道路邊坡的穩定性，但許多道路邊坡在一般天候和暴風雨環境下呈不飽和狀態。

範例 ii.

Subsequent delays in steel bridge construction projects have made it impossible for the CEC to accurately forecast the launching of a project, posing a high risk to new construction efforts.

鋼橋營造工程數度延期，使 CEC 無法正確預測工程的開始，對新的營建工作形成高風險。

範例 iii.

Analysis and design methods, codes and specifications have been continuously developed to enhance the performance of structures against seismic force. Many structures were thus designed and constructed when either structural codes lacked seismic design provisions or these structures may incur severe earthquake damage. Linearly elastic procedures are sufficient as long as the structure behaves within elastic limits.

分析與設計方法、法規和規格均持續發展，以期加強結構抗震強度能力的表現。當結構法規缺少地震設計規定或結構可能蒙受嚴重地震損害時，便因此設計和建造了許多的結構。只要結構在彈性限制內表現良好，線性彈性程序即已足夠。

問題的嚴重性:這個問題影響到您機構的程度有多深?

範例 i

For instance, conventionally adopted saturated soil mechanics procedures are limited in slope analyses owing to the inability to explain why the slope

remains stable under a sharp slope angle during the dry season and the failure time of the slope during stormy conditions can be accurately predicted.

例如，照慣例使用的飽和土壤力學程序在道路邊坡的分析上有所限制，因為無法解釋為什麼斜坡角度陡峭的邊坡在乾燥季節可維持穩定，而在暴風雨環境下邊坡的失敗時間可以正確預測。

範例 ii.

Previously, the CEC authorized a contractor to undertake a steel bridge project, which the owner subsequently rejected. The owner claimed that the contractor made a breach of contract and insisted on confiscating the performance bond of the steel bridge project, compensating for the difference in the re-bidding fee and publicizing this transgression in a government procurement bulletin to prevent CEC from bidding on public projects for a year. The Public Construction Commission of the Executive Yuan served as a mediator to settle the dispute to avert pending litigation.

之前，CEC 授權包商進行鋼橋工程，而業主隨後予以拒絕。業主聲稱包商違約，堅持沒收鋼橋工程的履約保證金、賠償重新招標費用的差額，並應在政府採購公報上公佈該項違約情事以使 CEC 不得參與公共建設招標一年。對此項爭議，行政院公共建設委員會居中調解，以避免訴諸法律。

範例 iii.

For structures responding beyond elastic limits, linear analyses may indicate the location of first yielding, but cannot accurately predict failure mechanisms and account for redistribution of forces during progressive yielding.

對於反應超出彈性限制的結構，線性分析可指出首次彎曲的位置，但在逐漸彎曲的過程中，對於力的重新分配，卻無法正確地預測失敗的機制和原因。

問題的牽涉性:這個沒有解決的問題會如何影響到您的機構及工程業界其他人?

範例 i

The inability of slope stability analyses to determine the actual degree of saturation of soil slope during dry and wet seasons makes it impossible to

incorporate unsaturated soil in order to simulate the soil slope mechanism.

道路邊坡穩定性分析無法決定乾燥季節和潮濕季節時的正確土壤邊坡飽和度，因此便無法結合非飽和土壤來模擬土壤邊坡結構。

範例 ii.

The inability to adopt a standard means of resolving contractual disputes will adversely impact progress in Taiwan's construction engineering sector.

無法用標準方式解決合約爭議，對台灣營造工程發展會有不利影響。

範例 iii.

Such a limitation makes it impossible for the above procedures to adequately perform assessment and retrofitting evaluation for these structures.

這項限制使得不可能用以上程序為這些結構適當進行評估和改良評定。

F. 工程需求:要如何進行來解決這個工程問題?

範例 i.

Therefore, rainfall induced shallow type landslides in Taiwan must be investigated by adopting the theory of unsaturated soil mechanics.

因此，必須用非飽和土壤力學的理論來研究台灣降雨引起的土石流。

範例 ii.

A mediation method must therefore be developed to enable the CEC to resolve contractual disputes in the construction industry.

因此必須發展可使 CEC 解決營造業合約爭議的調解方法。

範例 iii.

Nonlinear (static and dynamic) procedures can overcome this problem and display the performance level of the structures under any loading level.

非線性(靜止和動力)的程序可以克服這個問題，並可在任何承載水準下呈現結構的表現水準。

建議性報告

2. 建議性報告告知讀者工程目標、方法論及預期的結果，以求解決特定的工程問題。

A. 問題的總論：該解決的工程問題是什麼？

範例 i.

In our recent working group, members raised the concern that public venues such as auditoriums, theaters, shopping malls and subway stations that have large capacity space often lack proper ventilation and adequate energy efficiency.

在我們最近的工作小組中，成員對禮堂、戲院、購物中心、地鐵站等具廣大容納空間的公共場所大多缺乏良好通風和適當能量效率的情況表示關切。

範例 ii.

Given the frequency of foreign occupation in Taiwan's history, such occupations were characterized by demolishing older civil construction facilities and reconstructing those structures with new designs to exemplify their influence over Taiwan, as is still evident in many existing structures.

由於台灣過去屢受外國佔據，古老的民間建築典型地均會在佔據期間遭到摧毀，以新式設計的結構重建，以彰顯該國對台灣的影響，目前許多現有的結構均足以證明。

範例 iii.

Although environmentally induced vibration can be eliminated to lower the percentage of product defects and increase the accuracy of high precision instruments by either reducing the intensity of the energy source energy or isolating the transmitting path, however, uncertain or incomplete dynamic characteristics, e.g., vibration time-dependent behavior and structural interaction, often lead to error in engineering judgment.

雖然可藉由降低動能來源能量的強度或隔離傳輸路徑來消除對環境造成的震動，以降低產品瑕疵的比例及提高精密儀器的準確性，然而，不確定或不完整的動力特性，例如，震動時間的附屬行為和結構的相互影響，通常會導致工程判斷上的錯誤。

B. 建議：您的機構對解決問題有何提議？

範例 i.

Therefore, we recommend developing an economically efficient ventilation system, capable of monitoring air circulation requirements in relation the number of highly mobile individuals in a public space.

因此，我們建議發展具經濟效益的通風系統，可監測公共空間內高流動量人群在空氣流通上的必備條件。

範例 ii.

Therefore, based on historical data accumulated from the civil engineering industry in Taiwan and subsequent analysis, we recommend developing an Internet-based platform to distribute information freely and facilitate future information exchanges.

因此，根據從台灣土木工程業彙集的歷史資料和隨後的分析，我們建議發展網路平台，以自由散佈資訊，促進未來資訊交流。

範例 iii.

Therefore, we recommend devising an artificial neural network-based analysis method capable of assessing the exact vibration properties to determine accurately the reliability of a control system.

因此，我們建議設計可評估實際震動特性的人工神經網路分析法，以正確決定管制系統的可靠性。

C. 方法論: 您的機構計劃如何實行這個目標?

範例 i.

Environmental data acquired by a sensor array system can be analyzed using an artificial neural network (ANN) system. In the ANN algorithm procedures, the control system can then be trained to adjust the parameters based on the analysis results. In particular, the sensors can survey the ambient temperature in real time and feedback that data to the ANN system for assessment.

可使用類神經網路(ANN)系統分析感應器列陣系統取得的環境資料。在 ANN 演繹程序中，可使控制系統根據分析結果以調整參數。特別是感應器亦可勘測周遭的即時溫度，將資料回傳 ANN 系統以供評估。

範例 ii.

Civil engineering-related information in various forms can be accumulated, including hand writing, sketches, original documents, photocopied material, microfilm, digital files or even oral history audio transcripts. An efficient method to accumulate such

materials can also be devised to avoid inefficiency or redundant and conflicting data. The civil engineering data can then be analyzed systematically by performing smaller pilot trials, followed by analysis of large amounts of data once reliability of the analysis approach is verified. Next, an Internet-based platform incorporating this data can be constructed using advanced data mining and artificial intelligent technologies.

可以彙集各類型的土木工程相關資訊，包括書面、草圖、原始文件、影印的材料、微縮影片、數位檔案或甚至是口述歷史抄本。也可設計彙集此類材料的有效方法，以避免效率不彰或累贅或矛盾的資料。分析大量資料後，便可進行小型試驗，一旦分析法的可靠性獲得驗證，即可有系統地分析土木工程資料。接下去便可使用進階資料探勘和人工智慧技術建立結合此類資料的網路平台。

範例 iii.

Dynamic data can be surveyed precisely using the most appropriate sensitive sensors. The frequency domain can then be calculated via a statistical software program. Next, the ruling output can be determined using the artificial logical algorithm. Finally, the adaptive outcome can be implemented and improved via a neural network.

可使用最合適的高靈敏度感應器確實檢視動力資料。然後以統計軟體程式計算頻率範圍。隨後利用人工邏輯演算法決定主要的輸出信息。最後經由神經網路執行及改善適應的結果。

D. 預期的結果: 達成目標的立即利益為何?

範例 i.

The proposed ANN system with a sensor array can automatically control the air ventilation system, in which operational efficiency is ensured with the automatic data feedback procedure.

所建議的 ANN 系統具感應器列陣，可自動控制通風系統，資料自動回傳程序則可確保通風系統的實行效率。

範例 ii.

The proposed Internet-based platform can orient practitioners and academics on the progression of civil engineering in Taiwan since such a data source was previously unavailable. The proposed platform operates on a uniform standard created for analyzing pertinent civil engineering data. Additionally, various data mining approaches incorporated in the proposed platform makes the data more reliable and acquired efficiently. Moreover, the proposed system can conveniently disseminate information to the public via Internet access, thus facilitating data mining, analysis, distribution,

information exchanges and a valuable reference for future undertakings. While continuously updated with the latest civil engineering developments, the proposed system can provide a valuable framework for future practitioners and academics, thus bridging the gap between recorded data and its practical implications for future engineering efforts.

所建議的網路平台可將參與者和學者引領至台灣土木工程進展的方位，而此類的資料來源過去是不存在的。所建議的平台以制式標準運作，該標準是爲了分析適當的土木工程資料而建立。此外，所建議的平台結合了各種資料探勘法，使資料更可靠，更有效取得。再者，所建議的系統可方便透過網路存取向大眾散布資訊，因此便可加速資料探勘、分析、散布、資訊交流和對未來工作任務的參考價值。持續更新最新土木工程發展的同時，所建議的系統亦可爲參與者和學者提供有價值的架構，替未來工程成果建立起記錄資料和實務執行之間的橋樑。

範例 iii.

The proposed artificial neural network-based analysis method can reduce much of the time and error associated with vibration solutions.

所建議的人工神經網路分析法可節省許多時間並減少與解決震動有關的錯誤。

E. 全面性的貢獻: 達成目標後會對工程界其他人造成何種利益?

範例 i.

In addition to contributing to research on smart design architecture technology, the proposed system can minimize the time in which the ventilation system responds to changes in a defined public space, enabling engineers to further enhance ventilation design.

除了對精明設計建築技術的研究有貢獻之外，所建議的系統亦可將通風系統回應特定公共空間內變化的時間減至最少，使工程師可進一步地提升通風設計。

範例 ii.

By integrating the expertise of civil engineers and IT professionals, the proposed platform attests to the ability of modern technologies to comply with the need to create a practical context for data accumulated over many years in the civil engineering profession.

藉由整合土木工程師和 IT 專業人員的專業知識，所建議的平台證明了現代技術有能力達成建立一個可彙集多年土木工程專業資

料的實務環境的需求。

範例 iii.

Importantly, the proposed model can provide a valuable reference for researchers involved with vibration-related topics and also allow engineers to make decisions easily and efficiently.

重要的是，所建議的模型可為進行震動相關主題的研究者提供有價值的參考資料，並可讓工程師不費力、有效地作出決定。

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有效撰寫工程英文備忘錄—非正式實用工程技術報告
柯泰德

簡介

工作備忘錄是台灣工程師和國外相對合作對象溝通的必須文件， 本文章描述常見的工作備忘錄：非正式實用工程技術報告。 有效的工程技術報告提供精確的訊息以供決策的制定。內容包括工作備忘錄裡的資料解讀，工程方案評估，結論及建議的形成。工程技術報告同時告知影響機構的情勢，例如顧客的偏好及目前可得的市場。成功的工程技術報告隨同台灣土木工程方案的案例也一併提供。

強有力的工程技術報告包括以下要素：

- a. 簡要的描述工程方案所關心的事項。經由一個句子描述工程機構對影響目標工業或客戶有關事項的關心程度。

範例 i.

Our project addressed the prohibitively high cost of pipe jacking and horizontal directional drilling in construction technology owing to the inability to accurately forecast related estimates.

我們的計畫說明推進工法和水平鑽掘工法等營建技術因無法正確預測相關估計值故而成本過高。

範例 ii.

Our recent effort addressed contaminants that pollute the aquifer, making it impossible to drink water from groundwater sources for several years.

我們最近的成果說明污染含水土層的污染物，使得地下水數年內無法飲用。

範例 iii.

Our group has thoroughly explored the difficulty of assessing properties of vibration that often incur product defects during manufacturing.

我們的小組針對常在產品製造時導致瑕疵的震動，徹底探究評估震動特性時所發生的困難。

範例 iv.

Our recent study concerned the inadequate water reservoir supply in Taiwan, as

exacerbated by surging consumer demand and frequent droughts recently.

我們最近的研究與近來氣候乾旱、需水量激增，致使台灣水庫供水量漸趨不足有關。

範例 v.

Our engineering group discussed the inability of urban planners in Taipei to incorporate aesthetic quality into engineering design of public buildings, making the urban landscape bland and less comfortable to live.

我們的工程小組討論台北都市計劃者，在公共建築工程設計上未融合美學性質，而導致都市景觀貧乏、居住較侷促。

範例 vi.

Our engineering team has become increasingly concerned with significantly rising pile construction-related costs and project duration owing to the inability of the large-diameter bored pile, which forms the foundation of high-rise buildings, to provide sufficient bearing capacity and incorporate safety considerations.

作為高樓地基的大口徑鑽掘式基樁無法提供充分的承載力，亦無法涵蓋安全考量，我們的工程小組因而對高漲的基樁施工相關成本和工期甚為擔憂。

- b. 闡明特定部門或客戶所關心的工業環境：工程問題形成的工業環境背景描述。

範例 i.

Pipe jacking and horizontal drilling methods are adopted to comply with budgetary and time constraints in completing the Kaohsiung Meishan-Chochi 161 km Cable Line Project. Conventional constructs, e.g., the open excavation pipeline method, on urban roadways often require constant movement or scaffolding to protect the pipeline.

採用推進工法和水平鑽掘工法，符合高雄 Meishan-Chochi 161 公里電纜線路工程的完工預算和時間限制。都市道路的傳統構想，例如：露天開挖管線法，均須不斷移動或搭建鷹架以保護管線。

範例 ii.

Groundwater usage in Taiwan is increasing at an accelerated rate, 台灣使用地下水的比例極速攀升，

範例 iii.

Environmentally induced vibration increases the percentage of product defects, makes high precision instrument inaccurate or inoperable and raises concerns from the nearby general population. In practice, vibration can be eliminated through either reducing the intensity of the energy source energy or isolating the transmitting path.

環境產生的震動提高瑕疵產品的百分比，使得高精密儀器失去精準或無法使用，亦引起鄰近民眾的不安。實際上，震動可藉由降低能量源強度或孤立傳導途徑來排除。

範例 iv.

Demands on the water supply in Taiwan have skyrocketed owing to the island's increasing population and elevated living standards.

台灣人口增加、生活水準提升，使得台灣供水量的需求激增。

範例 v.

Responsible for 80-90% of all public construction projects, construction companies and engineering consultancy firms lack personnel with art-related backgrounds, explaining the absence of an aesthetic quality in project design.

負責 80-90% 公共建設計畫的營造公司和工程顧問公司，因缺少具備藝術背景的员工，所以說明了工程設計缺乏美學性質的原因。

範例 vi.

High-rise buildings in China and Taiwan in recent years have increasingly applied a bored pile with a diameter up to 2-25 meters as the construction foundation.

中國和台灣近年的高樓逐漸採用 2-25 米口徑的鑽掘式基樁作為建物地基。

c. 介紹工程問題：工程問題的本質和對與其相關的特定部門或客戶的負面影響。

範例 i.

Completion time of a pipeline project is thus extremely difficult to estimate when constant movement or scaffolding is involved.

因管線工程牽涉到持續移動或搭建鷹架時，故完工時間便極難預估。

範例 ii.

leading to a growing incidence of groundwater pollution in major groundwater

supply regions in Taiwan, such as the Ping-tung Plain.

導致台灣主要地下水供應區發生愈來愈多的地下水污染，例如：屏東平原。

範例 iii.

However, uncertain or incomplete dynamic characteristics, e.g., vibration time-dependent behavior and structural interaction, often lead to error in engineering judgment.

然而，不確定或不完整的動力特性，例如：震動時間附屬行為和結構互時常導致在工程上判斷錯誤。

範例 iv.

Eventually, the current reservoir supply will be insufficient if current personal and industrial demand persists.

如果維持目前的個人和工業需求，以目前水庫供水量而言最後將無法負荷。

範例 v.

The lack of such design considerations can prevent a city from emitting a unique landscape or image. As most engineers are concerned mainly with construction analysis-related issues, the aesthetic quality of engineering design is not of priority concern.

缺少此類的設計考量，會使城市呈現不出獨特的景觀與形象。由於多數工程師所關心的主要是建築分析的相關問題，工程設計的美學性質並非優先考慮的對象。

範例 vi.

However, empirical analysis methods and conventional construction procedures cannot effectively determine the required bearing capacity of large-diameter bored piles designed. According to *in-situ* pile load test results from various sites in China and Taiwan, the actual bearing capacity of the bored pile only reaches 60-80% of the design value.

然而，經驗分析法和傳統建築程序均無法有效確定所設計的大口徑鑽掘式基樁所需的承載力。根據中國和台灣各個場地進行原地基樁載重試驗的結果，鑽掘式基樁的實際承載力僅達到設計值的 60-80%。

- d. 介紹工程方案的目標：工程機構對以上問題最合理的回應

範例 i.

Therefore, we developed a construction design method that adopts pipe jacking and horizontal directional drilling to avoid a time delay in the project schedule.

因此，我們發展出使用推進工法和水平鑽掘工法的營建設計法，以避免工程進度在時間上的延誤。

範例 ii.

Therefore, we developed a deterministic and stochastic model for simulating groundwater flow can be developed to assess monitoring network alternatives.

因此，我們發展出決定隨機法，便可以發展模擬地下水流，藉以評估監測網路替代法。

範例 iii.

Therefore, we developed an artificial neural network-based analysis method capable of assessing the exact vibration properties to determine accurately the reliability of a control system.

因此，我們發展出可以精確評估震動特性的類神經網路分析法，以正確決定管制系統的可靠性。

範例 iv.

Therefore, our research group developed a novel groundwater numerical model capable of analyzing the position and the quantities of optimal monitor wells in Choshuichi River Fan.

因此，我們的研究小組發展出可分析 Choshuichi River Fan 最理想的監測井位置及數量的新地下水數值法。

範例 v.

Therefore, we launched a project to incorporate additional aesthetic planning in public construction projects in order to revitalize the city landscape and instill in residents an appreciation of art.

因此，我們著手進行在公共建設計畫納入美學企劃的計畫，以創造有生命力的城市景觀及灌輸居民對藝術的鑑賞力。

範例 vi.

Therefore, we developed a performance-based method capable of determining the *in situ* load on a full-scale bored pile.

因此，我們發展出可以決定原尺寸鑽掘式基樁的原地載重量的效能法。

e. 工程方案方法論的細節描述：精確的方案步驟描述。

範例 i.

A vertical shaft was constructed in a nearby underground obstacle. A hole was then drilled that enables engineers to pass through the underground obstacle via the vertical shaft. Finally, an electric cable was constructed and placed in the hole.

在附近地底障礙物處來建築立井，然後鑽洞使工程師由立井通過地底障

礙物，最後建築電纜置於洞內。

範例 ii.

The conceptual model of groundwater flow for a particular site was constructed. The conceptual model was then transformed into a deterministic numerical model using MODFLOW. Additionally, a stochastic numerical model was developed by linking the Kalman filter to the system and observation equations of the deterministic numerical model.

建立特定場所地下水流概念模型，然後用 MODFLOW 將概念模型轉為決定性數值模型，同時將卡爾曼濾波器連結至決定性數值模型的系統和觀測方程式以發展隨機數值模型。

範例 iii.

Dynamic data were surveyed precisely using the most appropriate sensitive sensors. The frequency domain was then calculated via a statistical software program. Next, the ruling output was determined using the artificial logical algorithm. Finally, the adaptive outcome was implemented and improved via a neural network.

使用最適當的高靈敏度感應器精確測量動力資料，然後使用統計軟體程式計算頻率範圍，再用人工邏輯演算法決定主要結果，最後用神經網路執行及改良適合的成果。

範例 iv.

Geo-hydrological layers of existing and newly set wells were analyzed, along with a numerical model developed as well. Setting parameters were then estimated from the covariance of regional variables. Next, 3D groundwater numerical simulation was performed to verify the geo-hydrological analysis and confirm the aquifer's position. Moreover, with the geo-statistical method, the layered structure was analyzed by the results of the groundwater numerical model. Finally, the statistical optimal monitoring design is determined by variance reduction analysis.

除了發展數值模型之外，分析現有及新設井的地下水地層，然後從地區變項協方差估算設置參數，隨後再執行 3D 地下水數值模擬以證實地下水分析及確認含水土層的位置。此外，用土地統計法以地下水數值模型的結果分析地層結構。最後用降低變異數分析決定統計上最理想的監測設計。

範例 v.

An exploratory landscape group governing public construction projects was established, whose members have art-related backgrounds. Those members were allowed to decide how to incorporate an aesthetic quality in public construction projects. Next, design and construction could be undertaken by incorporating the group recommendations. Additionally, the group can function in an advisory role for public construction projects to clearly plan out the landscape setting.

成立成員均具備藝術相關背景的景觀勘查小組管理公共建設計畫。允許成員決定如何將美學性質融入公共建設計畫。結合小組的建議後即可著手進行設計與建造。此外，小組在公共建設計畫中亦可擔任諮詢的角

色，明確地為景觀設置做好準備。

範例 vi.

Instrumentation was installed on the pile head and embedded within the pile shaft at various depths. The displacement with respect to the load applied on the pile top was then monitored. Next, the skin friction associated with the displacement of a pile shaft at various depths under loading was derived. Additionally, exactly how end-bearing capacity and the corresponding pile tip settlement are related was evaluated, thus elucidating the bearing behavior for the large-diameter bored pile. Finally, the bearing capacity of bored piles with various dimensions was accurately estimated, along with appropriate construction procedures for the bored pile evaluated as well.

將測試設備安裝於樁頭，以不同深度嵌進樁身，然後監測樁頂的負載量位移，得出承載下不同深度樁身位移的表面摩擦力。同時確實評估點承力和所對應的樁端設置之間的關連，據此說明大口徑鑽掘式基樁的承壓行為。最後正確估計出不同尺寸的鑽掘式基樁的承載力，並評估鑽掘式基樁適當的建造程序。

f. 工程方案主要成果總結：工程方案對特定部門或客戶立即的利益。

範例 i.

Experimental results indicated that the proposed construction design method can pass through the underground obstacle, eliminating the need to move the pipeline.

實驗結果顯示所提議的管建設計法可通過地底障礙物，無須移動管線。

範例 ii.

Simulation results demonstrated that the proposed stochastic model can provide further insight into the uncertainty of the estimation error of this model by adopting different groundwater monitoring network alternatives.

模擬結果證明所提議的隨機模型使用不同的地下水監測網路替代法，對模型估計錯誤的不確定性提供進一步的深入了解。

範例 iii.

Analysis results confirmed that the proposed artificial neural network-based analysis method can reduce much of the time and error associated with vibration solutions.

分析結果證實所提議的類神經網路分析法可減少與震動減緩方案有關的錯誤和時間。

範例 iv.

Simulation results indicated that the proposed model can accurately estimate the new sitting wells precisely. Those estimates can be used not only to design efficiently a ground water network, but also to enable decision makers to identify optimal positions.

模擬結果顯示所提議的模型可精確估計新設井。估計的結果不僅可用於地下水網路的有效設計，亦可使決策者辨識出最理想的位置。

範例 v.

The proposed exploratory landscape group can reduce concerns of incompatibility between landscape setting and city construction by integrating an aesthetic quality in urban planning.

所提議的景觀勘查小組令都市計劃結合美學性質，可減少對景觀設置和城市建築間不協調的憂慮。

範例 vi.

The proposed performance-based method can determine the bearing capacity of larger-diameter bored piles more precisely than the conventional empirical methods do.

所提議的效能法比傳統經驗法更能精確決定大口徑鑽掘式基樁的承載力。

- g. 工程方案對特定部門或領域的全面貢獻：研究結果和所提方法對工程機構以外更廣大讀者的牽涉。

範例 i.

Importantly, the proposed method can provide a valuable reference for governmental authorities or construction companies when dealing with underground obstacles.

重要的是，所提議的方法可為政府機關或營造公司處理地底障礙物時提供有價值的參考。

範例 ii.

The proposed model can minimize the costs of constructing a monitoring network by assessing monitoring network alternatives. The results of this study can be used to construct a real-time groundwater flow model for supporting the conjunctive use of water resources by combining the stochastic model and real-time groundwater level measurements.

所提議的模型對監測網路替代法進行評估，可將建造監測網路的成本減至最低。此項研究結果可用以建立即時地下水流模型，藉由隨機模型和即時地下水水位測量值的結合，支持水資源的聯合運用。

範例 iii.

Importantly, the proposed model can provide a valuable reference for researchers involved with vibration-related topics and also allow engineers to make decisions easily and efficiently.

重要的是，所提議的模型可為震動相關主題研究者提供有價值

的參考，亦可使工程師輕易、有效地作出決策。

範例 iv.

In addition to minimizing the tolerable errors, the proposed model can reduce the number of monitoring wells.

除了將可容忍的錯誤減至最低外，所提議的模型亦可減少監測井的數目。

範例 v.

Above measures can significantly improve the urban landscape and instill in residents an appreciation of art.

以上方式可顯著改善都市景觀及灌輸居民對藝術的鑑賞力。

範例 vi.

The proposed method based on the *in situ* performance can verify the bearing capacity of a large-diameter bored pile, thus ensuring the safety and stability of high-rise buildings erecting in China and Taiwan, as well as enabling the construction firm to efficiently control budgetary and project schedule constraints.

基於原地效能所提出的方法，可驗證大口徑鑽掘式基樁的承載力。因此可確保中國和台灣高樓建築的安全與穩定，亦可使營造公司有效控制預算和工程進度。

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簡介

工作備忘錄是台灣工程師和國外相對合作對象溝通的必須文件，本文章描述二種常見的工作備忘錄：非正式實用工程技術報告。為了使工程類的讀者採行計劃或策略，您需遵循以下步驟：首先引起讀者注意，再者建立讀者對計劃、策略或服務的需求，展示計劃、策略或服務的可行性，引導讀者預想計劃、策略或服務實行後的成果，最後採取特定行動。台灣土木工程案例在此也一併提供。

- A. 引起讀者注意：描述一個事實或情勢跟工程類的讀者所關心的特定情勢做連結。

範例 i.

With the upcoming Asia-Pacific Economic Cooperation (APEC) Meeting to be held in Bandung, i.e., the provincial capital of West Java, in May 2007, the Indonesian government must construct a convenient and rapid freeway connecting Jakarta and Bandung.

為了因應 2007 年 5 月即將在西爪哇省會班頓舉行的亞太經濟合作(APEC)會議，印尼政府必須建造一條便利的高速公路連結雅加達和班頓。

範例 ii.

While damaging rail tracks and raising public concern, railway vibration not only lowers the quality of residential living, but also requires continuous maintenance and structural replacements, leading to larger structural damage if left unattended.

除了造成鐵軌損壞、引起民眾不安之外，鐵路震動不僅會降低居住品質，也需要進行持續的維修和結構的更換，若置之不理，將導致更大的結構損壞。

範例 iii.

The green house effect, accelerated industrial growth and strong consumer demand as exacerbated by elevated living standards, account for insufficient power supply during the summer.

溫室效應、工業快速成長及因生活水準提高而加劇的消費者龐大需求，是夏季電力供應不足的主因。

範例 iv.

Decision-making environments are increasingly complex such as in selecting the

most appropriate construction site location for a civil engineering project. For instance, selecting the criteria for developing a decision evaluation model is extremely difficult. While the inclusion of too few criteria in the evaluation model leads to incomplete results, too many makes the model too complex and difficult to evaluate.

決策狀況日益複雜—例如：選擇土木工程計畫最適當的營建場地位置。譬如說，選擇用以發展決策評估模型的準則就十分困難。評估模型包含的準則太少，所得結果便不完整，準則太多，模型就變得太複雜、太難作評估。

範例 v.

Although the number of post-secondary educational institutions in Taiwan has more than doubled since the early 1990s, the academic competence of students has rapidly declined. Whether the cause for such a decline is owing to less intelligent and diligent students than previously or the steady increase in educational institutions remains unclear.

雖然台灣中級學校以上大學院校的數目自 1990 年代初期起呈雙倍成長，但學生的學科能力卻大幅衰退。衰退的原因是因為學生不若以往聰明努力還是因為大學院校不斷增加，仍不得而知。

- B. 建立讀者對計劃、策略或服務的需求：描述工程問題和需求間的連帶關係，以及不解決問題的後果。

範例 i.

This undertaking will promote the country's image with respect to technical accomplishments. PT. Jasa Marga (Persero) (JM), an Indonesia governmental enterprise, won the bidding rights in 2005 to construct the Cikampek-Cipularang Freeway (CCF) that will connect the Jakarta-Bandun Freeways. Failure to complete construction of the CCF by the end of April 2007 will mean a lost opportunity during the APEC Meeting to showcase Indonesia's rise to the international stage. The most difficult aspect of the CCF project is the Cikubang Bridge, which is located in a mountainous region and will largely determine whether the CCF project is completed on time. However, construction of the Cikubang Bridge was delayed eight months because of tight budgetary constraints and poor construction management. With the project facing a twelve month deadline for completion, a new contractor must be assigned the task. However, the conventionally adopted construction model must be adjusted to comply with already tight scheduling delay constraints. The inability to make such an adjustments may deal a blow to Indonesia's image, reflecting the

ineptitude of governmental policy and a low confidence level among the general public.

此項任務將提升該國技術成就的形象。印尼政府企業 PT. Jasa Marga (Persero) (JM) 2005 年贏得興建 Cikampek-Cipularang 高速公路(CCF)的權利，該公路將連接雅加達至班頓的高速公路。若未能於 2007 年 4 月底前興建完成，就表示將在亞太經濟合作會議期間喪失在國際舞台展現印尼實力的機會。CCF 工程最困難的部份就是 Cikubang 橋，Cikubang 橋位於山區，是決定 CCF 是否能如期完工的絕大因素。然而 Cikubang 橋的興建卻因拮据的預算限制及不良的營建管理而延誤 8 個月。此項工程必須指派新的包商，面對完工期限為 12 個月的工程。然而，傳統使用的營建模型必須進行調整，以符合因延誤而吃緊的進度限制。若該項調整無法完成，可能使印尼的形象受到打擊，反映出政府政策的拙劣和民眾偏低的信心水準。

範例 ii.

To effectively address this concern, vibration behavior studies attempt to distinguish between energy resources, assess dynamic characteristics, analyze structural interaction and simulate emission effects. Such investigations must ensure that field instrumentation can monitor and determine wave propagation precisely. The inability to do so would lead to verification errors. For instance, a semiconductor wafer fab should adopt either the VC-D level in 48dB or VC-E level in 42 dB. Vibration that exceeds these restraints would increase the defective rate in production. Although the massive retain wall is assumed to be the most effective means of decreasing vibration, poor soil properties could exacerbate the confined wave magnitude as the overlapping effect occurs. An ambient vibration survey can clarify the dynamic properties of a structure, while an artificial neural network can analyze *in situ* soil interaction to derive a solution.

震動行為研究嘗試以區分能量來源、評估動力特性、分析結構互動和模擬放射效果來有效處理此項令人擔憂的問題。該研究必須確保實地儀器足以精確監測及決定波動，否則可能產生驗證錯誤。例如，半導體晶圓廠應是採用 48dB 的 VC-D 或 42dB 的 VC-E。震動超過該限制，將可能提高生產時的瑕疵比例。雖然厚重的擋土牆被認為是減緩震動最有效的辦法，但不良的土質卻可能在發生重疊效應時強化受限波幅。周遭震動的調查可闡明結構動力特性，類神經網路則可分析原地土壤互動，以得出解決辦法。

範例 iii.

While Taiwan relies on water, fossil fuels and nuclear power for its power supply, no adequate water source is available to establish a hydro power plant. As

evidence of their prohibitively high costs in operations, operating costs for fossil fuel power plants and nuclear power plants can run into the billions of dollars such as the No. 4 Nuclear Power Plant. The inability to devise a more economically means of preventing power shortages during summer will ultimately lower living standards and industrial revenues owing to frequent power lapses.

台灣的電力供應仰賴水、礦物燃料及核能，但卻無適當水源可興建水力發電廠。發電廠營運成本過高已有跡象，例如：核四廠，礦物燃料發電廠及核能發電廠的營運成本可高達數十億元。若無法擬出更經濟的方法防止夏季電力短缺，最後將會因停電頻繁而降低生活水準和工業營收。

範例 iv.

Conventional evaluation models are generally concerned only with economic factors and neglect factors that cannot be evaluated in money. However, large investment programs involve many intangible factors that cannot be valued, such as the satisfaction of related groups and potential environmental impact. In addition to an economic criterion, for example, when evaluating different construction site locations, many criteria are still applicable, such as the level of pollution emitted from the site and receptiveness of neighboring residents. Adopting the conventional models is likely to cause decision makers to select an inappropriate scheme. For governmental investment decisions, implementing an inappropriate scheme will have large social costs and waste resources.

傳統的評估模型一般僅關心經濟因素，而忽略無法用金錢衡量的因素。然而大型的投資計畫涉及許多無法予以評價的無形因素，例如：相關團體滿意度和潛在環境影響等。譬如說，評估不同的營建場地位置時，除經濟準則外，仍適用許多其他準則，例如：工地排放汙染的程度和附近居民的接受度等。採用傳統模型很可能使決策者選擇不適當的方案。在政府投資決定上，實施不適當的方案將造成龐大的社會成本及資源的浪費。

範例 v.

According to Taiwan's Ministry of Education (MOE), the acceptance rate for students taking the joint college and university entrance examination has increased from less than 50% in the early 1990s to nearly 90% in 2005. As is generally assumed, academic competence is bound to suffer with an increasing number of students accepted into Taiwanese educational institutions. For instance, many newly established schools accept high school graduates with barely passing academic marks, which would have been impossible only a few years ago in most average-level educational institutions. A widely held consensus among

academics regarding the decline in academic competency among junior college and university students is the MOE's progressive policies. Additionally, a decline in overall academic competence of students appears to have adversely impacted the quality of post-secondary education, ultimately eroding the national strength of Taiwan.

根據台灣教育部表示，大學入學考試的學生錄取率已從 1990 年代初期的 50% 增加到 2005 年幾乎達 90%。普遍認為，台灣大學院校招收學生人數逐漸增加，學生學科能力必將每況愈下。譬如說，許多新成立的學校竟錄取學業成績勉強及格的高中畢業生，這在幾年前對大多數排名中等的大學院校來說都是不可能的事。學者對於專科生和大學生學科能力低落普遍所持的共同意見，是教育部革新政策。此外，學生學科能力全面低落，似乎已對中等教育之後的品質產生不利的影響，最終必將侵蝕台灣的國力。

C. 展示計劃、策略或服務的可行性: 詳細描述完成計劃或策略目標的必須步驟。

範例 i.

To resolve the above dilemma, we have developed an efficient and timely construction model to compensate for scheduling delays. To do so, a modified construction model is considered from four aspects of the project: switching to a different contractor, revising structural design, altering construction approaches and adding equipment. For structural design of girders, continuous box type is changed to a simple supported beam type. In the construction method, an automatic slip-form system is implemented instead of a conventional form system for erecting twenty pier columns, i.e., over forty meters high and a girder by using the horizontal pushing method to replace the cantilever method. For piling work, at least three sets of boring rig must be added to the job site. Re-contracting a well-informed contractor is the most urgent task. Despite this responsibility, the informed contractor must have strong financial support and ample construction resources, e.g., experience with similar projects, abundant construction equipment and personnel, reliable construction management and the ability to reduce mobilization time.

為了解決以上難題，我們發展出一個有效、適時的營建模型來彌補延誤的進度。對此，修正的營建模型從工程的四個方向考量：更換不同的包商、修正結構設計、改變營建方法和增加設備。針對大樑的結構設計，將連續箱樑改為簡支樑。在此營建方法下，以自動滑動模板系統取代傳統模板系統來豎立 20 根墩柱，換言之，超過 40 公尺高，並以水平推力法取代懸臂工法建設大樑。針對打樁工程，工地必須至少增加 3 架鑽探機。最急迫的任務就是重新

發包給見多識廣的包商。儘管在此責任下，此名見多識廣的包商仍必須具備強大的財力和豐富的營建資源，例如：相似工程的經驗、豐富的營建設備和人員、可靠的營建管理和減少動員時間的能力。

範例 ii.

To satisfy this engineering need, we have developed an artificial neural network-based analysis method capable of assessing the exact vibration properties to determine accurately the reliability of a control system. Dynamic data are surveyed precisely using the most appropriate sensitive sensors. The frequency domain is then calculated via a statistical software program. Next, the ruling output can be determined using the artificial logical algorithm. Finally, the adaptive outcome is implemented and improved via a neural network.

爲了滿足此項工程的需求，我們發展出可確實評估震動特性的類神經網路分析法，以精確決定控制系統的可信賴性。使用最合適的高靈敏度感應器確實檢視動力資料。然後以統計軟體程式計算頻率範圍。隨後便利用人工邏輯演算法決定主要的輸出信息。最後藉由神經網路執行及改善適應的結果。

範例 iii.

To effectively address the above engineering need, we have devised a wind power strategy for increasing the power supply from a wind power plant that does not cause CO2 pollution, and operates economically. Based on this strategy, a wind power plant is established at a location with a strong wind current in Taiwan such as on the west coast or in the southern part of the island. An adequate wind source must be available to establish a wind power plant.

爲了有效滿足上述工程的需求，我們擬定風力策略，以增加既經濟又不會製造二氧化碳污染的風力發電廠的電力供應。根據此項策略，在台灣西部沿岸或南部等風勢強勁的地點建立風力發電廠，必然可利用適當的風力資源建立風力發電廠。

範例 iv.

Based on the above, we should develop an efficient evaluation model capable of selecting the optimum construction site locations among various alternatives. This model allows us to evaluate an appropriate number of criteria for cost and effectiveness. To do so, various construction site locations are selected by the model by cost effectiveness analysis. . Two methodologies of multiple attribute decision making (MADM), including the technique for order preference by similarity to ideal solution (TOPSIS) and the analytic hierarchy process (AHP), are then used to rank all candidate construction site locations from a complete

perspective.

根據以上所述，我們應發展可自眾多選項挑選最理想營建場地位置的有效評估模型。該模型可讓我們在成本和效力上評估出適當的準則數目。對此，可用該模型以成本效力分析選擇多處營建場地。然後使用理想解類似度偏好順序評估法(TOPSIS)和層級程序分析法(AHP)等二項多屬性決策(MADM)方法，以全面性的觀點展望，將所選的所有營建場地予以排列。

範例 v.

Therefore, MOE educational policy must be re-evaluated with the aim of scaling down the number of post-secondary educational institutions in line with the supply of academic personnel and demand for educational attainment. To effectively address this problem, we have devised an evaluation method capable of determining the increases in the number of university student enrollment in Taiwan over the past decade based on Ministry of Education (MOE) records. The minimum scores for the students admitted by the Colleges of Science, Engineering and Liberal Arts at some prestigious universities during this period can be tabulated for comparison. To do so, statistical models are established using the above data, along with the annual change in the number of universities, students admitted and minimum acceptance scores.

因此，應以縮減中級以上學校數目以符教師人數和學識需求的目的，重新評估教育部的教育政策。為了有效處理此項問題，我們擬出可根據教育部紀錄決定台灣過去十年來所增加的大學生註冊人數的評估方法。一些頂尖大學的理、工、文學院在該期間內所錄取的學生的最低分數亦可列表比較。對此，使用以上資料及大學、錄取學生和最低錄取成績的每年變動數建立統計模型。

- D. 引導讀者預想計劃、策略或服務實行後的成果：強調採行該計劃或策略後立即和長期的利益。

範例 i.

Advantages of the proposed method are obvious. The proposed construction model can save three months of piling work, four months for pier columns, construction and three months for girders erection. The overall schedule may cut down at least eight and half months. Hopefully, the proposed model can facilitate on time or ahead of time completion of a project. JM must be responsible for limiting potential on-site harm. Moreover, the proposed model can achieve project goals, although overall construction cost might be increased 6% in terms of the total construction cost. The ability of JM to effectively respond to this challenge will gain public confidence and bolster Indonesia's international image.

所建議的方法的優點很明顯。所建議的營建模型可節省 3 個月的打樁工程、4 個月的墩柱工程和 3 個月的大樑建築。整體工作時間至少可縮短 8.5 個月。希望所建議的模型可使工程及時或提前完工。JM 必須負責限制潛在的現場傷害。此外，雖整體營建成本可能較總營建成本增加 6%，但所提議的模型仍可達成工程目標。JM 有效回應挑戰的能力將取得大眾的信心，並提振印尼的國際形象。

範例 ii.

The proposed artificial neural network-based analysis method can reduce much of the time and error associated with vibration solutions. Importantly, the proposed model can provide a valuable reference for researchers involved with vibration-related topics and also allow engineers to make decisions easily and efficiently.

所提議的類神經網路分析法可節省許多時間並減少與解決震動有關的錯誤。重要的是，所建議的模型可為進行震動相關主題的研究者提供有價值的參考資料，並可讓工程師不費力、有效地作出決定。

範例 iii.

The proposed wind power strategy can provide about 10% of all power requirements. Additionally, a wind power plant can minimize the costs of fuel demand and provide a cleaner environment.

所提議的風力發電策略可提供約 10% 的總電力需求。此外，風力發電廠可將燃料需求成本減至最低並提供更乾淨的環境。

範例 iv.

As anticipated, the proposed model can evaluate exactly the relationship between the cost and effectiveness of all candidate construction site locations. The evaluation results can provide not only economic information on all construction site locations, but many other comparable situations. The proposed model can also provide a valuable reference for government when selecting construction site locations for civil engineering projects. Importantly, the ranking methodology can provide a more objective outcome with weights of related decision groups, than can other methodologies. The ranking methodology can also provide a more flexible procedure with respect to the outcome's complexity. Moreover, the ranking outcome can allow decision makers to identify the order preferences for alternatives.

如同預期的，所提議的模型可確實評估所有所選營建場地位置成本與效力

間的關係。評估結果不僅可作為營建場地位置的經濟資料，在許多其他類似情況下也適用。所建議的模型亦可作為政府在選擇土木工程計畫營建場地位置時的有價值參考。重要的是，與其他方法相比，排列法可提供受相關決策團體重視的較為客觀的結果。對於結果的複雜性，排列法可提供比較彈性的程序。此外，排列結果亦可讓決策者在眾選項中辨識出偏好順序。

範例 v.

As anticipated, analysis results generated from this evaluation method indicate a rapid decline in the minimum scores for admitted students over the same period as the number of university increased, despite the possible variance among colleges and universities with respect to the rate of decrease in scores.

如同預期的，評估法得出的分析結果顯示，大學數目增加時，同期錄取學生的最低分數大幅下降，只是分數下降的比例在各院校間有所差異罷了。

- E. 最後採取特定行動：工程類的讀者經由完成計劃或策略來有效貢獻工程部門中的特定領域。

範例 i.

We seek your expedient approval to implement the above construction method in order to secure the success of this vital engineering project.

我們特請您核准實施以上的營建方法，以確保此項重要工程計畫的成功。

範例 ii.

We therefore highly recommend that you adopt this artificial neural network-based analysis method in your future project, especially those concerned with vibration control such as the ongoing hi-speed railway project in Taiwan.

我們因此強烈建議您在未來的工程上，特別是在諸如目前台灣高鐵工程等有關震動控制的工程上，採用類神經網路分析法。

範例 iii.

We therefore seek your authorization to adopt this wind power strategy to ultimately provide Taiwan with more viable sustained energy alternatives.

我們因此特請您授權採用此項風力發電策略，最終提供台灣更可行的永續能源方法。

範例 iv.

We seek your approval to adopt this evaluation model as the basis for selecting

all future construction site locations in Taipei in the future.

我們特請您核准採用此項評估模型作為未來在台北選擇營建場地位置的基礎。

範例 v.

We strongly recommend that the MOE adopt this evaluation method as a valuable reference for reforming its higher education policy in Taiwan to reverse the deteriorating academic competence of university students.

我們強烈建議教育部採用此項評估方法作為改革台灣高等教育政策的有價值參考，以挽救大學生惡化的學業能力。

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