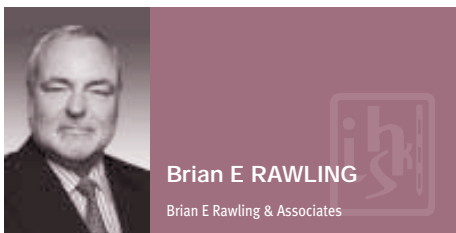


Contractor Owned Plant

- The Cost of Owning - Part II



This is the second article of a three part series, covering the complications of assessing the costs of contractor owned plant and considers capital lock-up, replacement and earning potential in times of inflation or deflation.

To help explain the principles, a worked example (as featured in the previous article) is provided for a Caterpillar 330L hydraulic excavator purchased new in 1996, by DIG Ltd, for a delivery price of HK\$1,400,000, (i.e. the all in cost).

To briefly re-cap, in the previous article, the hourly owning cost of DIG Ltd's excavator was assessed at the amounts shown in **Figure 1**.

330L Excavator (costed in 1996) HK\$/p.h.	
Depreciation	108.19
Insurance	5.56
Finance	16.55
Subtotal for hourly cost	<u>130.30</u>

Over a plant life of 6 years this equates to an income of about HK\$238,883 per annum (i.e. HK\$130.30/p.h. x 11,000p.h. ÷ 6 years)

Figure 1 Hourly owning cost – straight line method of depreciation

Capital Lock-Up

The first article considered the cost of finance,

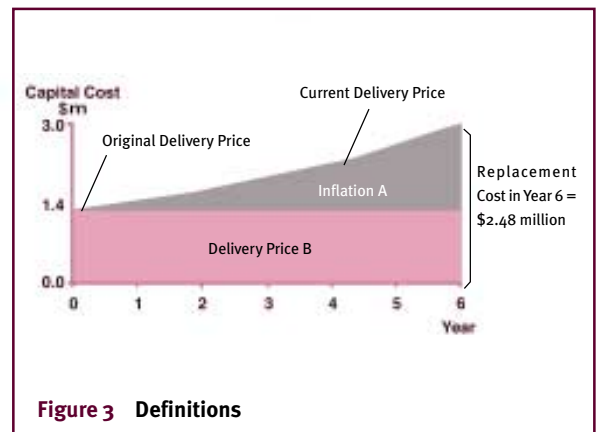
but what about capital lock-up? This is the cost of financing DIG Ltd's negative cash flow, or the cost of using the capital invested in the excavator until that capital is recovered. The interest on capital should be considered whether the excavator was bought outright or, as in the example, was bought through hire purchase. The capital lock-up cost can be assessed by a cashflow study similar to **Figure 2**.

In this example, funding was assessed at 6.5% simple interest on:-

- ▶ the residual value of the excavator (which will not be realised until the end of year 6); and
- ▶ the negative cash flow caused by a relatively short (2 years) hire purchase agreement.

The interest rate to be used when assessing capital lock-up cost should be that which the company pays if it borrows the capital or that which the company could earn if it invests its own capital.

The advantage of a 2 year hire purchase agreement is lower finance charges relative to the cost of capital locked-up in the excavator. If the



hire purchase agreement was to run for the useful life of the excavator (6 years) then the capital lock-up would be limited to the residual value of the excavator but the overall cost of financing would be greater as the hire purchase interest would be higher than the capital lock-up.

Inflation / Deflation and Replacement

We now move onto the contentious stuff! But let's first consider the following definitions with the help of the diagram in **Figure 3**.

- ▶ **Inflation** shown by area A is the difference, at any given time, between the original delivery purchase price and the current delivery price for a similar excavator.

<u>End of Year</u>	<u>Capital Cost</u>	<u>Finance</u>	<u>Insurance</u>	<u>Cash Out</u> [A] + [B] + [C]	<u>Cash In</u>	<u>Difference</u> [D] - [E]	<u>Cumulative</u> <u>Differences</u>	<u>Interest (6.5%)</u> ([G] x 0.065)
	[A]	[B]	[c]	[D]	[E]	[F]	[G]	[H]
	<u>HK\$</u>	<u>HK\$</u>	<u>HK\$</u>	<u>HK\$</u>	<u>HK\$</u>	<u>HK\$</u>	<u>HK\$</u>	<u>HK\$</u>
1	700,000	91,000	10,000	801,000	238,883	562,117	562,117	36,538
2	700,000	91,000	10,000	801,000	238,883	562,117	1,124,234	73,075
3			10,000	10,000	238,883	(228,883)	895,351	58,198
4			10,000	10,000	238,883	(228,883)	666,468	43,320
5			10,000	10,000	238,883	(228,883)	437,585	28,443
6			10,000	10,000	238,883	(228,883)	208,702	13,566
	<u>1,400,000</u>	<u>182,000</u>	<u>60,000</u>	<u>1,642,000</u>	<u>1,433,298</u>			<u>253,140</u>
						Plant life		<u>+ 11,000 p.h</u>
						Hourly cost of capital lock-up		<u>\$23.02 / p.h</u>

Figure 2 Capital lock-up

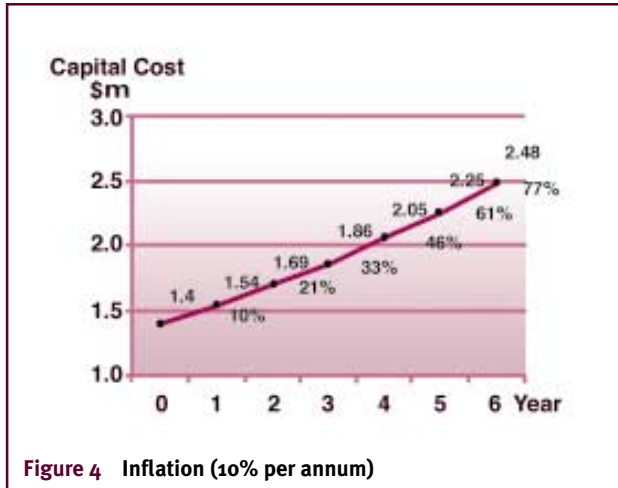


Figure 4 Inflation (10% per annum)

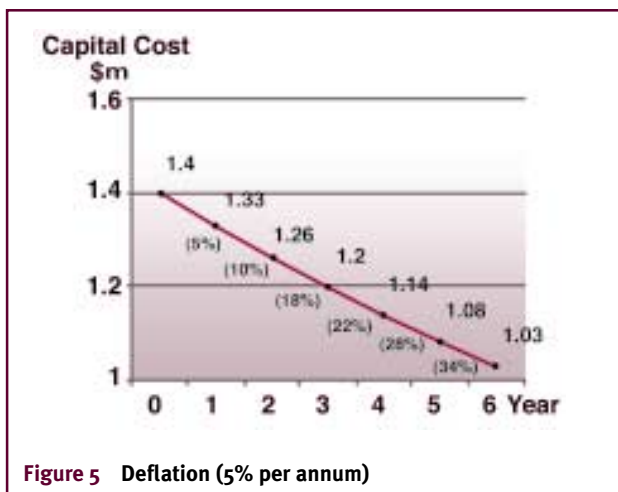


Figure 5 Deflation (5% per annum)

- **Replacement Cost** is the cost of replacing the excavator with a similar excavator at the end of its useful plant life i.e. Delivery Price [B] + Inflation [A].

The example which has been chosen is one of inflation, but deflation works in a converse way and would impact on the capital lock-up cost as returns would diminish.

Inflation Costing

If DIG Ltd did not account for inflation and priced work based on the 1996 delivery price, then it would not be valuing the excavator at current market rates. By year 6, at 10% annual inflation, DIG Ltd would be underpricing the inflationary trend by about 77% (see Figure 4).

If the converse occurred, and there was 5% deflation per annum over a 6 year period which resulted in lower delivery prices for plant, then DIG Ltd would be overpricing the deflationary

trend by about 34% (see Figure 5). If DIG Ltd did not reduce its prices it would be out of work and out of business.

Taxi fares are one analogy of age, value and inflation which may help to further explain the philosophy. A new taxi and a taxi which is 5 years old both charge the same fares even though both taxis have a different value in terms of potential earnings due to the differences in remaining useful life. The taxi fares charged are the same irrespective of whether it is the first day of use of a new taxi, with its full working life ahead of it, or the last day of use of an old taxi which will be retired on the next day. However, for an operational day, both new and old taxis have the same current earning potential for that day provided that the productivity of the old taxi can match the

productivity of the new taxi. The same applies to old and new plant if the old plant is capable of productivity to match the new plant. The plant rates are the same regardless of whether the same type of plant was manufactured in, say, 1991, 1993, 1995 or 1996.

Inflation and earning potential may be logical business sense but are they “direct loss and/or expense” and/or “additional cost”?

The definition of “Cost” in the KCRC General Conditions of Contract for Civil Engineering and Building Work includes for “*depreciation in value of any Contractor’s Equipment owned by the Contractor, but excluding profit*” [emphasis added]. Therefore, the “value” of the plant has to be assessed before depreciation can be calculated. As “value” is related to inflation and earning potential there is good reason, in BERA’s opinion, to suppose that these factors should be included in the assessment of cost, at least insofar as KCRC contracts are concerned.

When determining “value” it is not sufficient to limit considerations to what an item cost when it was purchased. For example, take an apartment purchased in early 1997 for \$10 million. Today, the value of that apartment is not \$10 million but about \$5 million. Therefore, “value” is related to market conditions not purchase price.

As DIG Ltd bought the excavator near the top of the construction market in Hong Kong in 1996 then the value (earning potential) in 2003 will be much less due to deflation even though the price of a new Caterpillar 330L excavator may not have depreciated.

Accordingly, when calculating depreciation after year 1, the “value” of the excavator in any year of use should reflect the current delivery price in that year as opposed to the original delivery price. At 8% inflation at the end of year 1 the current depreciated delivery price of a similar excavator would add an additional \$8.65 p.h above the hourly cost of depreciation at the beginning of year 1 (i.e. HK\$(1,400,000 8% x 85%)+11,000 p.h’s).

The converse would apply in times of deflation.

Replacement Costing

Where there is an ongoing business venture, the work that DIG Ltd does today should generate sufficient income to set up a fund for financing the replacement of the present excavator with a new one which will have to be purchased in the future if the company is to continue business. This is rather like inflationary or deflationary costing but projected for the useful plant life.

T M Ryan in an article entitled “Plant Cost Estimating I and II” published in the Institute of Quantity Surveyors’ ‘The Quantity Surveyor’ considered, at some length, the effects of inflation and recovering the replacement cost of plant. Basically, he submitted that the owning costs should account for depreciation for the cost of a replacement excavator purchased in the future not the cost of the present excavator i.e.:-

“The rate for each year should rise to match inflation in the cost of a new machine and still produce an amount which will show a return on the capital invested and at the same time provide funds for the replacement of the machine at the required time.”

At the time when Mr Ryan wrote his article (August 1980) inflation in UK had been rampant and accounting for replacements was perhaps more essential.

The principle is illustrated in **Figure 6**. Based upon an annual inflationary trend of 8%, DIG Ltd would recover HK\$1,571,356 for depreciation. However, the depreciated replacement cost for a new excavator at the end of year 6 is HK\$1,888,380, a shortfall of \$317,024.

Spon's Civil Engineering and Highway Works Price Book (1999), at page 104, recommends that plant-owning costs should *"be updated annually or bi-annually...to ensure complete recovery of the costs associated with the item of plant and return of capital to enable the machine to be replaced at the end of its life with the contractor. The purchase price must also be adjusted to ensure recovery of the replacement cost and not the original cost of purchase"*.

Summing Up

The costing of company owned plant should reflect inflationary/deflationary trends. If there was persistent deflation in the cost of new plant then, if the deflationary trend was not taken into account, the new plant would have an hourly cost lower than the old plant. That cannot be correct in assessing a reasonable and proper cost for an item of plant which is not new. In times of inflation, obviously the converse applies.

There is then the question of replacement. If the contractor only recovers the delivery price of an item of plant, then when it has reached the end of its useful working life, if the company is to continue in business, it must refinance to purchase a replacement. That is risky as in times of a downturn bank managers will not look favorably on loans to purchase new plant. However, in downturns the plant manufacturer may be able to offer special deals including deals on funding.

Therefore, is replacement really a cost and should it be part of an assessment of direct loss and/or expense and/or additional cost?

BERA consider that there is no fixed answer as it will depend upon the individual contractors and their company policy. For instance, if the company is a major earthworks contractor whose accounting procedures provide for replacement, then replacement costing may be allowable. However, if the contractor financed each plant purchase with a bank loan or hire purchase then replacement costing would not be allowable.

If replacement costing is allowable then the cost of capital lock-up would reduce as recovery of the capital lock-up would occur quicker.

Similarly, if inflation pricing occurs then the cost of capital lock-up reduces for the same reasons as replacement costing.

The next article considers plant operating costs.

For further information please contact bera@netvigator.com 

<u>End of Year</u>	<u>Delivery Price at 8% Inflation</u>	<u>Residual Value</u>	<u>Depreciation</u>	<u>Yearly Depreciation Adjusted for Inflation</u>
		$([B] \times 15\%)$	$([B] - [C])$	$([D]/6\text{years})$
[A]	[B]	[C]	[D]	[E]
HK\$	HK\$	HK\$	HK\$	HK\$
0	1,400,000	210,000	1,190,000	0
1	1,512,000	226,800	1,285,200	214,200
2	1,632,960	244,944	1,388,016	231,336
3	1,763,597	264,540	1,499,057	249,843
4	1,904,685	285,703	1,618,982	269,830
5	2,057,059	308,559	1,748,500	291,417
6	2,221,624	333,244	1,888,380	314,730
				1,571,356

Figure 6 Inflationary and replacement costing