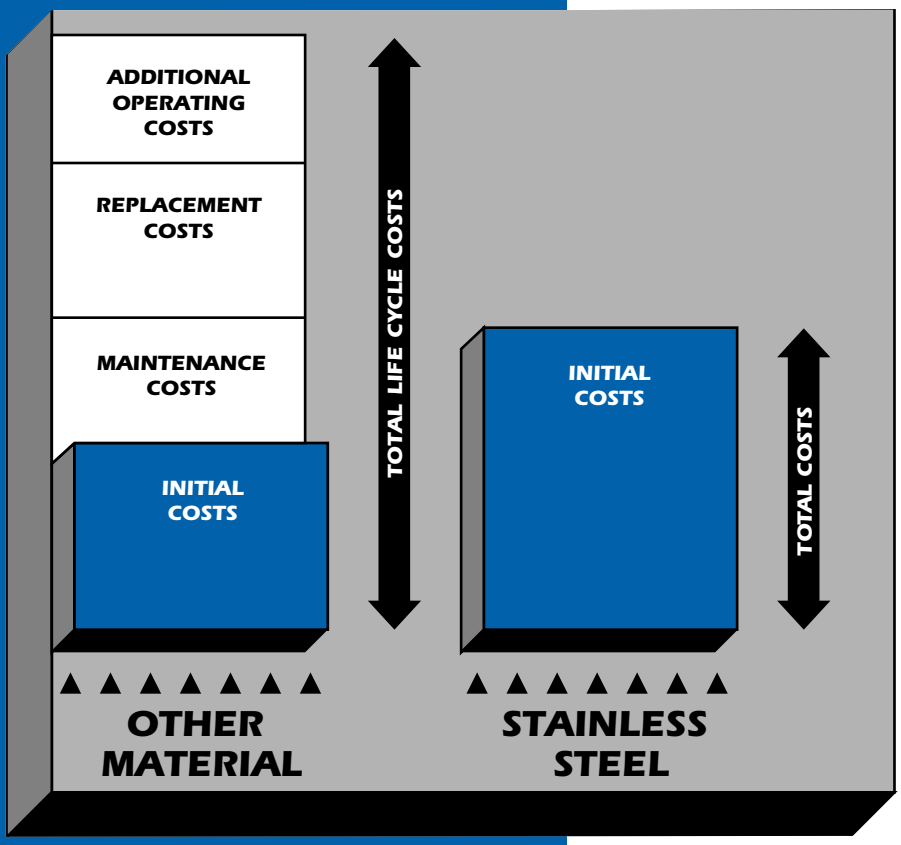
INTRODUCTION

TO LIFE CYCLE COSTING FOR STAINLESS STEEL



SPECIALTY STEEL INDUSTRY OF NORTH AMERICA

3050 K Street, N.W.
Washington, D.C. 20007
TEL: (202) 342-8630 or (800) 982-0355
FAX: (202) 342-8631
http://www.ssina.com

Stainless Steel
The Value Option®

Today's material selection is a major commitment. It commits the designer/specifier and his client to the total package of lifetime costs.

Life Cycle Costing/LCC

What Is Life Cycle Costing?

Life Cycle Costing/LCC is a technique developed for identifying and quantifying all costs, initial and ongoing, associated with a project or installation over a given period.

The full cost of a project includes projections of future interest and inflation rates, maintenance intervals and costs, and the desired service life.

Materials costs are assessed taking into consideration such long- and short-term factors as initial outlay, maintenance and its frequency, downtime effects, production losses, repair, replacement, and other operationally related costs such as manpower and energy consumption.

LCC uses the standard accounting principle of discounted cash flow, so that total costs incurred during a life cycle period are reduced to present day values. This allows a realistic comparison to be made of the options available in choosing the most cost effective material.

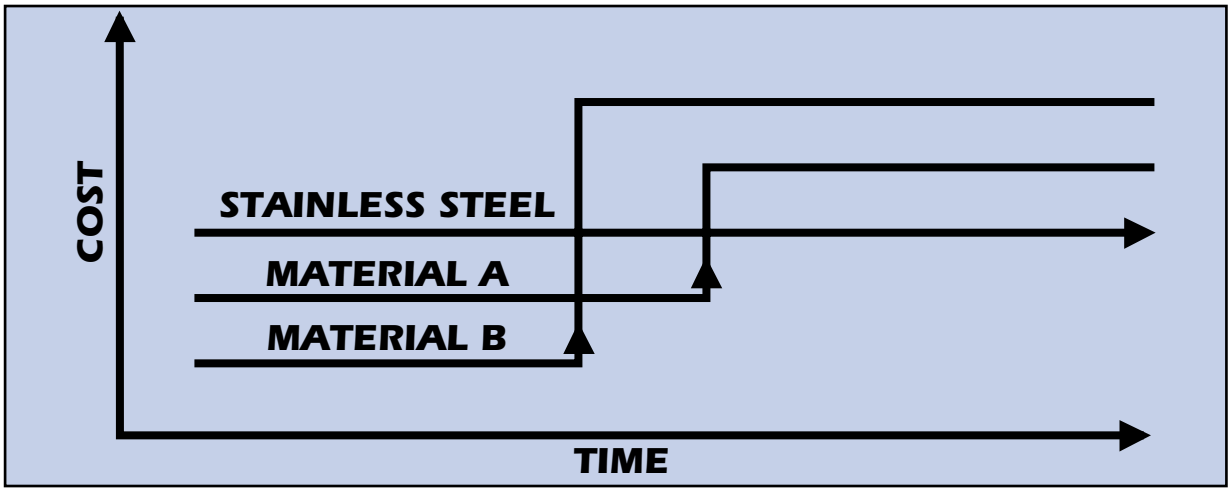
Why Life Cycle Costing?

Experience has shown that the costs of both future maintenance and associated downtime can far outweigh the initial material costs.

A full life cycle cost analysis enables the materials specifier to consider the full implications of future costs over the life of the project both in terms of actual monetary value and inconvenience of future maintenance and replacements. The graph below illustrates that the cost of Alternate Materials A and B substantially increases over time while the cost of stainless steel usually remains constant.

Cost Of Corrosion

Corrosion of metals costs the United States economy over $300 billion annually. It is estimated that about one-third of this cost ($100 billion) is avoidable by use of best known technology. This begins with design, selection of anti-corrosion materials like stainless steel, and quantifying initial and future costs including maintenance by Life Cycle Costing/LCC techniques.



The LCC software computer program has been developed to provide an efficient and essential tool for designers/specifiers to allow rapid, economical material selection, appropriate to a wide range of applications. The system requires an IBM (or compatible) PC, DOS version 2.2 or higher, 640 K RAM of memory, and is furnished on a 3½" diskette.

What Can The Life Cycle Costing Computer Program Do?

By working with only a few computer screens, the user can quickly and easily input the detailed information required to determine the Life Cycle Cost of any project — large or small.

The program compares the Lifetime Costs of up to three material alternatives in PRESENT VALUE TERMS.

On-screen displays, which can be printed at any time, consist of:

- **COST SUMMARY** showing initial costs, operating costs and total life cycle costs.
- **DETAILED ANALYSIS** listing all input variables.
- **SENSITIVITY ANALYSIS** on the primary input variables, showing the effect each has on total costs ('what-if' analysis). The sensitivity analysis performed by the program shows the effect of varying each of the input variables independently by a selected percentage on the base case life cycle cost.

The program also offers a HELP MENU to assist with input of variables.

How Can The Life Cycle Costing Program Be Obtained?

The LCC program is available free of charge by contacting:

Director of Stainless Steel Market Development
Specialty Steel Industry of North America
3050 K Street, N.W.
Washington, D.C. 20007
Tel: (202) 342-8630 or (800) 982-0355
Fax: (202) 342-8631
http://www.ssina.com

In material selection, LCC enables potential long-term benefits to be assessed against short-term expediency.

How Is It Done?

The Life Cycle Costing program is based on a "present value" concept.

"Present value" allows a designer/specifier to determine how much money must be committed today to account for the entire future costs that will occur during the entire planned service life of a project.

The Stainless Steel LCC program calculates the full project cost associated with material acquisition, fabrication, installation, operating, maintenance and other costs — all at present value.

The program compares three materials options in today's dollars. In most cases, the designer/specifier will find that stainless steel is the value option.

Shown below is the formula used to calculate the total Life Cycle Cost for each material being assessed.

All Costs at Present Value Before Addition:

Total life cycle cost (LCC)		Initial materials acquisition costs (AC)		Initial materials installation & fabrication costs (IC)		Operating & maintenance costs (OC)		Lost production costs during down-time (LP)		Replacement materials costs (RC)
LCC	$=$	AC	$+$	IC	$+$	$\sum_{n=1}^{N} \frac{OC}{(1+i)^n}$	$+$	$\sum_{n=1}^{N} \frac{LP}{(1+i)^n}$	$+$	$\sum_{n=1}^{N} \frac{RC}{(1+i)^n}$

Where: **N** = Desired service life **i** = Real interest rate **n** = Year of the event

Selecting materials is a decision which inescapably commits the company/client to a total financial package. Before final material selection, the full life cycle costs should be determined.

Why Stainless Steel?

The many unique properties of stainless steel — corrosion resistance, fire and heat resistance, cleanability and hygiene, high strength, impact resistance, ease of fabrication and unique aesthetic appearance — make stainless steel a powerful candidate in materials selection. Stainless steel is essentially a low carbon steel to which chromium has been added. There are more than 60 standard industry grades; many specialty grades are also available in a wide range of forms and finishes making stainless steel applicable to a wide variety of projects.

From its better known uses in cutlery, restaurant equipment, chemical processing machinery, automotive trim and exhaust systems, to computer diskette doors, building roofs and wall panels, household appliances, concrete reinforcing bars, and furnace components, stainless steel is truly a material for the 21st century.

Engineers, architects, materials specifiers and designers have often disregarded the valuable properties of stainless steel because of the higher initial cost. The use of LIFE CYCLE COSTING, however, shows that stainless steel is the most COST EFFECTIVE material for many applications, particularly where its use will eliminate required maintenance and/or replacement over the life of the project.

Benefits of Stainless Steel

- Corrosion Resistance
- Fire and Heat Resistance
- Strength
- Toughness
- Hygienic Quality
- Aesthetic Appearance
- Easily Fabricated
- Long Term Value

Life Cycle Cost Summary of a Bus Frame

Life Cycle Cost Summary of a Bus Frame (US$)			
Cost of capital		11.00 %	
Inflation rate		6.00 %	
Real interest rate		4.72 %	
Desired life cycle duration		20.0 years	
Downtime per maintenance/replacement event		5.0 days	
Value of lost production		815 Mu/day	
		Stainless	Mild Steel
Material costs		4400	1225
Fabrication costs		2120	410
Other installation costs		165	735
Total Initial Costs	(Mu)	6685	2370
Maintenance costs		155	2349
Replacement costs		0	0
Lost production		2570	7848
Material-related costs		0	2107
Total Operating cost	(Mu)	2725	12304
Total LCC Cost	(Mu)	9410	14674