

SINO-AMERICAN PERCEPTIONS OF COUNTERFEITING IN THE CONSTRUCTION
SUPPLY CHAIN

By

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To my mom and dad for their continuous support in my education

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TABLE OF CONTENTS

	<u>Page</u>
ACKNOWLEDGMENTS.....	4
LIST OF TABLES.....	7
LIST OF FIGURES.....	8
ABSTRACT	9
CHAPTER	
1 INTRODUCTION	11
2 COUNTERFEITING IN CONSTRUCTION.....	12
Definition of Counterfeiting.....	12
Examples of Counterfeiting.....	13
Counterfeit Airline Parts.....	13
Cranes.....	14
Chinese Drywall	15
Fake IT Components.....	15
Fly Ash	16
Circuit Breakers.....	17
Pipe	18
Pressure Vessels	18
Fasteners	19
Summary	20
3 LITERATURE REVIEW	22
Trends in Counterfeiting.....	22
U.S. Customs Impact on Counterfeiting	22
Conditions in North America That Encourage Counterfeiting	24
Conditions in China That Encourage Counterfeiting.....	24
Trends in the Construction Industry	27
Current Construction Material Market.....	27
Chinese Construction Industry	28
Chinese Materials Quality Control	29
4 RESEARCH METHODOLOGY.....	32
Introduction	32
Data Collection	32
Methodology	34
Research Objectives.....	35

5	DATA ANALYSIS.....	37
	Research Questions	37
	Research Question 1: Have you ever been the victim of counterfeiting?	37
	Research Question 2: Have you heard from a reliable source of another party being the victim of counterfeiting?	37
	Research Question 3-A: What was the counterfeit item?	38
	Research Question 3-B: How was counterfeiting detected?.....	40
	Research Question 3-C: How was the product counterfeited?	41
	Research Question 3-D: How did the product enter the supply stream?	42
	Research Question 3-E: How did the vendor of the counterfeit item react when confronted?.....	43
	Research Question 3-F: How did other interested parties react? What were their main concerns?	44
	Research Question 4: What does the counterfeiter's local government think about counterfeiting?.....	45
	Summary	47
6	CONCLUSION.....	48
	Summary of Research	48
	Limitations of Research	50
	LIST OF REFERENCES	51
	BIOGRAPHICAL SKETCH.....	53

LIST OF TABLES

<u>Table</u>		<u>Page</u>
3-1	2003 United States Customs Service IPR seizure statistics.....	23
5-2	Chinese interviewees who have encountered counterfeiting.....	38
5-3	Breakdown of counterfeit items in North America and China	39
5-4	Percent of companies that experienced counterfeiting for each type of item.....	39
5-5	Reaction of vendors in North American interviews	44
5-6	Reaction of vendors in Chinese interviews.....	44

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
2-1 Pair of cranes. A) The legitimate crane, B) The fake crane	14
2-2 Corroding copper.....	15
2-3 Making the ash powder	16
2-4 Loading the ash powder	17
2-5 Genuine and counterfeit circuit breakers	17
2-6 Ruptured steel pipe	18
2-7 Failure of a pressure vessel.....	19
2-8 Counterfeit bolts. A) Bolts welded together to hide a deficient piece. B) Bolts welded together to hide a deficient piece. C) Bolt with visible voids	20
4-1 Interviewee location.....	33
4-2 Interviewee type	33
5-1 Frequency of counterfeiting in China vs. North America.....	38
5-2 Most common detection methods in China and North America	41
5-3 Most common methods of counterfeiting in China and North America	42
5-4 Most common sources of counterfeit items entering the supply stream in China and North America	43
5-5 Most commonly expressed concerns in China and North America.....	45
5-6 The attitudes of local governments toward counterfeiting.....	46
5-7 Westerners' perceptions of the attitudes of governments in source countries toward counterfeiting	47

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The problem of counterfeiting has existed for a long time, from the ancient practice of producing fake currency to the many current cases of counterfeit products in most segments of industry. The construction industry has particularly become the target of counterfeiters, and counterfeit products now pose a threat to the safety and health of the public. These problems currently are common in both source countries and target countries. Recently, large quantities of fake fly ash, the basic ingredient of concrete, were found to have been used in a \$12 billion railway project in China. In February 2008, federal authorities of the United States seized some 400 counterfeit Cisco Systems knockoffs worth \$76 million. Since cultural differences can produce substantially various attitudes toward counterfeiting, this thesis compared and contrasted the trends and perceptions between China and North America in order to form a comprehensive understanding of counterfeiting and thus recommend effective methods to mitigate the problem.

This thesis analyzed data from 74 Chinese interview files and 85 North American interview files (75 from the U.S., 10 from Canada) and isolated data from relevant

answers to more than 40 questions, focusing on the 10 questions that best illustrate the differences in attitudes, cultures, trends, and opinions between Chinese and Western interviewees.

The research found that the main source of the counterfeiting problem is China. The motivation of counterfeiters essentially comes from the culture of China, which believes that “close is good enough,” a philosophy that has resulted in a lack of awareness and legitimate regulations to effectively prevent counterfeiting. The preventative actions that should be taken from this thesis are education and training. If China is going to sell to the United States, they need to understand how Americans feel about counterfeiting. Conversely, if the United States is going to buy from China, Americans need to understand the risk and send corporate representatives to China to oversee production.

CHAPTER 1 INTRODUCTION

The construction industry constantly is being driven to build better, faster, and cheaper products. In order to pursue maximum profits, construction companies reduce costs by procuring raw materials and equipment from the lowest cost sources. Since the trend of supply chain management is toward global sourcing, more complications to securing the procurement have arisen. Quality control can be a very complex issue if materials are procured from a variety of source countries. Fabrication errors, improper specifications, and improper identification of items all are likely to be compounded on construction projects. On top of these quality control problems, counterfeiting does occur, which is the intentional act to deceive the purchaser into believing that the product or material is something that it is not.

Because the construction industry directly affects the daily lives of every person, the awareness of the whole industry must be increased and effective measures must be implemented to mitigate counterfeiting. Understanding and controlling counterfeiting requires the purchaser to understand how cultural differences produce different attitudes toward counterfeiting. By understanding the cultural motivators that drive counterfeiters, one can be in a better position to eliminate or reduce the likelihood of purchasing counterfeit products and materials.

The intent of this paper is to compare and contrast the trends, perceptions, attitudes, opinions, and cultural ideas on counterfeiting between Western countries and China through analysis of collected data in order to recommend measures to mitigate the counterfeiting problems in these countries.

CHAPTER 2 COUNTERFEITING IN CONSTRUCTION

The production and sale of counterfeit products plays a great part in the international economy. In the mid-1980s, it was estimated that counterfeit products composed nine percent of total world trade in manufactured goods. Even though many countries have signed agreements to protect intellectual property, counterfeit products now are even more available in international markets. According to the World Trade Organization, world trade increased by 47% from 1990 to 1995; during this period, however, trade in counterfeit products increased by 150%. With the inclusion of counterfeit products that are produced and marketed domestically within a country, the total value of counterfeit products marketed in the world currently is estimated to be more than \$1 trillion annually (Hung 2003).

Definition of Counterfeiting

A counterfeit is an imitation, usually made with the intent of fraudulently passing off as genuine. Counterfeit products often are produced with the goal of taking advantage of the established worth of the imitated product.

Counterfeit products are different from low-quality products. Low-quality products obviously fail to meet performance standards, while counterfeit products usually have an “incubation period,” during which the item appears to be functioning normally and likely would go undetected even by professional inspectors. Thus counterfeit products raise serious concerns.

Counterfeit products can be classified into three types. Class “A” counterfeit products and materials are the results of patent infringement or other intellectual property fraud and are of similar quality to the legitimate brand. Class “A” counterfeit

materials and products do not pose a hazard. Class “C” products and materials are obvious fakes, which both the selling and purchasing parties usually know. They typically are not a concern in construction as they are detected through standard quality control methods. Class “B” products look legitimate under normal quality-control procedures but fail to perform due to low quality. Class “B” products are the primary focus of this research project because they are the most dangerous and difficult to identify. This effort did not focus on:

- “Gray market” products.
- Intellectual property violations.
- Low-quality or poorly designed products (unless they were produced or marketed with the intent to deceive).
- Commercial counterfeiting (retail products).
- Copyright infringement.

Examples of Counterfeiting

Construction materials can be and have been counterfeited, and such counterfeit materials have posed great dangers to human health. Several high-profile examples of counterfeiting have been reported in the construction industry, such as the cases involving Chinese drywall, fly ash, cranes, circuit breakers, pipe, pressure vessels, and fasteners.

Counterfeit Airline Parts

In the commercial airline industry, aircraft routinely carry 300 or more people. A failure caused by a counterfeit aircraft part can be truly catastrophic. Numerous major airlines currently have fake or used parts among their inventories, and some quietly admit it. In 1998, the Organisation for Economic Co-operation and Development

reported that as much as \$1 billion in unapproved airline parts were in warehouses of U.S. airlines and parts distributors. In 2001, a publication by Lawrence Livermore National Laboratory reported that as much as \$2 billion in unapproved parts now are sitting on the shelves of parts distributors, airlines, and repair stations (Parker 2001). In 2004, the Federal Aviation Administration estimated that two percent of the 26 million airline parts installed in aircraft were counterfeit (Scottsdale 2006).

Cranes

Counterfeit cranes have become a major problem in recent years. Counterfeiters have been able to duplicate actual products almost exactly by making the general design and even coloring identical so that only a trained and experienced professional would be able to tell the difference. In one case, some suspicious Tadano model cranes near Jabel Ali sea port were identified by close inspection to be counterfeit cranes manufactured in China. Figures 2-1 (legitimate) and 2-2 (fake) illustrate that the differences between the real thing and a counterfeit item can be subtle.



Figure 2-1. Pair of cranes. A) The legitimate crane, B) The fake crane

Terex Cranes also has identified eight counterfeit lattice boom crawler cranes being sold as Terex Demag models in the Henan Province of China. These counterfeit

cranes would threaten worker safety due to a mixture of different features and unmatched components in the manufacturing process.

Chinese Drywall

The case of counterfeit Chinese drywall has caused health concerns as well as deterioration of building components. In this case, the foul odor of sulfur emanating from the drywall was giving people serious respiratory problems that were compelling them to vacate their houses. Furthermore, the toxin that was given off by this drywall was corroding copper components in the building. These included copper piping used in plumbing, copper wiring, and copper evaporator coils in the HVAC units. Public safety is a major concern where this type of drywall was installed. Figure 2-1 shows how gas emitted from the defective drywall corrodes copper wiring, turning it black.



Figure 2-2. Corroding copper.

Fake IT Components

In 2005, a study by the Alliance for Gray Market and Counterfeit Abatement and consulting firm KPMG LLP estimated that the global IT industry annually loses about \$100 billion due to counterfeiting. This figure does not count the cost of indirect effects

such as field service, recalls, and warranty claims, as well as harm to the company image and loss of customer satisfaction (Laurent Bernardin 2009).

At the end of 2007, European and U.S. officials vowed to crack down on fake IT components after a two-week raid uncovered more than 360,000 counterfeit items. The seizure, which had a total value of more than \$1.3 billion, contained fake versions of products from Intel, Cisco, Phillips, and other famous international companies. Trade in fake IT components has reached \$200 billion a year, and most of these goods originate in China (The Raw Feed, Friday, February 22, 2008).

Fly Ash

A variety of instances have occurred in which people have been injured or even killed due to counterfeit material and equipment. Recently, large quantities of bogus material were found being used in several hundred kilometers of a \$12 billion high-speed railway between the cities of Wuhan and Guangzhou. The railway contractors had been tricked into buying large quantities of fake or deficient coal fly ash, which is a common ingredient in concrete. Authorities believe that this problem could destroy the



Figure 2-3. Making the ash powder



Figure 2-4. Loading the ash powder

structure of the railway, creating a catastrophe in public safety. Figure 2-2 shows one of the factories that were making fake fly ash powder. Figure 2-3 shows the loading of fake fly ash powder in the town of Pingshi.

Circuit Breakers

Smaller items also were found to be counterfeit. These items include rebar, fasteners, and circuit breakers. In one case, a shipment of one million Square D circuit breakers was found coming into the port of New York from China; Square D does not



Figure 2-5. Genuine and counterfeit circuit breakers

even produce these items in China. In fact, Square D manufactures its products only in the U.S. So all imported Square D circuit breakers are counterfeit. Figure 2-6 shows the difference between genuine and counterfeit circuit breakers.

Pipe

Counterfeit piping is a common problem in the construction industry. In one case, a steam line from a 300-megawatt unit at the Datong Power Station Unit 2 failed after only six weeks of use. Figure 2-7 shows the failure of this pipe. This failure of a pipe that contained steam at 1006°F at a pressure of 2538 psi resulted in the death of two employees as well as serious injuries which left several people in critical condition.



Figure 2-6. Ruptured steel pipe

Pressure Vessels

Pressure vessels and other steel products tend to fail due to counterfeit steel. Often this is a result of the fraudulent use of low-quality steel or the use of alloys that

may not be intended for application with certain chemicals or pressures. Many of these failures tend to occur during the initial hydro testing, a dangerous situation that should never occur. Figure 2-8 shows the failure of a pressure vessel.



Figure 2-7. Failure of a pressure vessel

Fasteners

In the 1980s, counterfeit fasteners were found on army tanks, naval vessels, and Interstate highway bridges. Consequently, the House Subcommittee on Oversight and Investigations examined the U.S. fastener industry. The study not only documented inadequate standards and quality-control methods in the fastener industry but also found that low-grade imported parts were passing through as high-quality fasteners. In 1990, the Fastener Quality Act (FQA) provided guidelines for inspecting and labeling fasteners and accrediting test facilities. Today, counterfeit fasteners are a negligible problem in the U.S., although the fastener industry endured a 14-year struggle (1985–1999) with the federal government over the proper marking of products and strict adherence to industrial standards (Joe Greenslade, Director of Engineering Technology for the Industrial Fastener Institute).

Bolts are common counterfeit items because they often are already in place when items such as pressure vessels and valves are purchased. For this reason, it is a good idea to torque bolts even after they have been installed. Figures 2-9A and 2-9B show how fake bolts were made by welding smaller pieces to the ends of bolts that were the correct sizes to save money or fix broken bolts. In most cases, these bolts are not checked; however, this bolt appeared loose, and when torque was applied, the bolt snapped into the two pieces seen in Figures 2-9A and 2-9B.

Another situation can be seen in Figure 2-9C, where there are visible voids in a manufactured bolt. This defect is not visible on the outside, but once the bolt has been split, the voids are clearly visible. These voids can reduce the bolt strength, which leads to failure.



Figure 2-8. Counterfeit bolts. A) Bolts welded together to hide a deficient piece. B) Bolts welded together to hide a deficient piece. C) Bolt with visible voids

Summary

Because counterfeiting is a worldwide threat due the globalization of the supply chain, it should be addressed at the global level. However, counterfeiting cannot be addressed the same way in every country. In a “global” market, it should be recognized that cultural differences still can result in substantial variations of definitions in ethics. A

difference in ethics can directly affect attitudes toward counterfeiting. The better the understanding of differences in cultural perceptions of counterfeiting, the more effective measures can be taken to mitigate it.

CHAPTER 3 LITERATURE REVIEW

Trends in Counterfeiting

Product counterfeiting, which is commonly defined as unauthorized copying of trademarked or copyright goods, damages legitimate producers through lost sales. International product counterfeiting has grown to be a serious problem in several industries (Bloch et al. 1993).

The manufacture and sale of counterfeit products plays a significant role in the international market (Hung 2003). In the mid-1980s, counterfeit products composed an estimated nine percent of total world trade in manufactured goods. In spite of many countries having signed agreements to protect intellectual property rights (IPRs), counterfeit products are available more than ever in both world and national markets.

The two most significant aspects of counterfeiting today are its financial significance and international scope. The counterfeiting problem is not limited to just commercial goods. It also is a problem among industrial goods that sometimes has disastrous consequences. For example, ineffective counterfeit pesticides are estimated to have caused a 15% decrease in the coffee crop of Kenya, which is the nation's chief export crop. The problem perpetuated itself when farmers, afraid that the ineffective counterfeit pesticides posed a threat, became reluctant to use any pesticides at all (Abalo 1984).

U.S. Customs Impact on Counterfeiting

In 2003, U.S. Customs seized a net value of \$94 million in counterfeit and infringing goods at ports of entry into the United States. Of this total, products coming from China accounted for \$62.4 million, or 66% of the total. The 2003 figures for China

represent a significant increase over comparable figures from 2002, when China accounted for 49% of all counterfeit and infringing products and \$48 million of the total \$98 million in illegal products seized by U.S. Customs (Chow 2004).

Table 3-1. 2003 United States Customs Service IPR seizure statistics

Trading partner	Domestic value(\$)	Percent of total
China	62,468,018	66%
Hongkong	8,236,507	9%
Korea	3,219,268	3%
Pakistan	2,010,465	2%
Mexico	1,966,929	2%
Malaysia	1,331,925	1%
Philippines	1,224,058	1%
Canada	1,189,160	1%
Switzerland	676,197	Less than 1%
Thailand	662,112	Less than 1%
All other countries	11,024,588	
<hr/>		
Total FY 03		
Domestic value	94,019,227	
Number of seizures	6,500	

Counterfeit items from China and Hong Kong (through which many counterfeits produced in China are transshipped) accounted for \$80 million, or 75%, of the total customs seizures. No other country accounted for more than three percent of counterfeit products. It has become well known that many counterfeit products which are made in China are transshipped through other countries, such as those in South America and Canada, before ultimately entering the United States. Thus China accounts for a significantly higher percentage than the 66% reported by the 2003 U.S. Customs statistics. It is possible that China accounts for up to 80% or even more of the counterfeit goods that enter the United States. Note that the \$94 million figure represents only the value of products that were actually seized by U.S. Customs in 2003. This likely is only a tiny fraction of what enters the U.S. market. If the total value

of the products seized accounts for one percent of the counterfeit and infringing products that enter the U.S. market, then the total value would have been approximately \$10 billion, with China accounting for between \$6–8 billion of that total. It is feasible that the actual figures are much higher (Chow 2004).

Conditions in North America That Encourage Counterfeiting

The United States is the largest market in the world for counterfeiters. Counterfeiters select products originating in the United States because U.S. multinational corporations (MNCs) expend a large amount of time and money to establish product visibility and brand identity. Therefore, counterfeit products are desirable because they have been labeled as products of legitimate manufacturers. Also, the distribution of counterfeit U.S. products includes both domestic and international products. Therefore, the counterfeiters can expand their market by selling their products both inside and outside the United States. The United States is one of the world's leaders in high-tech industries, and counterfeiters want to make the most technologically advanced products in order to increase profit. Moreover, the international market does not have an adequate supply of legitimate products of the United States, a fact that provides counterfeiters an opportunity to produce these kinds of goods in order to meet demand. In the United States, domestic and international legislation have done little to regulate counterfeiters (Harvey 1987).

Conditions in China That Encourage Counterfeiting

Product counterfeiters have established themselves all over the world, but the counterfeiting industry in China is estimated to pose the most serious counterfeiting problem in world history and appears to still be on the rise. The magnitude of

counterfeiting operations in China is astounding. According to the Chinese government's own conservative estimates based on a survey it conducted, the total value of counterfeit products domestically produced and marketed within China in 1998 was \$16.1 billion (Hung 2003).

A recent study by China's State Council Research and Development Center reported that in the year 2001 the Chinese economy included \$19–24 billion worth of counterfeit goods. Brand owners in China estimate that 15–20% of all products bearing well-known brands in China are counterfeit and estimate their losses to be in the tens of billions of dollars per year. Counterfeiting is estimated to now account for approximately eight percent of China's current gross domestic product (Chow et al. 2004).

In recent years, there has been an increase in the number of both counterfeiting cases handled and criminals punished. All together, 12,260 criminals involved in counterfeiting were prosecuted; of these, only 1,636 received sentences from five-year imprisonment up to the death penalty. The others received less severe penalties. Among all cases, 8,272 were related to counterfeit money, securities, financial documents, and special invoices, an increase of 64% since 1998; 206 were related to patent or trademark counterfeiting and false advertisements, an increase of 26% over the last year with 275 criminals punished (Chow et al. 2004).

Another investigation of 283 enterprises in China, conducted by the State Bureau of Quality Technical Supervision, revealed a similar situation. Among all the enterprises investigated, 182 spend 240 million Yuan (\$29 million U.S.) annually and employ more than 1,600 people to combat counterfeiting; 160 of them suffered from counterfeiting

activities, with a total damage of 9.6 billion Yuan, which accounted for 11.1% of their annual gross output value (Chow et al. 2004).

The counterfeiting of trademarks, brands, and other intellectual property in China is currently the most serious counterfeiting problem in the world. Fake foreign goods in China are so common that consumers cannot easily distinguish between real and fake foreign commodities. Almost every consumer in China knows that counterfeits of well-known international and local brands are peddled in every street market. The Shanghai Technical Supervision Bureau recently released the results of a survey of computers being sold in the city's market. The survey revealed that nine out of 14 models of imported brand-name computers satisfied industry standards. A large number of the low-quality computers that were marketed as world-famous brands actually were shoddy counterfeit products. A survey of the Shanghai footwear market in early 1996 indicated that various brands of shoes, including Nike and Puma, were low-quality counterfeit knockoffs. The export of counterfeit products from China to countries and territories abroad has increased recently, a disturbing trend which indicates that China has become the source of a global counterfeiting problem (Hung 2003).

In recent years, complaints by Chinese consumers about counterfeit and inferior products have risen sharply. As reflected in consumer complaints, almost every product category is subject to counterfeiting; these include television sets, washing machines, radios, stereos, cameras, motorcycles, pharmaceuticals, baby food, and instant noodles. These complaints indicate that many counterfeit products are of inferior quality and may harm unwitting consumers. Perhaps the most notorious recent incident, involving counterfeit liquor, led to twenty-seven human deaths in 1997 (Chow 2000).

Trends in the Construction Industry

Current Construction Material Market

Materials compose one of the three major costs of construction. Materials sometimes are ordered weeks or even months in advance of requirement, leading to uneconomical inventory on construction sites or in contractors' warehouses. A study by Marsh (1985) shows that materials and equipment constitute approximately 60% of a project's cost. Bernold and Treseler commented that materials represent a large portion of construction costs and may represent an even larger portion in the future (Bernold et al. 1991).

China's construction industry annually consumes 20–30% of the nation's total steel production, 70% of cement, 40% of timber, 70% of glass, 50% of paint, and 25% of plastic products (Chen 1998). Even though the state plan of producing and supplying building materials through the quota system has shrunk significantly in the last decade, about 50% of building materials still are produced and supplied through the state plan system for most large projects (Chen 1998).

The cost of material varies depending on the type of construction project. Various estimates place the cost of materials in industrial construction projects in the range of 50–60% of the project cost. This does not include economic costs that are not measured but nonetheless exist. Materials dictate 80% of a project's schedule from the initial material acquisition to the delivery of the last item (Kerridge 1987). Furthermore, materials greatly influence a project's indirect costs, plans, and operations and are a major factor in a project's process.

The importance of materials is even more evident among international construction projects. The management of materials on an overseas project poses

another level of complexity, especially in a situation where procurement responsibilities are divided due to factors beyond the control of the owner's project management team or the constructor. Many construction projects in third-world countries are affected by the unavailability of locally sourced supplies in the host country, necessitating the import of most materials. Quality can become a complex issue if materials are procured from a variety of sources (Chen 1998).

Chinese Construction Industry

The Chinese economy has developed at an alarming rate since 1980. The gross value of industrial output increased by an average annual rate of 17% from 1980–1991 and 27% from 1992–1993, with a share of 57% of the GDP in 1991. In terms of agricultural output, the average annual growth rate was six percent from 1980–1990 and four percent from 1991–1993, with a 27% share of the GDP in 1991. The share of services in the GDP increased from 23% in 1980 to 27% in 1993. Fixed investment grew at an average annual rate of 13% from 1980–1991 and 23.3% from 1992–1994, with a share in the GDP of 32% in 1992. National income grew at an average annual rate of eight percent from 1980–1991 and 12% from 1992–1994. The total values of exports and imports in 1994 were \$121 billion and \$115.9 billion, respectively, with a trade surplus of \$5.1 billion. FDI inflows reached \$42.2 billion by 1994, with an average annual increase of 28.1% from 1986–1994 (Chen 1998).

The gross output of the construction industry, which was valued at 13.9 billion Yuan in 1978, had reached 382 billion Yuan in 1994. The major construction output for this period could be divided into the following numbers: 110,000 megawatts of new electrical generating capacity; 117 million tons of cement production; 7,484 km of new

railway lines; 41,300 km of new highways; 340 million tons of additional harbor cargo handling capacity; more than 10 new major railway stations in big cities; more than 2 billion square meters of new residential housing; 9.3 billion square meters of rural housing; and a large number of public facilities. This output was complemented by roughly 25.4 million tons of additional coal production and 183 million barrels of additional petroleum recovery. The annual output of the construction industry currently is about \$93 billion. The industry employs about 24 million people, more than five percent of the total labor force in the country (Chen 1998).

Construction activities have spread throughout the country. From 1978–1994, the majority of Chinese construction projects were concentrated in the province of Guangdong and along the eastern coastal areas in the field of civil engineering and construction installation work. In recent years, increasing numbers of projects involving infrastructure and energy exploration have taken place in the inland provinces (Chen 1998).

However, the share of the construction industry in China's GDP is still low in comparison to developed countries. Thus a strong potential for further growth in China's construction industry may exist. The rapid growth of the construction industry has directly resulted in a dire shortage of infrastructure and building space. Moreover, this growth rate is predicted to continue to increase into the foreseeable future (Chen 1998).

Chinese Materials Quality Control

The quality of construction is recognized as a serious problem in China. The quality of construction work undertaken by the line ministries' construction companies generally is better than that of provincial enterprises, and the quality of construction by

state-owned enterprises is considered to be better than that of urban and rural collectives and rural construction teams (RCTs). The quality of work done by RCTs ranks worst; waste of construction material is a major contributing factor. The reasons for low construction quality range from poor designs to low-quality materials, weak management, ambitious completion targets, and lack of worker skills. Improving construction quality is one of the major challenges currently facing China's construction industry (Chen 1998).

A large amount of the available raw resources are made into building materials. China widely uses raw materials and transport systems. The primary problems with the building materials in China are the following:

- Lower productivity in building materials in comparison to other industries
- Lower profitability of building material
- Continued use of quota system for estimating construction costs. Cost estimating based on this system is inaccurate because it is fixed annually or semiannually while material prices fluctuate (Chen 1998).

The performance and quality of building materials are of great importance to the construction industry. They affect not only the safety and functions of construction projects but also socioeconomic development. A good example is found in building construction in Beijing. With the acceleration of urbanization in Beijing, building materials used in residential and public buildings are in high demand. Because such a large quantity and great variety of building materials are being used in Beijing, quality control measures are difficult to enforce. In addition to bricks and building blocks mainly sourced by Beijing enterprises, an increasing proportion of building materials such as steel, cement, sanitary ceramics, stone materials, and radiators are supplied by enterprises from other provinces, a practice that contributes to the complication of

supply channels with the participation of numerous companies. This results in difficult management of product quality (Beijing Municipal Commission of Housing and Urban Rural Development 2007).

CHAPTER 4 RESEARCH METHODOLOGY

Introduction

The objective of this research is to analyze Chinese interview data along with data gathered in the United States in order to compare and contrast the trends, perception, attitudes, and opinions of the different cultures.

Data Collection

To accomplish the research objectives, several interview methods were developed and used to interview a variety of people. The interview comprised approximately 40 questions about various interrelated aspects of counterfeiting. The interviewees included government agents, insurance agents, owners, contractors, manufacturers, and suppliers. Depending on who was being interviewed, different sets of questions were asked specific to a person's area of focus. Each interview took approximately one to one and a half hours to conduct, depending on the interviewee's level of knowledge on the subject. These people were contacted with the help of the research team and were chosen based on the size and importance of their organizations in the global construction industry and their particular positions and functions within the organizations.

In total, 180 face-to-face interviews were conducted with industrial and governmental leaders in China, Taiwan, Hong Kong, the United Kingdom, Pakistan, Canada, and throughout the United States. The team also conducted five telephone interviews. The breakdown was 70 face-to-face interviews in the U.S., 74 in China, 10 in Canada, 16 in Taiwan, eight in the UK, and two in Hong Kong. The phone interviews all were within the U.S. Figure 4-1 shows the breakdown of interviews by country.

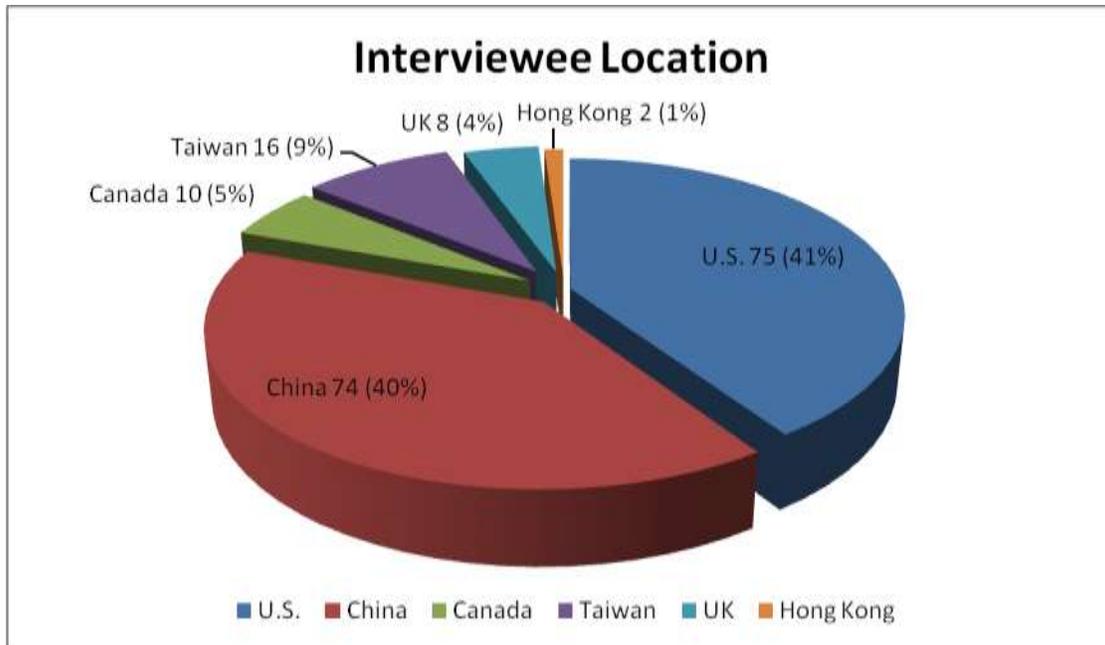


Figure 4-9. Interviewee location

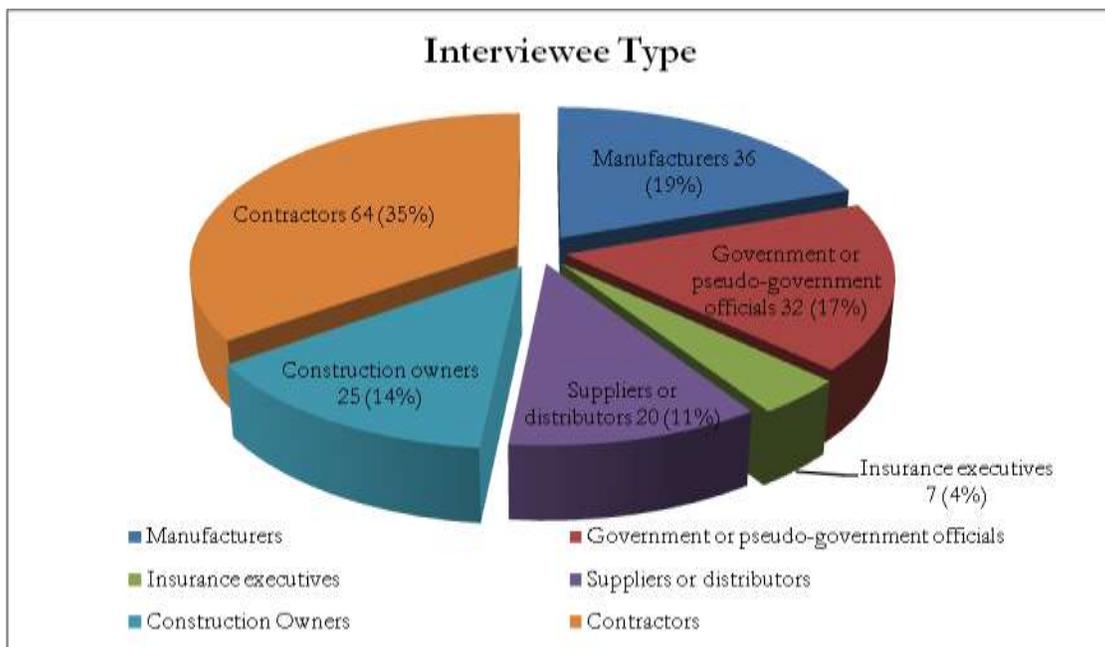


Figure 4-10. Interviewee type

Interviewees from private industry tended to be responsible for either quality or procurement within their organization, though some were in top administrative positions. The breakdown of interviewees for all nations was as follows: 36 manufacturers (20%);

32 government or pseudo-government officials (17%); 7 insurance executives (4%); 20 suppliers or distributors (11%); 25 construction owners (14%); 64 contractors (35%).

Figure 4-2 shows the interviewee breakdown by type.

The questions that were asked included but were not limited to:

1. What is the difference between counterfeits and low-quality products?
2. What do you do to prevent counterfeiting?
3. Have you ever experienced cases of counterfeiting? Where was the problem? Where did it come from?
4. What do you do to qualify vendors?
5. What are some key indicators of counterfeiting?
6. Who reports to whom in the case of counterfeiting?
7. What trends do you see in counterfeiting?
8. How aware is the industry of counterfeiting?

Methodology

74 of the raw Chinese interview files were translated into English and transcribed into Microsoft Word format along with 85 English interviews. This allowed the two sets of interviews to be categorically analyzed. The interviews followed a master script that was developed to collect data on the key points of the trends in counterfeiting. Due to cultural differences, the questions used in the Chinese interviews slightly differed from those asked in the United States. Professor Pan of Tsinghua University, who was responsible for collecting data in China, revised some questions to adapt to the culture within China.

An example of such a revised question is as follows:

United States question #1: What does your local government think about counterfeiting?

Chinese question #1: Have you ever discussed this problem with the local government?

In an effort to identify cultural differences and thus effectively conduct the research, open communication was maintained with Professor Pan to clarify the reasons why she changed the questions. The data from 74 Chinese interview files (65 interviewed by the Chinese team, nine interviewed by the American team), and 85 North American interview files were analyzed to compare and contrast the trends, perceptions, and attitudes between the Chinese and the North American data.

Because the data were mainly qualitative as opposed to quantitative, they could not be analyzed statistically but rather as a process of seeking trends and commonalities.

Research Objectives

The specific objectives of this research project are as follows:

- Assess the vulnerability of the construction industry to counterfeit items.
 - Discuss issues involving the supply chain.
 - Identify the attitude of source countries toward counterfeiting.
- As the research methodology indicates, the following data points will be chosen

from North American interviews and Chinese interviews:

1. Have you ever been the victim of counterfeiting?
2. Have you heard from a reliable source of another party being the victim of counterfeiting?
3. Case Study Data
 - a. What was the counterfeit item?
 - b. How was it detected?
 - c. How was it counterfeited (i.e. brand, material, documentation, certification)?
 - d. How did it enter the supply stream?
 - e. How did the vendor react?
 - f. How did other interested parties react?

4. What does your local government think about counterfeiting?

CHAPTER 5
DATA ANALYSIS

Research Questions

Research Question 1: Have you ever been the victim of counterfeiting?

Research Question 2: Have you heard from a reliable source of another party being the victim of counterfeiting?

As indicated by the background research, counterfeiting has become a common problem in recent years. One point of interest in the research was to determine the vulnerability of the construction industry to counterfeit items. Guided by this objective, the following questions were asked in the interviews: Have you ever been the victim of counterfeiting? and Have you heard from a reliable source of another party being the victim of counterfeiting? Of the 74 interviewees in China, 48 said that they have been the victims of counterfeiting or have heard of another party being the victim of counterfeiting. Of the 85 interviewed in North America, 53 said yes to the same question. Table 5-1 shows the percentage of North American interviewees who have encountered counterfeiting. Table 5-2 shows the percentage of Chinese interviewees who have encountered counterfeiting. Figure 5-1 compares the experiences of North America and China.

From the findings of the Chinese interviews, most people are aware of counterfeiting and believe that it is a common problem. Even the interviewees who had

Table 5-1. North American interviewees who have encountered counterfeiting

North American interviewees who have either encountered counterfeiting or have heard of a case of counterfeiting from a reliable source	Frequency	Percent
Yes	53	62.3%
No	18	21.2%
N/A	14	16.5%
Total	85	100.0%

Table 5-2. Chinese interviewees who have encountered counterfeiting

Chinese interviewees who have either encountered counterfeiting or have heard of a case of counterfeiting from a reliable source	Frequency	Percent
Yes	48	64.8%
No	10	13.5%
N/A	16	21.7%
Total	74	100.0%

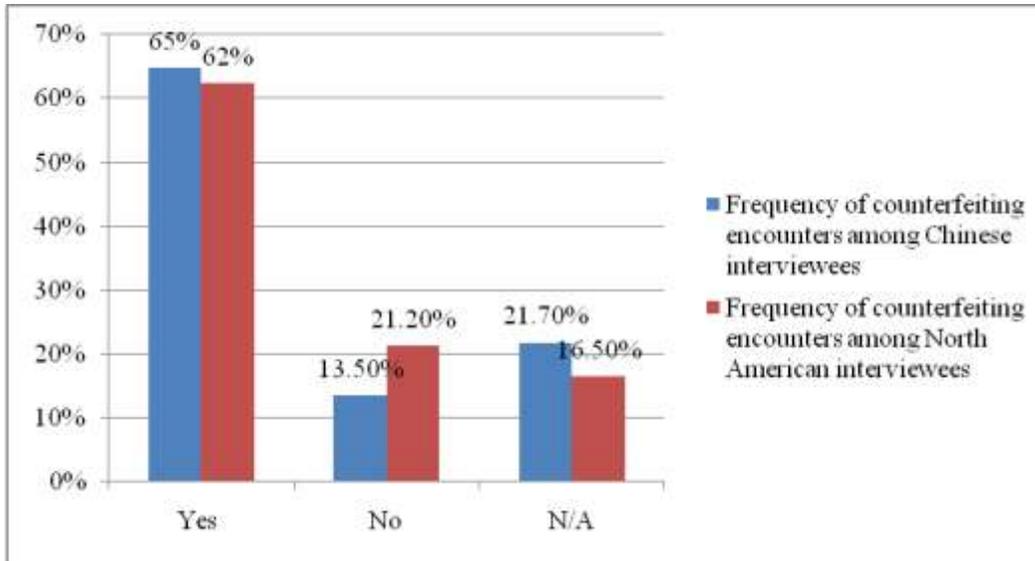


Figure 5-11. Frequency of counterfeiting in China vs. North America

not been victims of counterfeit products always knew of incidents reported by the media.

The high proportion of interviewees who have experienced counterfeiting indicates that the problem is very common in both source countries and destination countries.

Research Question 3-A: What was the counterfeit item?

To collect information on case studies, a group of questions were asked in the interviews regarding actual cases of counterfeiting. Numerous counterfeit items were identified in response to the question, what was the counterfeit item? Steel, both bulk and plate, was the item most identified as counterfeit. Finished steel products such as valves and pipes also were common in both sets of data. Electrical items, primarily circuit breakers, were the construction items next most counterfeited. Table 6-3 shows

the breakdown of the most counterfeited construction items in both countries. Table 6-4 shows the percentage of interviewees who reported on each type of item. The percentage per interviewee in Table 5-4 exceeds 100% because some interviewees identified more than one type of counterfeit item.

A number of Chinese interviewees mentioned an upward trend in counterfeit nonstructural materials such as decoration material and waterproof or insulation material because the standards and inspection processes in nonstructural materials are not sufficient to prevent counterfeiting. Essentially, the motivation for counterfeiting

Table 5-3. Breakdown of counterfeit items in North America and China

Counterfeit Items	North America		China	
	Frequency	Percent	Frequency	Percent
Steel	17	16.5%	16	16.7%
Valves	13	12.6%	12	12.5%
Pipe	12	11.6%	14	14.6%
Fasteners	10	9.7%	0	0
Circuit breakers	7	4.8%	2	2%
Rotating equipment parts	6	5.8%	4	4%
Electrical equipment	6	5.8%	8	8%
Pipe fittings	5	5.8%	2	2%
Pressure vessels	5	4.8%	3	3%
Cement	3	2.9%	3	3%
Electrical conduit fittings	3	2.9%	2	2%
Waterproofing or insulating material	2	1.9%	5	5.2%
Pumps	0	0	3	3%
Ceramic tile	0	0	5	5.2%
Wiring	2	1.9%	4	4.1%
Other	12	11.65%	13	13.5%
Total items	103	100%	96	100%

nonstructural materials are lower risk and easier operation.

Table 5-4. Percent of companies that experienced counterfeiting for each type of item

Counterfeit Items	North America		China	
	Frequency	Percent	Frequency	Percent

Steel	17	20%	16	21.6%
Fasteners	10	11.8%	0	0
Valves	13	15.3%	12	12.6%
Pipe	12	14.1%	14	18.9%
Circuit breakers	7	8.2%	2	2.7%
Rotating equipment parts	6	7%	4	5.4%
Electrical equipment	6	7%	8	10.8%
Pipe fittings	5	5.8%	2	2.7%
Pressure vessels	5	5.8%	3	4%
Cement	3	3.5%	3	4%
Electrical conduit fittings	3	3.5%	2	2.7%
Waterproofing or insulating material	2	2.3%	5	6.7%
Pumps	0	0	3	4%
Ceramic tile	0	0	5	6.7%
Wiring	2	2.3%	4	5.4%
Other	12	14.1%	13	17.6%
Total items	103		96	
Total interviewees	85		74	

Research Question 3-B: How was counterfeiting detected?

Counterfeit items have been discovered in several ways, the most common being testing. Figure 6-2 shows the methods used to detect counterfeit items.

From these findings, it can be seen that 24% of the Chinese interviewees answered that counterfeit products would have been put into use without certification, while 16% of the North American interviewees gave the same answer. Without ensuring product integrity, counterfeit products that are put into operation will cause great problems after the “incubation period.” The definition of counterfeiting, which was presented in Chapter 2, stated that counterfeit products appear to be good products, and thus are unlikely to be detected by simple testing. A source inspection program should be implemented regardless of where an item is placed for critical materials. The

higher the criticality of the goods or materials, the more robust the inspection program should be.

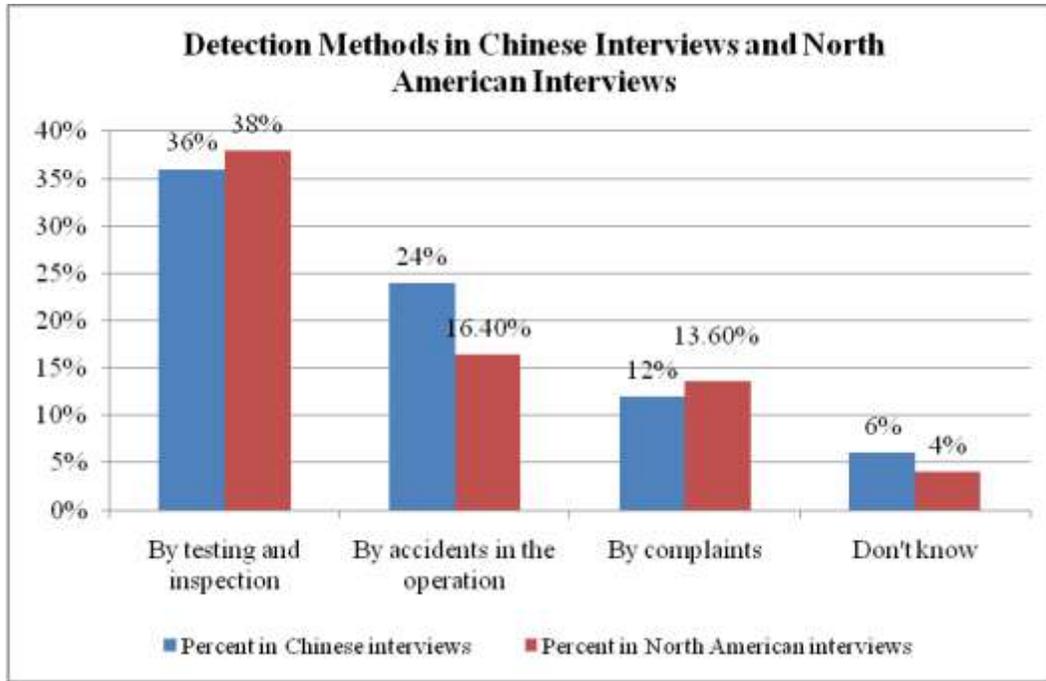


Figure 5-12. Most common detection methods in China and North America

Research Question 3-C: How was the product counterfeited?

Figure 5-3 shows the breakdown of the major methods of counterfeiting. In the North American interviews, fraudulent stamps and paperwork were reported far more than the method most familiar to the public, which is faked brand names, logos, or trademarks. In fact, only 24% of all identified counterfeit items were due to faked brand names, logos, or trademarks. Note that the percentages in Figure 6-3 should not sum to 100% in North American interviews because more than 25% of those who identified counterfeit items could not remember the details of how an item was identified as counterfeit.

Brand counterfeiting was the most common method reported in the Chinese interviews. The percentage of counterfeiting methods reported in the Chinese interviews exceeds 100% because faked brand names and logos always coexist with faked certifications. Figure 5-3 shows the comparative methods of counterfeiting between China and the United States.

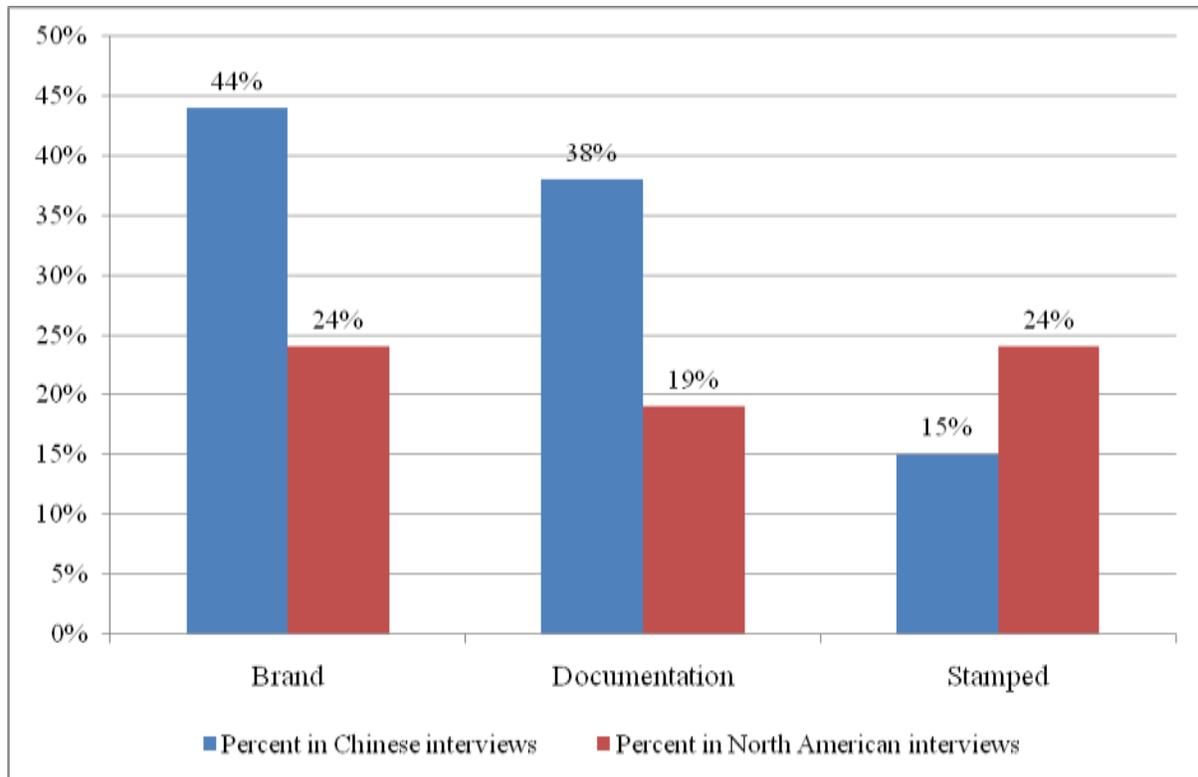


Figure 5-13. Most common methods of counterfeiting in China and North America

Research Question 3-D: How did the product enter the supply stream?

Each interviewee was asked to identify how the counterfeit items entered the supply stream. The uniform response was that the item entered through the distributors. It is worth noting that most counterfeit items are purchased from smaller manufacturers or suppliers in China. These kinds of suppliers are more concentrated in smaller cities or towns in China where there are few or no regulations. Figure 6-4 shows the

percentage figures of how counterfeit items enter the supply chain stream in both countries.

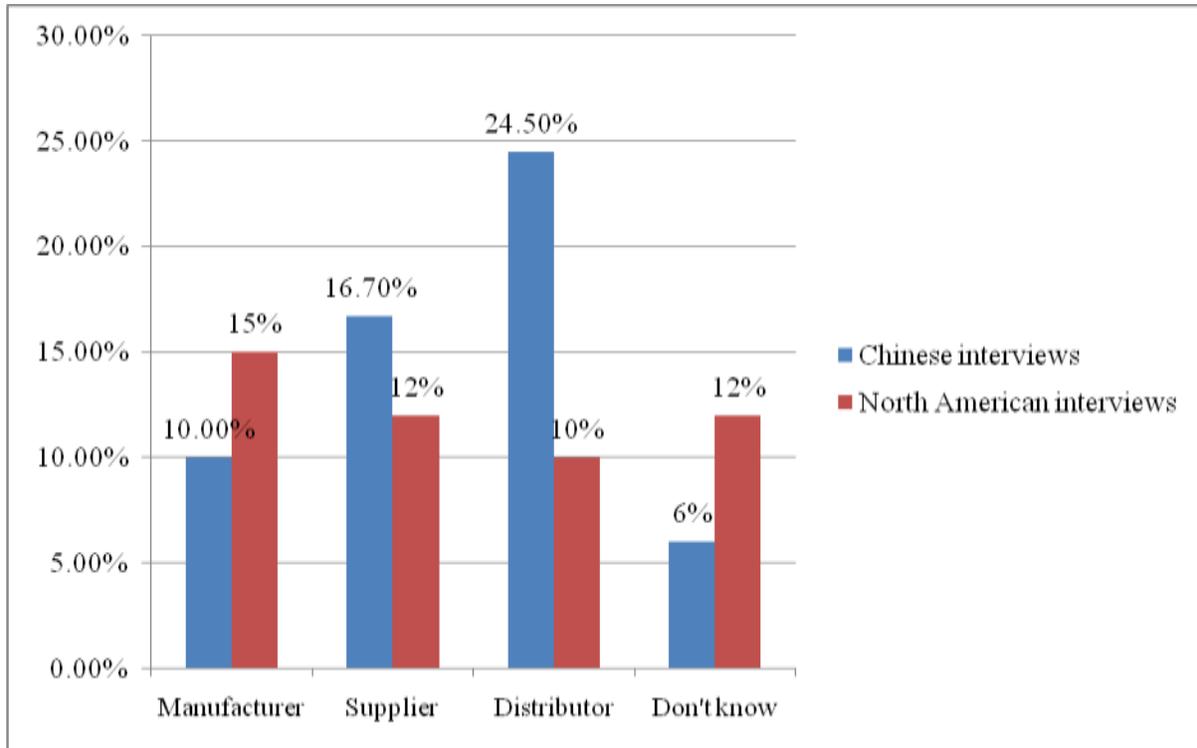


Figure 5-14. Most common sources of counterfeit items entering the supply stream in China and North America

Research Question 3-E: How did the vendor of the counterfeit item react when confronted?

The reports of vendors' reactions when confronted about providing counterfeit products are surprising. Up to 50% of the interviewees answered that the vendor ducked responsibility or even denied the accusations. In contrast, 36% of the vendors showed definite interest in taking measures to solve the problems, and 14% took some measures but were reluctant or had a generally bad attitude. The vendors usually replaced the problem items and then took remedial measures to mitigate the problems. Tables 5-5 and 5-6 show the reaction of vendors reported in North American and Chinese interviews.

Table 5-5. Reaction of vendors in North American interviews

Reaction of Vendors in North American Interviews	Frequency	Percent
Took positive actions	12	11.6%
Denied the problem	30	29.1%
No response	16	15.5%
Don't know	18	17.5%
N/A	24	23.3%

Table 5-6. Reaction of vendors in Chinese interviews

Reaction of Vendors in Chinese Interviews	Frequency	Percent
Took positive actions	24	25%
Denied the problem	36	37.5%
No response	15	15.6%
Don't know	9	9.3%
N/A	12	12.5%

Research Question 3-F: How did other interested parties react? What were their main concerns?

Another question related to the supply chain is: How did other interested parties react? Answers varied from person to person, but responses depended mainly on whether the interviewee was Chinese or Western. This question is difficult to analyze because the interviewees responded as though they were asked different questions. Generally, the North Americans replied that the other interested parties were upset upon learning about counterfeiting, but they were happy that the counterfeit items were caught before being placed into application. More than half of the Chinese did not answer the question directly but usually just identified the interested parties.

The owners are most concerned about counterfeiting, because they ultimately are responsible for everything that happens on a construction project. Counterfeit goods can cause great problems for owners in terms of safety, time, money, reputation, etc. Another further question asked is: What was the main concern of the interested party at that time? Safety, quality, money, and reputation are the most common concerns of the

other parties. As can be seen in Figure 6-5, the total percentage is more than 100% because the interviewees always expressed concern about more than one effect. The owners and government officials were concerned about the project safety and quality; the contractors mainly were concerned about time and money.

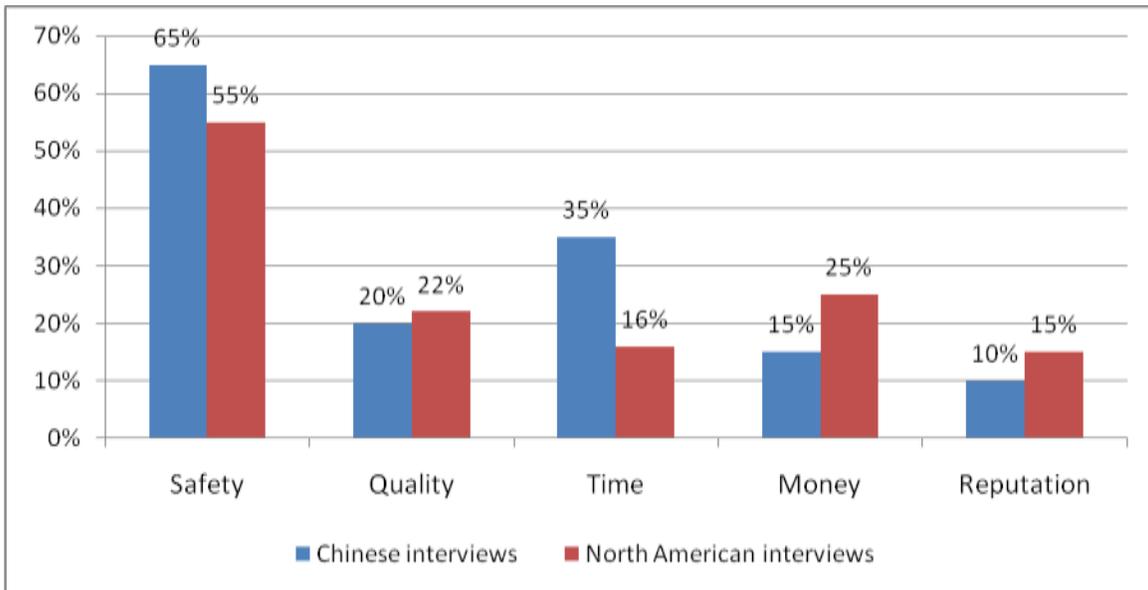


Figure 5-15. Most commonly expressed concerns in China and North America

Research Question 4: What does the counterfeiter's local government think about counterfeiting?

The answers to this question can be separated into two categories: One is the government's level of awareness of counterfeiting, and the other is whether it has effective means by which to control counterfeiting activity. In answering these questions, the North American interviewees have common opinions. They believe that individual Chinese citizens understand the problem of counterfeiting and want to improve their efforts to end it; that they have values and have decided that counterfeiting needs to be dealt with; and that the national government also wants counterfeiting stopped but does not have effective control measures. Of the answers given in the Chinese interviews, 57% believe that the government is aware of the

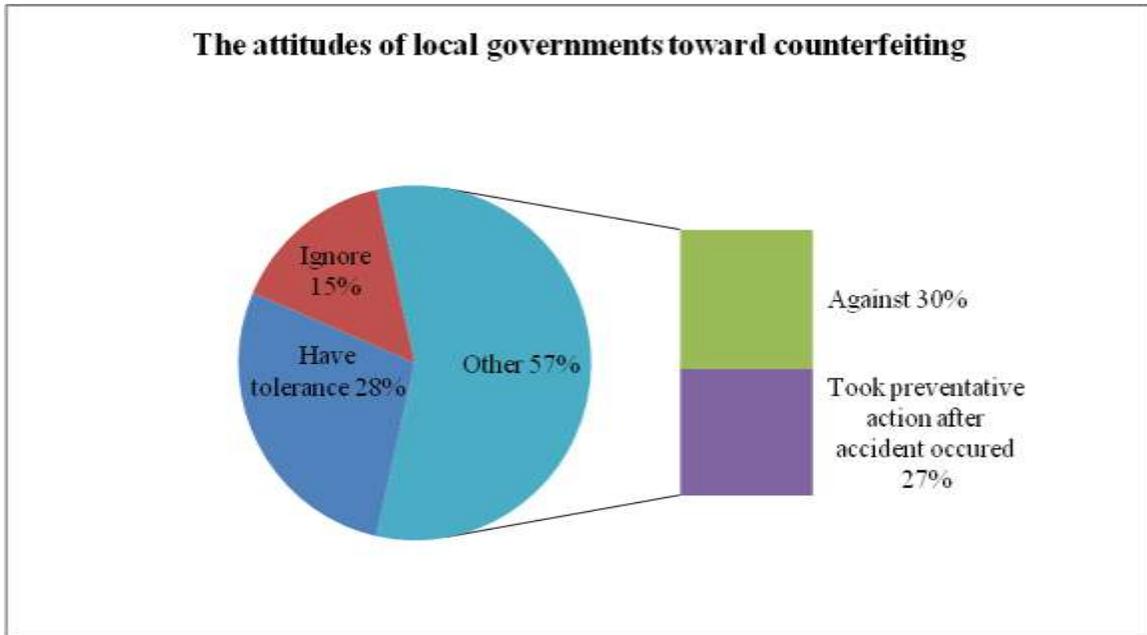


Figure 5-16. The attitudes of local governments toward counterfeiting counterfeiting problem and is trying to control it; 28% indicated that local governments have some tolerance of counterfeiting; and 15% responded that local governments do not care about the counterfeiting issue. Figure 6-6 shows the attitudes of local governments toward counterfeiting. Figure 6-7 shows Western perceptions of what the governments in source countries think about counterfeiting.

Some conclusions can be drawn from these interviews; the governments of source countries really are aware of the counterfeiting problem but, to some extent, have complex attitudes toward the issue. On one hand, they try to supervise and control the problem but have difficulty finding an effective way. Local governments just take some regulation measures when accidents happen rather than prevent counterfeiting beforehand. On the other hand, the central governments of some countries are more concerned about counterfeiting than the local governments. Local governments are more concerned about economic development and tax revenue; thus they tend to

protect local manufacturers, and some smaller companies make counterfeit products in order to survive in a fiercely competitive market.

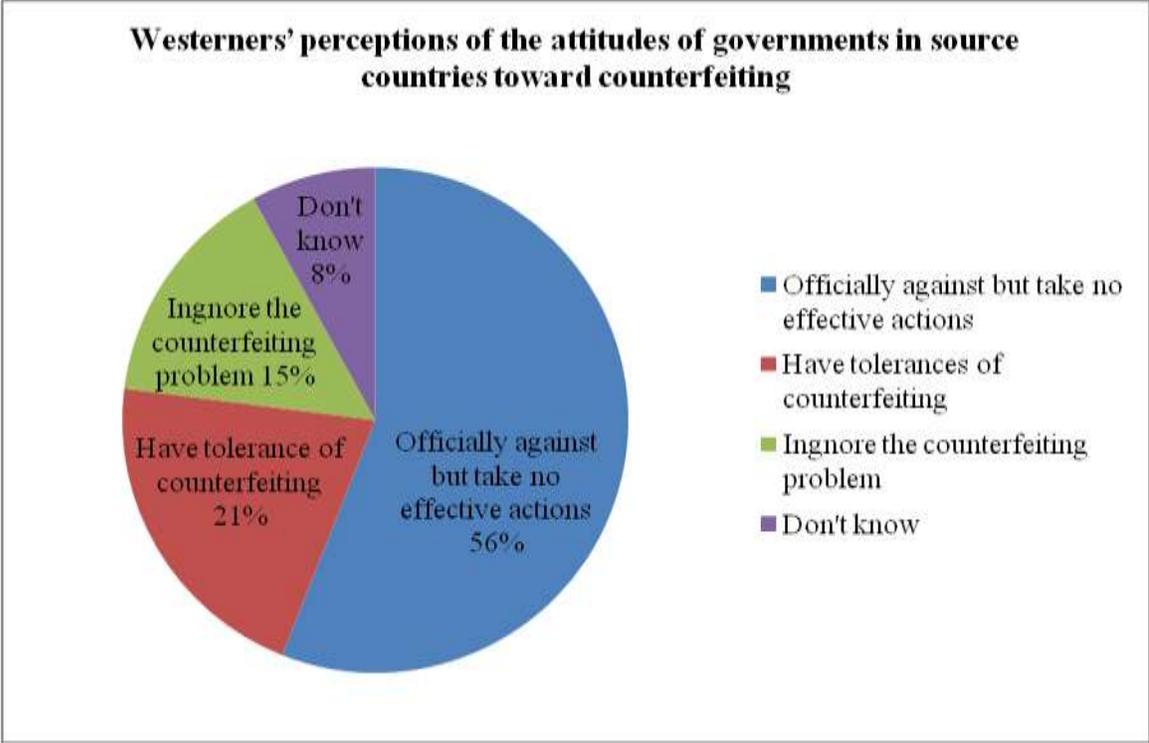


Figure 5-17. Westerners' perceptions of the attitudes of governments in source countries toward counterfeiting

The perception of local governments toward counterfeiting varies in different countries. Most interviewees in North America think that local governments in China are officially against counterfeiting but have no effective means to mitigate it.

Summary

Since the data were mainly qualitative as opposed to quantitative, they could not be analyzed statistically but rather as a process of seeking trends and commonalities. These findings show the differences between the North America and China.

CHAPTER 6 CONCLUSION

Summary of Research

Counterfeiting is a worldwide problem. While the production of counterfeit items may be concentrated in certain areas of the world, their distribution covers the entire globe. It is not surprising to find that China is the main source of counterfeit products. Understanding the essential motivation of counterfeiters is a good step to effectively prevent counterfeiting. Therefore, much consideration should be given to culture differences between countries, especially China and North American nations. In a “global” market, it should be recognized that cultural differences can result in substantially different perceptions of ethics. A difference in ethics can directly affect attitudes toward counterfeiting.

In China, more than half of the interviewees have been or know some people who have been victims of counterfeiting, a fact which indicates that the overall environment is not good. The increase of counterfeiting problems ultimately could lead to increased tolerance of counterfeiting.

The research found that steel items, mostly piping, were most identified as counterfeit by the industry. Meanwhile, there is a trend in counterfeit nonstructural materials in construction. One reason is the low cost of decoration material, the other may be the long “incubation period” during which no problems are discovered.

Most counterfeit items are purchased from smaller manufacturers or suppliers in China. These kinds of suppliers are more concentrated in smaller cities or towns in China, where few or no regulations exist. Counterfeit items have been discovered in several ways, the most common being by testing. But a large amount of counterfeit

products are put into use without being identified. This indicates that the current detection methods are, to some extent, ineffective or that some problems exist in standards of certification.

The research discovered that the reaction of vendors when confronted about providing counterfeit products is negative. They do not like to accept the responsibility. This is the most common problem in the Chinese construction industry—lack of honesty. This is the final line of defense in thwarting counterfeiting; if fake products are known to enter the supply chain, active inspection is a must. If a product is found to be counterfeit, or if the integrity of the goods or materials cannot be verified, all members of the project (purchasing, inspection, engineering, etc.) should be made aware of the issue, and a conscious decision must be made based on the potential risks and the disposition of the goods and/or materials.

The research also found that local Chinese governments understand the problem of counterfeiting and want to improve their effort to stop it. They have values and have decided that counterfeiting needs to be dealt with. The national government also wants counterfeiting stopped, but their control methods are not effective. This may be a result of the Chinese culture, which believes that “close is good enough.” This is why they have not been able to effectively control counterfeiting activities. Otherwise, local governments have certain tolerance toward the existence of counterfeiting, because counterfeiting activity is able to motivate the development of local economies. In Chinese cultures, counterfeiting is seen as a “normal step in the course of business development.”

Limitations of Research

The limitation of this research would be the lack of data points; although the number of interviewees and the number of questions asked in each interview provided an impressive number of data points, more always is better. On the other hand, the answers provided qualitative data rather than quantitative data, which is not suited for statistical analysis. Therefore, the analysis is limited to comparative analysis.

LIST OF REFERENCES

- Autograph Album for Ten Years' Enforcement for State Supervision and Inspection of Product Quality (1985-1995) (in Chinese) (Beijing, China: China State Bureau of Technical Supervision, 1995). 4. Ibid. 5. Ibid. 6. Ibid. 7. Ibid. 8. Ibid. 9. Ibid.
- Bernold, L.E. and J.F. Treseler, J.F. (1991). "Vendor analysis for best buy in construction." *J. Constr. Engrg. and Mgmt.*, 117(4), 645-658.
- Bloch, P. H., R. F. Bush, and L. Campbell (2003). "Consumer "accomplices" in product counterfeiting: a demand side investigation." *Journal of Consumer Marketing*, 4(4), 27-36.
- Chandhry. P. E. and Walsh, M. G. (1996). "An assessment of the impact of counterfeiting in international markets: the piracy paradox persists." *Columbia Journal of World Business*, 31(3), 34-38.
- Chen, J. J. (1998). "The characteristics and current status of China's construction industry." *Construction Management and Economics*, 16(6), 11-719.
- Chow, D. C. K. (2000). "Enforcement against counterfeiting in the People's Republic of China." *Northwestern Journal of International Law & Business*, 20(3), 447.
- Chow, D.C.K (2004), Counterfeiting in China and It's Effect on U.S. Manufacturing, Written testimony of D. C. K. Chow, Ohio State University College of Law, Columbus, OH, <<http://hsgac.senate.gov/>>
- Ghemawar, P. (1985). "Building strategy on the experience curve." *Harvard Business Review*, 63(2), 143-9.
- Harrold, P. and R. Lall (1993). "China: reform and development in 1992-93." *World Bank discussion paper No.215*. The World Bank, Washington, DC.
- Harvey, M. G. (1987). "Industrial product counterfeiting: problems and proposed solutions." *The Journal of Business & Industrial Marketing*; 2(4), 5-13.
- Hung, C. L. (2003). "The business of product counterfeiting in China and the post-WTO membership environment." *Asian Pacific Business Review*, October, 58-77.
- Institute for Construction Training and Development Sri Lanka Country Report (1997).
- Keats, A.M. and J. Joyner (1995). "Counterfeiting reaches new levels." *National Law Journal*, 17(36), 19-22.
- Lenard, D. Higgins, D. and Cousins, L (1997). "An overview of the Australian property and construction industry." *Third Asia Construction Conference*, Hong Kong

Polytechnic University, Hong Kong.

Lu, Q. (1994). "The economic structure of the PRC construction industry." in *CIB W55 Annual Meeting*, Hong Kong Polytechnic University.

"Meeting Materials of the State Crackdown on Counterfeit Goods in 1995." (in Chinese), *Quality Management*, Vol. 10, 1995, p. 16.

Pasadilla, J. R., and Y. H. Chiang (1998). "Globalization and construction industry development: implications of recent development of construction United States International Trade Commission (1983). "The Effects of Foreign Product Counterfeiting on U.S.-Industry." Acme Reporting Company, *Washington, D.C. Investigation* No. 332-158.

The Economist (1997) Series, Schools Briefs on Globalization, November-December.

"Supervision and Inspection Promote the Improvement of Product Quality: 6500 Manufacturers of Non-conforming Products Were Criticized" (in Chinese), *People's Daily*, Dec. 29, 1997. 12, Inspection results issued by the China State Bureau of Technical Supervision.

SSBC (1993,1994,1995) China Statistical Yearbook 1993, 1994, 1995, China Statistical Information and Consultancy Service Center, The state Statistical Bureau of China, Beijing, China.

Walker, A. (1981). "A Program to Combat Commercial Counterfeiting," *Trade-Mark Report*, 70, 117.

Wassermann, J. (1980). "UNGTAD: Trademarks and Developing Countries." *Journal of World Trade*, 14, 80.

Westbrook, R. A. (1980). "A Rating Scale For Measuring Product/Service Satisfaction." *Journal of Marketing*, 44(4), 68-72.

Yao, B. (1997). "General situation and prospects of China's construction industry." *Review of Urban & Regional Development Studies*, 11(2), 78-81.

Ye, B. L. (1996). "Why low-quality and fake products cannot be stopped." (in Chinese), *China Quality*, December, 15.

Xie, A. L. (1995). "Legal construction of quality should conform to the demand of socialist market economy." *Quality Management*, (in Chinese) 7, 26-35.

Zhang, Z. Y. (1996). "Opportunity and Challenge." *Beijing Review*, 39(1), 4.

BIOGRAPHICAL SKETCH

Shuai Cui was born in Tianjin, China. She is the daughter of Jin'an Cui and Weijun Wu. She has lived in Tianjin since she was born. She attended Yaohua High School in Tianjin from 1999 until her graduation in 2004. She began her college career in September 2004 at Tongji University in Shanghai, China. In 2008, she completed her Bachelor of Science with a degree of Construction Engineering and Real Estate.

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