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# WHEN IS AN ESCALATION CLAUSE NECESSARY? DEALING WITH PRICE FLUCTUATIONS IN DREDGING CONTRACTS

## ABSTRACT

Escalation refers to a provision in a contract which calls for an adjustment in price in the event of an increase or decrease in certain costs. Escalation clauses are becoming increasingly common in dredging contracts as a means to cover unexpected costs resulting from fluctuations in the prices for raw materials, fuel and labour during the course of the construction project.

The Contractor when preparing a tender estimate includes for costs of fuel, steel and wages and has to evaluate the appropriateness of an escalation clause to cover the risk of price fluctuations during the execution period of the contract.

Based on the analyses presented here, the recommendation is made that any dredging contract of a duration of more than three to six months should have an escalation clause included, as it will take speculation out of the tasks of the Contractor, which will result in a better focus on the projected work itself.

Major contributions to the total dredging price subject to fluctuations are fuel, steel and labour costs.

## INTRODUCTION

An escalation clause is a clause in a contract that guarantees a change in the contract price once a particular factor beyond the control of either party results in an increase or decrease in the Contractor's costs. It is also referred to as "Rise and Fall" which indicates that if the price of certain costs fall then the contract price will be adjusted in the client's favour. What goes up may also go down after all. In mature dredging markets like Europe, escalation clauses in one form or another are common, but they are not widely applied by clients in emerging dredging markets.

Quite often escalation clauses are little understood by clients unfamiliar with the specifics of the dredging industry. Often the question arises, "Why do tenderers qualify their offers especially with respect to fuel escalation?", which is a major component of

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Above: In the € 1 billion Maasvlakte 2 contract a price escalation system is successfully in place. The Client (Port of Rotterdam) initially listed a set of indices available for use, upon which the Contractors proposed the applicable percentages for the indices. Subsequently the Client covered the fuel price risk through a fuel hedge contract.

unit price – usually 20 to 30%. Expecting Contractors to absorb the escalation risk of this in their rates is not exactly the perfect start for a professional contractual relationship between Client and Contractor. Moreover, it could well backfire for the Client with all Tenderers having no other option than to put a hefty risk premium into their prices to cover for sharp increases of component prices.

Based on research and experience, the recommendation is made that any dredging contract of a duration of more than three to six months should have an escalation clause included. In this way, speculation is removed from the tasks of the Contractor and this results in a better focus on the projected works themselves.

## PRICE FLUCTUATIONS

The extent and the details of the escalation clause and formula can and do vary according to the situation at hand. A few examples are given below.

### Fuel

The use of escalation clauses in dredging contracts goes back to the early 1970s when the oil crisis imposed a huge spike in oil prices. From September 1973 to March 1974 the oil price increased 260% in real terms paralysing

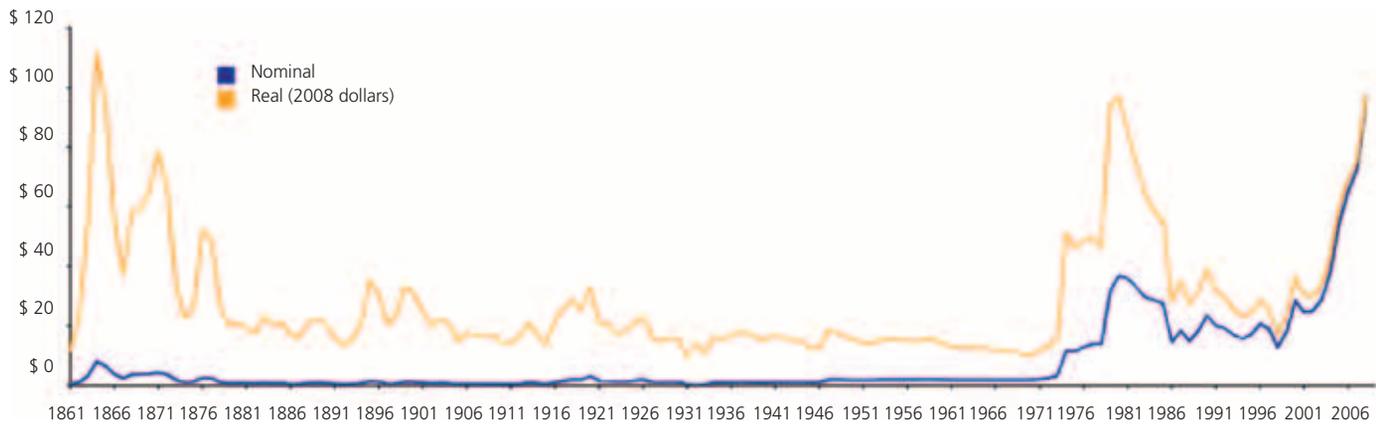


Figure 1. Nominal and real fuel prices from 1861-2008. Source: U.S. Energy Information Administration (December 2008).

the world economy. Further spikes occurred in 1979 with the fall of the Shah in Iran and more recently from 2001 onwards the oil price has been driven up with the rise of demand from the emerging countries like China, India and Brazil competing with the continuous demand for oil in the US economy. Figure 1 shows a chart of the nominal and real fuel prices over about 150 year period.

With the current political and social unrest in parts of North Africa and the Middle East, fuel prices are very volatile and are expected to remain unstable in the coming years. Recent events (2011) have shown that the rise and/or fall of the fuel prices in even a short timeframe of say a few months can be very significant. Figure 2 shows the World crude oil prices from 1980 to 2009 and as projected to 2035.

**Steel**

From 2004 onwards steel prices more than doubled as a result of China’s unending demand for iron ore, with only a brief respite caused by the Global Financial Crisis. Now the demand for raw materials has resumed and steel prices have hit record levels. Figure 3 shows the average monthly price of Iron Ore Carajas in U.S. cents per Dry Metric Tonne Unit (Units) from 1980 through 2011.

Steel is a not an obvious – but nevertheless important – element in dredging prices as the dredging contractors use steel in new-build vessels and for running repairs to their existing fleets. Dredging vessels have a life expectancy of over 25 years or more; maintenance and repairs (M+R) are a vital semi-continuous process with a distinct relation to the projects’

characteristics (like working in a hostile environment or pumping high-wear material).

Steel prices contribute significantly to these M+R costs. A drawback is that a balanced escalation clause is not easily achieved as there are differing factors and sources for data: CIRIA’s *A Guide to Cost Standards for Dredging Equipment 2009* and the IADC’s annual published indexation is one source for calculating any increase in M+R costs but in practice it has not been applied by Clients on dredging projects. The usual accepted sources are governmental statistics (like the EU Eurostat) on industrial steel and likewise (see Figure 4).

Still the problem persists in determining a fair percentage of the total project costs for “steel escalation in M+R”. Obviously M+R also involves a significant amount of labour costs and it could be argued that a separate indexation on the wages is appropriate. A specialised dredging consultant advising a client can produce a fair indication as part of the total project estimate. An alternative is to leave the percentage open for tenderers to fill in. This option will be discussed later in this article.

**Wages**

Even for the largest dredging equipment, the cost of crew wages is a major contribution to the total dredging price. Various developed economies around the world such as the USA, the European Union, Australia and Japan have government bodies which measure changes in wages. A Labour Price Index similar to the

**World crude oil prices, 1980-2035**

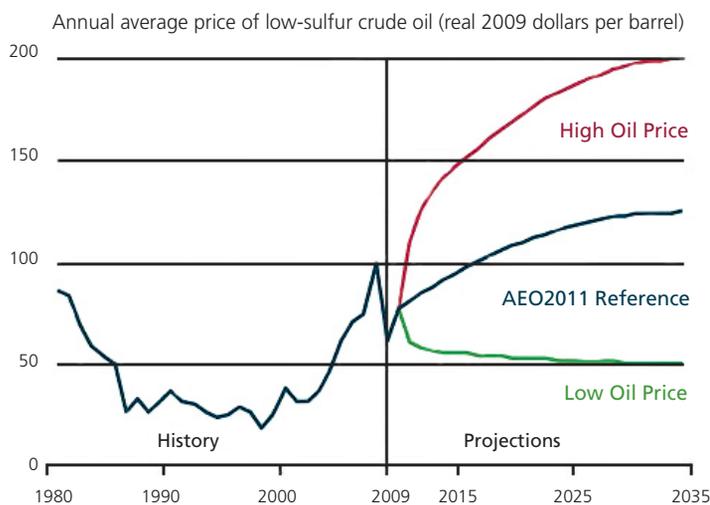


Figure 2. World crude oil prices (1980-2035). Source: U.S. Energy Information Administration, Annual Energy Outlook 2011 (December 2010).

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(MSc, Civil Engineering, Delft University of Technology) began work for HAM dredging in 1991, starting as superintendent and becoming planning/production and contracts engineer. He then joined the research department, specialising in the cost/benefit balance of hopper dredger equipment. From 1997 he worked as design and project development engineer at Ballast Nedam. In 2003 he became an independent consultant for civil engineering and dredging projects, mainly in port development. In 2006 he co-founded the Rotterdam-based consultancy Blue Pelican Associates.

U.S. Employment Cost Index is used by governments as an early indicator of wages pressure on inflation. An increase in the index suggests rising inflation pressures because firms tend to eventually pass higher labour costs onto clients in the form of higher prices.

The following is an excerpt from the Annual Report 2010 of one of the world's leading dredging companies (Boskalis):

*Risks related to price developments on the procurement side, such as increased wage costs, costs of materials, sub-contracting costs and fuel, are also taken into account in cost-price calculations. Wherever possible and especially on projects with a long completion time, cost indexation clauses are included in the contract, particularly with regard to labour and fuel costs. Material fuel costs are hedged*

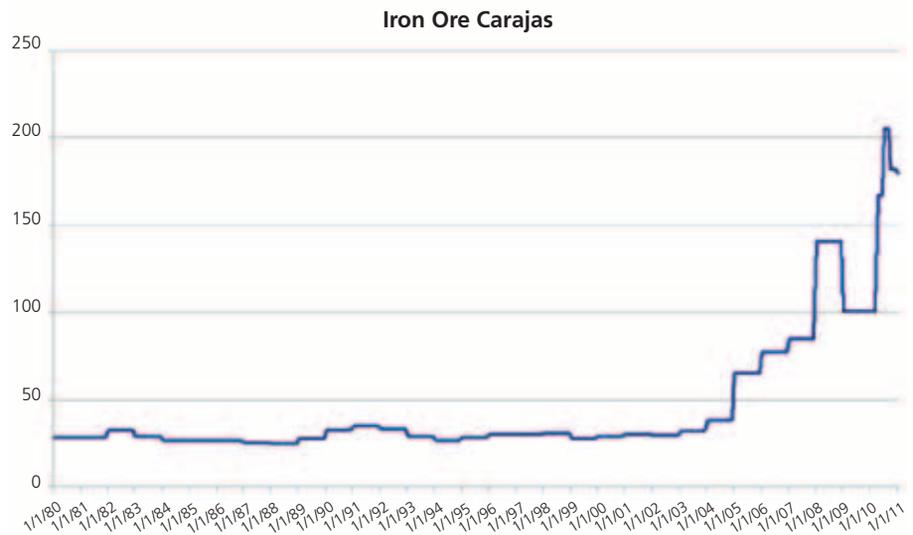


Figure 3. This chart reflects the average monthly price of Iron Ore Carajas in U.S. cents per Dry Metric Tonne Unit (Units from January 1980 through January 2011).

*in a number of different ways. Where possible, fuel cost variation clauses are included in the contract. Some contracts may also require fuel to be supplied by the client. In other cases, where substantial fuel risks exist, these are usually hedged with financial instruments such as forward contracts or futures.*

As the majority of European dredging contractors employ a core crew of their own nationality they are susceptible to wage increases in their home country. Whilst dredging contractors have increasingly sought to employ "Third Country Nationals" (TCNers) in order to reduce their labour costs they still are faced with labour forming a significant cost element in their contract prices. And for TCN crew, wage increases will likely be present as well.

The Contractor when preparing a tender estimate includes for costs of fuel, steel and wages, and has to evaluate the appropriateness of an escalation clause to cover the risk of price fluctuation during the execution period of the contract.

### **GUIDELINES FOR DEVELOPING ESCALATION CLAUSES**

Principally two systems exist: Reimbursing actual costs with the use of payslips (i.e., for fuel and/or labour) or the use of price indexes where the relative index value is related to a base value (=100) at a reference date.

### **Reimbursing actual costs**

A Fuel Escalation mechanism based on actual payslips appears to be a very straightforward system. Comparing the actual fuel price from a bunker invoice with the base value as has been stated in a Contractor's offer yields a difference that can be remunerated.

However, there are two significant drawbacks to the system:

- In the case of a (large) number of equipment on site using various types of fuel quality the bunker administration can become a significant task. Furthermore, equipment arriving and leaving must be surveyed and an agreement is needed on what price for the in-survey and out-survey volumes will be used.
- The volume of fuel that is used by the Contractor is not part of an escalation clause. The payslip method has no inherent correction mechanism for this, i.e., the Client has to introduce an extra check that the amount of fuel used for the works does not exceed the contractually agreed volume. Projects with multiple activities and possibly a list of variations make this check and/or correction cumbersome if not practically impossible.

Clearly the practical simplicity of the payslip method raises unwanted issues. The indices-system though initially appearing somewhat bureaucratic in its set-up and use is very efficient and effective and therefore recommended.

### Eurostat index values for iron, metal or steel products (January 2005=100)

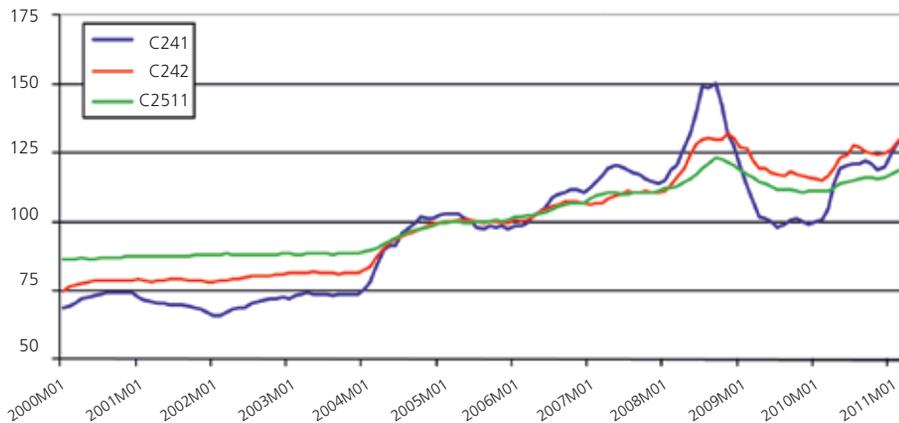


Figure 4. This chart presents some Eurostat indices for manufacture of iron, steel or metal products during the last decade. Obviously one should carefully select an appropriate index for using in a Rise and Fall clause. C241 is for basic steel, C242 is for steel pipes and tubes, C2511 is for steel products (Courtesy of Eurostat).

## Index System

(1) *Establish the base selling price subject to escalation.*

The item whose price is subject to escalation should be specified as precisely as possible:

- State whether the base price refers to a per-unit quantity or a certain volume of units.
- Give the effective date, month or year of this base selling price; this time period is often called the *base period*. In the authors' opinion the base period has to be chosen a sufficient amount of time before the date pricing of the Contractor is finalised, making sure relevant indices of the base period are actually published instead of being merely processed by statistics agencies.
- Indicate the length of time the base selling price will remain in effect (for instance: does the escalation cease if a delay is caused by the Contractor's own actions?)

(2) *Select an appropriate index or indices.*

Contracting parties may want to escalate the base price of a product by a single element such as fuel. Often, however, users may prefer to escalate on the basis of several data series, including some from other government statistical programmes, to reflect changes in costs of a variety of inputs. In some contracts, for example, costs of major materials and supplies are escalated with one or more Indices, while costs of labour are escalated with other index series such as the Employment Cost Index. In such cases, the escalation

clause should specify the percentage weight given to each index in calculating the total escalation amount. Clients may choose to list percentages themselves, but this is somewhat tricky and the preference is to have the Tenderers propose their own set of percentages (with an obligation for a Tenderer to substantiate in case the percentages are supposedly not realistic).

(3) *State the frequency of price adjustment.*

The escalation clause should specify whether price adjustments are to be made at fixed intervals, such as monthly, quarterly, or annually, or only at the expiration of the contract. To conform to the procedure, price adjustments have to be calculated over an interval whose beginning point is the contract's base period. As mentioned above, this is the time period associated with the chosen base price.

Difficulties will be encountered with those contracts which do not designate a specific frequency for price adjustment, but rather state that the latest data available as of a certain date should be used for adjustment. In this case, or for any other case that does not cite a specific time interval, problems will arise

(4) *Provide for missing or discontinued data.*

Occasionally any given index may be unavailable for a particular time period, usually because price information was not supplied by

a sufficient number of survey respondents to meet index publication standards. Highly detailed indices are more susceptible to this problem than indices for broader groupings. Escalation clauses should provide procedures to be used when required data are missing.

Sometimes an index is permanently discontinued when a commodity declines in market importance; this most commonly occurs as a result of periodic resampling of industries and their output. Escalation clauses may provide for successor indices if original indices are discontinued, or for contracting parties to renegotiate a successor index. A default provision that calls for using the next higher-level series might be included in the contract.

Note that if an index provider merely changes the title or recodes an index, the index is still considered to be the same series and therefore, presumably, should not necessitate any contract renegotiation.

A contract should not refer to an index value associated with a base price, but instead to its month and year alone. That is, what should *not* be written into the contract is language such as the following: "Divide the current index value by 103.9 (which is the value of the index for the base period January 1990) and then...".

Rather, it should be written: "Divide the current index value by the index value for January 1990, which represents the base period, and then...".

Contract clauses that incorporate specific index values will become problematic when the reference base is later changed by the index publisher; the index value incorporated into the contract will be incompatible with current official data after the index publisher has implemented the rebasing. Especially in the first few months after publication of an index value, small corrections by the publisher are quite frequent.

## Define the mechanics of price adjustment

(a) *Simple percentage method.*

One method of price adjustment is to have the base price changed by the same percentage as

that calculated for the selected index. To illustrate, suppose that the contract escalation clause refers to the Labour Price Index. Also suppose that the Labour Price Index was 110.0 when the base price was set. A year later when the first adjustment is made, the figure is 115.5.

This represents an increase of 5.0 percent in the Price Index as shown.

<b>Index at time of calculation</b>	<b>115.5</b>
<b>Divided by Index at time base price was set</b>	<b>110.0</b>
<b>Equals</b>	<b>1.050</b>

This means that the base price should be increased by 5.0 percent. To proceed:

<b>Base price (part associated with Labour)</b>	<b>\$1,000.00</b>
<b>Multiplied by</b>	<b>1.050</b>
<b>Equals adjusted price</b>	<b>\$1,050.00</b>

In later years, this procedure would be applied again by taking the current Index value and dividing by the Index value at the time the base price was set and then proceeding just as described above.

*(b) Escalation of a portion of the base price.*  
A common procedure changes only part of the base price so that only part of it is escalated by a selected index, while the balance remains fixed. This is commonly referred to as the "fixed portion" and is the element of the Contract Price which is not subject to price adjustment.

The percentage weight or escalation factor is an important element in the passing of risk between Contractor and Client.

To realistically work it should reflect the division of the Contractors' costs as an element of the build-up of their unit rates. Too low a figure and the Contractor bears too much of the price fluctuation risk, and with too high a factor overcompensation of price fluctuations occurs.

By definition whether prices will go up or down is unknown and both are unwanted situations for both Client and Contractor. Principally any escalation system works best if the contractual percentages resemble the actual build-up of the Contractors' costs.

To summarise, pitfalls to avoid are:

- Vague citation of "the applicable Labour Price Index" rather than a reference to a specific index by its title and any identifying code number.
- Use of unofficial price estimates derived from various sources during the estimate
- Ambiguous reference to dates ("index as of May 30").
- Lack of a provision for a successor Index should the designated index be dropped from the index system, or if it should become temporarily unavailable.
- Locking an index into a specific base period.
- Using ambiguous terms, for example, referring to "actual" indices.
- For an example of a basic escalation formula using index values, see the text box.

**REMARKS**

- The amount of fuel actually used or number of crew deployed by the Contractor is the Contractor's risk/reward only (as part of the Contractor's estimating process and commercial considerations). "Rise and Fall" clauses should only deal with the price fluctuations. This is again best achieved by

having the Contractor state the percentage of the various parameters as part of the total contract sum.

- In case fuel usage is somehow part of award criteria (likely to become more popular as a result of sustainability concerns), the calculation of indexation costs for fuel prices and the usage target calculation shall not interfere in a way that makes practical administration impossible.
- It is perhaps rather obvious but still important for all parties to realise that fuel and steel prices can go down as well, which may result in a reduction of monthly payments.
- Using "No indexation" is only acceptable for (very) short contracts, say maximum 3 to 6 months. For any longer period "no indexation" poses the Contractor with the commercial problem of gambling on future price developments. In the end the Client will pay for this (through an additional risk premium either from the Contractor or through a fuel hedge contract entered into by the Contractor) or the Contractor will lose money for reasons beyond the Contractor's control. Opportunistic Clients might consider that the Contractor should

**EXAMPLE OF A BASIC ESCALATION FORMULA USING INDEX VALUES**

**Rise & Fall Formula:  $A = P * ((a * L_1 / L_0) + (b * S_1 / S_0) + (c * F_1 / F_0) + d)$**

in which:

A = Value of monthly Payment Claim in accordance with contract after adjustment for rise and fall

P = Value of monthly Payment Claim, and:

- a = Agreed proportion for labour = 30%
- L<sub>0</sub> = Base Labour Price = 1100 €/man/wk
- L<sub>1</sub> = Current Labour Price = .... €/man/wk

*(The Current Labour Price is the actual value for the Payment Claim period as published by the Government Statistics Bureau)*

- b = Agreed proportion for steel = 10%
- S<sub>0</sub> = Base Steel Index = 100.0
- S<sub>1</sub> = Current Steel Index = ...

*(The Current Steel Index is deemed to be the latest released by Eurostat at the moment of issuing the Payment Claim)*

- c = Agreed proportion for fuel = 25%
- F<sub>0</sub> = Base Fuel Price = 593.12 \$/MT (excluding VAT, taxes, rebates, etc)
- F<sub>1</sub> = Current Fuel Price = ....

*(The Current Fuel Price is deemed to be the Fuel Gate price per metric tonne for Marine Gas Oil (MGO) averaged over the period of time since the last Payment Claim was made)*

- d = Agreed constant = 35%

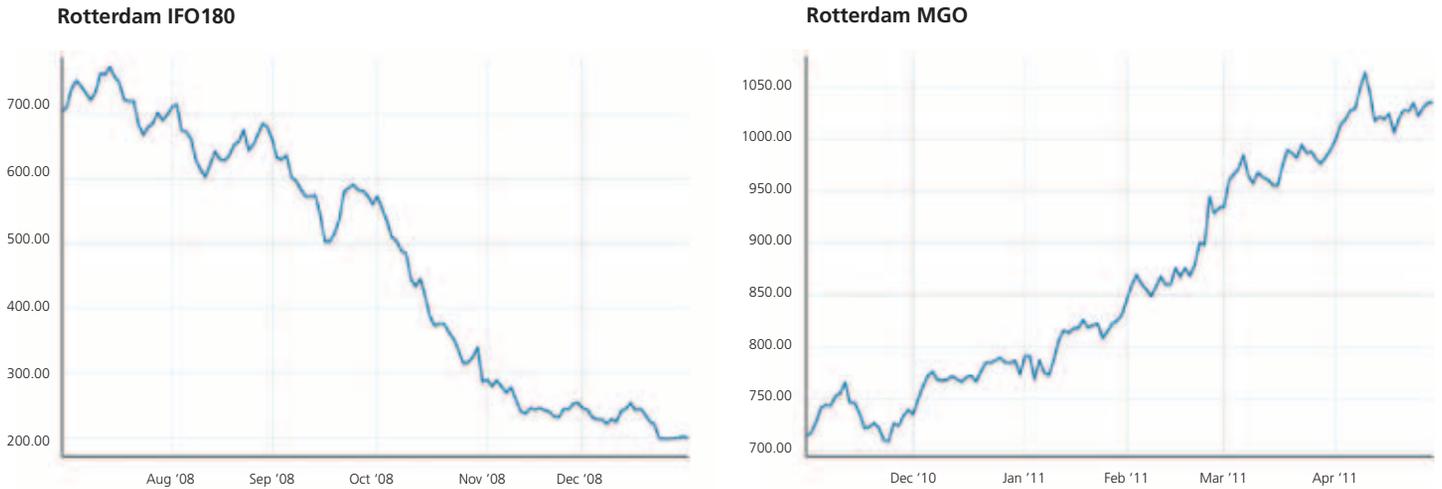


Figure 5. Two examples from the recent past show the price volatility on the bunker market. Even in a short timeframe of 6 months prices can rise or fall as much as 50%. Hence the recommendation to include an escalation clause for every contract with a duration over 3 months – and not to include a first-year exemption period. (Courtesy of www.bunkerworld.com).

bear this risk but they should realise that this will put immense pressure on the relationship and probably result in an overly firm and strict viewpoint of the Contractor as to any other issues popping up during the project.

- Clients should never bear any responsibility for delivery of fuel. Timing and Fuel Specifications or Quality would almost certainly become major problems.
- Clients are advised to exclude fuel escalation on mobilisation and demobilisation, as this occurs out of country and is a one-off payment whereas fuel for the project is continuing.

### PRICE INDICES AROUND THE WORLD Global

Increasingly many fuel users choose to follow fuel price fluctuations using data from publishers like Bunkerworld or Platts. Both are subscription services where prices are collected for all major bunker ports worldwide.

Prices for various types of fuel as used by marine equipment, like IFO (Intermediate fuel oil) and MGO (Marine gas oil) are shown daily (average and spread) (see Figures 5 and 6). This way, the price indication data is the most independent, up-to-date and true information that anyone could have access to. Historical data and extensive graphic presentation of the data are available as well. Bunkerworld has a limited part of the data available free of charge.

### England

In England escalation was applied on construction contracts using data from the BCIS formerly known as the *BERR Price Adjustment Formulae Indices*. These monthly Indices are used in conjunction with the Formula Methods of adjusting building, specialist engineering and civil engineering contracts such as the NEC's ECC Contract

which has special clauses to allow for changes in the costs of labour, plant and materials. They are also familiarly known as either the NEDO or Baxter Indices and are widely used on Variation of Price Contracts.

They have been applied to dredging contracts for fluctuations in labour and steel costs. Fuel fluctuations have traditionally been dealt with

#### IFO180 (RME180 RMF180)

Date	\$/MT	ch\$	BBP*	High	Low
May 23	621.00 ▼	-6.50	Pending	623.00	620.00
May 20	627.50 ▼	-3.00	627.50	632.00	625.00
May 19	630.50 ◀	0.00	630.50	633.00	629.00
May 18	630.50 ▼	-5.00	630.50	633.00	629.00
May 17	635.50 ◀	0.00	635.50	641.00	632.00

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28-Day spread \$66.50

28-Day volatility 10%



#### MGO (DMA DMX)

Date	\$/MT	ch\$	BBP*	High	Low
May 23	907.50	-20.00	Pending	915.00	900.00
May 20	927.50	+2.50	927.50	932.00	922.00
May 19	925.00	+13.50	925.00	930.00	923.00
May 18	911.50	-7.00	911.50	922.00	901.00
May 17	918.50	-7.50	918.50	920.00	915.00

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28-Day spread \$133.00

28-Day volatility 13%



Figure 6. An example of daily fluctuations for various fuels (Courtesy of www.bunkerworld.com).



Figure 7. Price fluctuations on dredging projects, wherever they are located and whatever equipment utilised, require careful attention by Employers and Contractors alike.

purchase prices from suppliers. This system is applied in many countries around the world as indices do not apply to fuel as the cost may vary considerably per location as the transport and delivery costs have to be taken into consideration (Figure 7).

### Netherlands

The Dutch system often used for standard build-only contracts has its origin in road building. It is now used for the majority of major construction contracts lasting longer than a year. Using 22 different indices for a wide variety of commodities (including fuel, labour and steel) with a monthly update, the system has the advantage of a nationally standardised and clear administrative process. The way these indices are prepared is not entirely clear, and for specialist projects like most dredging, marine or offshore projects, the indices used are not overly appropriate. In a number of cases the indices become available only after some 4 months. This escalation system is applied to local dredging contracts, although as far as fuel is concerned, the Client predefines the percentage for fuel as part of the total contract price though during the first year after signing the contract no escalation is applied. Considering the volatility of the worldwide fuel market this is no longer defensible in the present market.

Furthermore, the system in which Client predefines the percentage of fuel can still

leave the Contractor with some price risk that needs to be insured or to be included in the basic price somewhere. In general, however, both contract parties consider this system successful in taking most of the speculation out of the hands of the Contractor and thus helping competitive pricing.

### Germany

German contracts for major waterway maintenance adopt the system where actual payslips for fuel are compared with the base fuel price in the Contract. The difference in fuel price is taken into account with the (monthly) payment of the works.

### HEDGING OF FUEL PRICES

Those Clients looking for certainty as to their future expenses (and therefore shy of entering into an open-ended price escalation clause with a Contractor) might consider the option of entering into a fuel hedge contract with an oil company, a financial institution or a fuel trading company. Effectively a fixed fuel rate and volume usage prognoses is agreed between Client and the fuel hedging company, at the expense of a premium on top of the actual market price of the fuel to cover for the risks involved. The premium depends on the actual situation in the oil market and the prognosis for the contractual period. Principally this system is similar to a currency exchange risk insurance. However it requires insight from the Client to the fuel volume prognoses of the

Contractor for the project at hand. It is up to each Client to decide for themselves, based on their specific financial situations and the way financial risks are managed, whether fuel hedging for a dredging contract should be considered beneficial. It is generally considered by Port companies who have their own existing fuel supply contracts rather than Clients who employ dredging companies in a one-off contract. In general it can be said that the hedging premium is hefty, especially in uncertain times in the world oil market as at present (2011). The possibility of hedging a part of the total consumption (for instance 33%, 50% or 67%) might be a good solution to cover part of the risk.

## CONCLUSIONS

Reviewing the above considerations, the authors' recommendation is that any dredging contract of a duration of more than three to six months should have an escalation clause included. Such an escalation clause will take speculation out of the tasks of the Contractor which results in a better focus on the projected works itself. Major contributions to the total dredging price subject to fluctuations are fuel, steel and labour costs.

The administration of an escalation clause is remarkably straightforward if the contract is drafted carefully in this respect. Of the two systems that exist for an escalation clause the use of price indices relative to base values is considered superior to the reimbursement of actual costs using payslips.

The percentages that apply to various indices chosen for an escalation clause in a dredging contract are preferably left open for Tenderers to fill in as part of their offer. A Client cost estimate for the project can yield figures for this as well.

Clients who prefer not to be exposed to inherent risks of, for instance, fuel price fluctuations can combine an escalation clause in their dredging contract with a separate fuel hedge contract with an oil company, a financial institution or a fuel trading company.