Identification of Good China Steel Manufacturer for Industry

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Abstract. The purpose of this research study was to identify Good China Steel Manufacturer for Industry. Since 1990s, China’s Steel manufacture rapidly improve the output of the Steel Supply. In 2003, accumulated annual production by China’s Steel Manufacture exceeding 200million tons of Steel surpass others traditional Steel Manufacture likely Western Europe, India and Japanese Steel Manufacture. In China, there are Steel Manufacture that capable to produce the Steel Material follow World Class quality similar with reputable steel manufacture in Japan and Western Europe, however due to people general sceptical opinion on the China product, people perception that all China product is low quality without proper investigate on their capability and ability to supply the Steel Material for industry. In the project that related to steel product i.e Steel Bridge, offshore steel Jacket and Platform, pipeline, 40%-50% of Contract price is liaise with procurement of material. Utilizing China Steel Product envisage potential cost saving of 10%-20% to the overall Project cost that give advantage for both Contractor and Customer in reducing the overall cost of project. This paper aims to outline a research project for developing both information and technical requirements to identify good China Steel Manufacture via literature review, questionnaire survey, focus group, and audit report by reputable organization . The project results, will act as solid platform for Contractor and vendor to identify potential Steel Vendor for their project. It will support the decision-making process with respect to, quality, safety enhancement and assurance of quality to utilize China Steel Product for a project.

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1 Background

In view of current world market economic and growing number of projects worldwide, the need for steel has becoming more and more critical. With limited number of approved and qualified supplier of steel, the need to search a new steel manufacture that meet the quality with competitive price become essential for big company to sustain in the construction industry. Increasing of construction for high rise building, bridge, offshore project increases the demand for Steel Material. Based on report by World Steel Association for year 2017, the total world steel production on year 2017 are 1,691 million tonnes (MT) with increasing of 5.3% from year 2016 (Year 2016 production of 1,606 million tonnes (MT)). The main producer for steel is from China with total production of 831million tonnage (Mt) which contribute to 49.1% of world steel production. On 2016, China production for steel is 786 million tonnages (Mt) which show increasing of production of 5.7% from year 2016 to 2017.

With the growing demand, China’s iron and steel industry has obtained rapid development since the 1990s. During the global economic downturn on year 2007 which is considerable as dampened to industrial growth for worldwide, despite to economic crisis, China continues its rapid economic development growth by injecting more money for local infrastructure project as part for the government’s fiscal stimulus package to overcome the economic crisis. The bank injecting and provide loan to steel manufacture in order to boost their production and technology. China steel mill utilizing new technology that is advance technology in steel making comparing to Japan and Western Europe which is traditional Steel Manufacture that equip with old technology and machine that aging more than 20 years.

Fig.1. Crude Steel Production (Source: world steel.org)
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![Crude Steel Production](image)

**Fig.2.** World Crude Steel Production 2016 and 2017 (Source: World steel)

Despite China been categorize as the world main steel producer, the customer and contractor still cautiously in considering China steel product for their project. Several project been reported and tried in arbitration for low quality steel been deliver to the customer that impact to the project schedule and cost. [China 19 January 2000 CIETAC Arbitration proceeding (Steel cylinders case)], [Chinese steel fails strength test; AARON LEAMAN, Fulton Hogan HEB Waikato Project New Zealand].

In the face of several tried in arbitration by international company to the China Steel producer, the world cannot run away from sourcing the steel material from China steel mill as their commercial proposal is lower 10% to 20% compare to Japanese and European Steel producer. The attractive commercial propose by China mill and fast delivery of the steel promising the contractor to complete their construction ahead the schedule with lower cost regardless several cases of quality from China Steel producer.

With the increasing of world demand for steel material, most of China Manufacture apply international recognize certificate i.e ISO 9001, API, EURONORM, to certify the premise meeting worldwide international standard. As remarked by Roger G.Schroeder (2008), “…ISO 9001 Certification has a major impact on worldwide quality practices. Many companies are demanding ISO certification from their suppliers as a condition for doing business”. This situation has caused lots of contracting organizations to register for ISO certification. Joseph Juran (2002) said, “Initially the suppliers resisted the Quality System mandated by their customers, afterwards, it became a part of life”.

## 2 Problem Statement

Although the China steel is certified by ISO9001 certification, the issue of non-conformance to the specification still exits. Due to that, China Steel producer always been label as low-quality product. Several efforts are being recognised to find others alternative method to identify good China Steel mill manufacturer. Thus, it will help the Contractor to identify for reputable steel mill manufacture that capable to produce the steel meeting the quality assurance and quality control than been attended for application. Therefore, the objective for this research is to identify the method for identifying Good China Steel manufacture for industry purpose.
3 Methodology

Several activities are being develop to identify the best solution and way forward in meeting the Research objective. The activities were as follows:

1. Understand the Technical Specification for the Steel Material
2. Identify the Gap Analysis between available recognize Quality Assurance Standard with the China Mill Practise.
3. Market Survey / Interview with the people familiar in conducting Mill Audit for China Mill
4. Data Gathering and Analysis
5. Recommendation and best practice to identify Good China Steel Manufacture.

4 Result and Discussion

An interview and market survey have been conducted with the professional in Engineering, Procurement of Material and Project Management Consultant (PMC) that have experience with China Steel Mill in their previous and current project. A total of 25 questionnaires that have been distributed to the total of 80 personnel (comprising of 35 no of Engineer, 35 no of Procurement Specialist and 20 no of Project Management Consultant) by hand and interview method for gaining the industry response for selection of Good China Steel Manufacture. The questionnaire consist as follows main section:

Section A : Responded Information
Section B : Responded Experience in dealing with China Steel Mill and/or China Steel Product.
Section C : Responded / Responded Company Criteria for selection of China Steel Mill

**Fig.3.** Responded Background
Methodology

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![Table 1: Responded experience with China Steel Manufacture and/or China Steel Product](image)

<table>
<thead>
<tr>
<th>No</th>
<th>Responded Experience with China Steel Mill and/or China Steel Product</th>
<th>No of Pax</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 years and below</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Above 5 years up to 10 years</td>
<td>30</td>
<td>38%</td>
</tr>
<tr>
<td>3</td>
<td>Above 10 years</td>
<td>50</td>
<td>62%</td>
</tr>
</tbody>
</table>

![Table 2: Survey on the China Steel Quality](image)

<table>
<thead>
<tr>
<th>No</th>
<th>Survey on the China Steel Quality</th>
<th>No of Pax</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Good Quality, recommended for future Project/Purchasing</td>
<td>10</td>
<td>12.5%</td>
</tr>
<tr>
<td>2</td>
<td>Good, Can be consider for future Project/Purchasing</td>
<td>63</td>
<td>78.8%</td>
</tr>
<tr>
<td>3</td>
<td>Good, however required intervention from Customer/buyer for Quality Control</td>
<td>5</td>
<td>6.3%</td>
</tr>
<tr>
<td>4</td>
<td>Poor, can be consider upon further mill audit and verification.</td>
<td>2</td>
<td>2.4%</td>
</tr>
<tr>
<td>5</td>
<td>Poor, cannot be consider for future Project/Purchasing</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Based on the interview and market survey conducted, all the responded are industrial people that familiar dealing with the steel manufacture around the world. All the responders are with experience more than 5 years dealing with the China Steel Manufacture and/or China Steel product. They have experience dealing direct and indirect with the Steel mill for supply of steel material for their project.

Analysis of Responded Company Criteria for selection of China Steel Mill as below:

a. Recognize by International Standard

The mill is been certified by ISO 9001 and/or international standard. However, most of the respondents highlight that the steel mill that are approved by American Bureau Shipping (ABS) marine certification is more reliable and convincing to be utilize as the ABS certification is more detail and comprehensive comparing to others certification. The ABS certification also providing more detail approval in term of steel making process, process limitation, Quality Assurance and Quality Control and also the steel limitation on size and specification. The detail helps the responded in identify the mill capabilities without visiting the mill facilities.

b. Proven Track Record

All the mill selected for supply of the Steel product for their project are with prudent track record for supply of steel product more than 5 years to the reputable client i.e PETRONAS, Shell etc. They have experience supply of Structural Steel for international project.
c. Local Inspector for Inspection  
The main issue in China is about communication barrier. Most people in China unable to speak fluent English, therefore hiring local Chinese inspector will eliminate the communication barrier between both parties. Hiring local inspection company can eliminate quality issue as they understand the work culture in China and capable to identify any wrong doing by the manufacture that able to safeguard the purchaser.

d. Mill Company Corporation  
One of the key success factor for quality is that the mill shall be not be Private Company or belong to family or person. The reason behind this as the CEO or the top management can manipulate the system of the company in order to achieved higher profit by comprising the quality.  
The Steel mill that belong to Chinese government link company or public listed are the key success factor for good quality steel mill. The mill are maintain their quality assurance and quality control as their company are control by stakeholder that required them to maintain their integrity and quality. This criterion play an important criteria for selection of good Chinese Steel manufacture. Although there are several good private Steel mill that maintain the quality control, however the quality of the product can be questionn aire if no proper surveillance by customer in place during the steel making. To eliminate the risk, selection of mill company corporation are required.

e. Mill Audit  
Most of the steel mill utilize by responded are been audited by their engineering team. The team have intensively audit the mill from the steel making until the delivery of the steel. Some responded also make reference to marine surveillance company report (e.g ABS, Det Norske Veritas (DNV), Bureau Veritas and etc) in identifying and narrow down the list of potential steel mill in China for selection.  
The marine surveillance company mill audit report can be consider as reliable information and convincing as they periodically conducting the mill audit for the steel mill and its mandatory requirement by marine classification if the material is required to be purchased for shipbuilding.

f. Internal Steel Making  
The origin of billet and the slab for the mill shall be coming from their own mill. The mill capable to control the quality during the steel making until to complete steel material. There are some reservation for rolling mill as the steel mill rely the chemical composition from the billet/slab mill only.

5 Conclusions  
With the right procedure in selection of Steel Mill, we are able to identify Good Chinese Steel Manufacture that can comply with the Industrial requirement and have good quality assurance and quality control. The Chinese Steel Mill are already proven for supply of Steel Material for harsh environment (i.e marine, offshore structure, high rise building) and aerospace technology (China Satelite and Fighter Jet). However, proper selection of steel
mill shall be studied the Contractor before purchasing the steel material and not only rely upon to Steel Mill catalogue or company background.

6 Future Research Recommendation

In order for contractor to identify good Chinese Steel manufacture, the contractor can validate by:

1. Identify the mill proven in marine classification
2. Proven track record
3. Hiring Local Inspector for inspection surveillance
4. Identify Mill corporation
5. Conducting mill audit or rely upon to others company mill audit report especially by Marine Classification body (ABS, DNV, BV)
6. Having capabilities for internal steel making.

References

[1] Institute of Industrial Economies, Chinese Academy of Social Science (CASS), China’s Industrial Development
[3] [ China 19 January 2000 CIETAC Arbitration proceeding (Steel cylinders case)],
[4] [Chinese steel fails strength test; AARON LEAMAN, Fulton Hogan HEB Waikato Project New Zealand ].
[7] WORLDSTEEL ASSOCIATION
[8] American Bureau Shipping (ABS)