RICS PRACTICE INFORMATION

Cash flow forecasting

UK

2nd edition, July 2024

RICS®

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Document definitions

Document type	Definition
RICS professional standards	**Set requirements or expectations for RICS members and regulated firms about how they provide services or the outcomes of their actions.** RICS professional standards are principles-based and focused on outcomes and good practice. Any requirements included set a baseline expectation for competent delivery or ethical behaviour. They include practices and behaviours intended to protect clients and other stakeholders, as well as ensuring their reasonable expectations of ethics, integrity, technical competence and diligence are met. Members must comply with an RICS professional standard. They may include: • mandatory requirements, which use the word 'must' and must be complied with, and/or • recommended best practice, which uses the word 'should'. It is recognised that there may be acceptable alternatives to best practice that achieve the same or a better outcome. In regulatory or disciplinary proceedings, RICS will take into account relevant professional standards when deciding whether an RICS member or regulated firm acted appropriately and with reasonable competence. It is also likely that during any legal proceedings a judge, adjudicator or equivalent will take RICS professional standards into account.
RICS practice information	**Information to support the practice, knowledge and performance of RICS members and regulated firms, and the demand for professional services.** Practice information includes definitions, processes, toolkits, checklists, insights, research and technical information or advice. It also includes documents that aim to provide common benchmarks or approaches across a sector to help build efficient and consistent practice. This information is not mandatory and does not set requirements for RICS members or make explicit recommendations.

1 Introduction

This practice information summarises what cash flow forecasting is, how to produce a useful forecast and how to then use the forecast to assess progress on site as well as other issues. It can also help assist both employers and contractors to analyse actual expenditure against forecast expenditure.

For the purposes of giving guidance the client is referred to as the 'employer' and the main contractor as 'contractor'. However, much of the guidance can equally be applied to a contractor/ subcontractor or supplier arrangement.

This practice information generally gives guidance on the cash flow of construction contracts (project cash flows) and not specifically for the cash flows of companies (organisational cash flows), although there are many principles that do overlap.

Cash flow is the lifeblood of the construction industry and relates to the incoming or outgoing of money to or from a company over a given period (usually monthly). Within construction contracts, a cash flow forecast is generally used to inform the employer so they know what and when their monetary commitments under the contract will be. They can be in the form of long-term or short-term forecasts and these forecasts should be constantly updated and revised as better, more accurate information becomes available or when variations to the model occur (i.e. non-expenditure of provisional sums, claims, extension of times).

Guidance is given in relation to the main forms of contract and main procurement routes, under the following headings, which map to the Assessment of Professional Competence (APC):

- General principles (Level 1: Knowing)
- Practical application (Level 2: Doing)
- Practical considerations (Level 3: Advising)

1.1 Minimum level of service

The quantity surveyor is expected to fulfil the following duties, notwithstanding the detailed terms of any appointment or contractual obligation.

- Take an initial brief from the employer to understand their requirements for a cash flow forecast.
- Develop and maintain a project cost plan and project cash flow forecast for the duration of the project to give the employer an understanding of their likely obligations.
- Update the cash flow forecast throughout the design, tendering and contract period.
- Monitor actual payments against the cash flow forecast and explain any discrepancies.

2 General Principles: Level 1 – Knowing

This section explains:

- what cash flow forecasts are used for
- their usefulness in terms of running a business and predicting business failure
- the various contractual mechanisms for dealing with cash flows
- the relevant legislative items and
- the formulas or 'curves' used to predict the cash flow for construction projects.

2.1 Uses of cash flow forecasts

There are two main types of cash flow forecast.

- The cash flow forecast of a company (i.e. a contractor or consultant) – otherwise known as organisational cash flow.
- The cash flow forecast of a particular construction contract or project – otherwise known as project cash flow.

The cash flow forecast of a company will review and analyse the predicted incoming and outgoing cash for a set period of time (usually a year) and is often used for business and resource planning and for analysing the financial health of companies.

The cash flow forecast of a construction contract or project deals specifically with the payments due under a particular construction contract.

The construction contract cash flow will often inform a company's overall cash flow as they are intrinsically linked.

It is important to understand both types of cash flow forecast and how and why they are used in the construction industry.

Various parties in a construction contract use cash flow forecasts for different reasons and it is therefore not uncommon to present cash flow forecasts in different ways to fit the requirement. It is also important to note that cash flow can travel in different directions, but for the purposes of this practice information any reference to cash flow means the cash flow from the employer to the main contractor unless otherwise stated.

Other directions of cash flow to consider are the main contractor's cash flow to their subcontractors and suppliers, the employer's cash flow to consultants (i.e. architect and

quantity surveyor, etc.) and other fees (fit-out costs, VAT, etc.). For an overall project cash see Table 1.

From	Employer	Main contractor	Sub-contractors
To	Main contractor	Sub-contractors	Suppliers
	Consultants	Suppliers	Specialists
	Specialist contractors	HM Revenue & Customs	
	HM Revenue & Customs	Designers	
	Direct appointments		

Table 1: Potential directions of cash flow

The following is not exhaustive but aims to illustrate some of the common usages of cash flow forecasts.

2.1.1 Obtaining loans and bank monitoring

In simple terms the purpose of a cash flow forecast is to ensure that the employer has an accurate assessment of what needs to be paid to the contractor and at what intervals, therefore the employer's bank or funder needs to be aware of drawdowns to manage the movement of funds to meet the contractual timescales of payment.

Although especially important for developers and clients if they are obtaining debt finance (loans) to fund their projects, it is also important if they are using their own money. It is not uncommon for banks and other funders to request a drawdown schedule at the beginning of any project. If an employer has their own money (equity) this may be tied up in other assets or dependent on in-coming cash flow (revenue).

Banks will often employ bank monitoring specialists (frequently quantity surveyors) to ensure that the contractor's drawdown requests are in line with the original cash flow forecast and to provide an explanation if it differs. The business case of projects can be linked to the funding terms received from their funder and a deviation from this agreement can have a significant effect on the overall business case. The employer can be liable for penalties, interest charges and arrangement fees for securing an accelerated fund, from their funder if the drawdown is markedly less or in excess of the drawdown schedule.

2.1.2 Contractor progress monitoring

Perhaps the most common use of a cash flow forecast for a quantity surveyor is to monitor the progress of the works on site against the agreed programme. At the point of entering

into contract with the contractor, the employer will often ask for a cash flow forecast based on the agreed programme.

It is equally important that this is also done between the main contractor and their subcontractors. This becomes more accurate than using an S-curve (section 2.5) as it is based on an agreed sequence of events rather than a formula. It is also therefore very useful in assessing whether a contractor is on programme or not. If the interim valuation amounts are ahead of cash flow forecast, this can signify that the works are ahead of programme. If the interim valuation amounts are behind cash flow forecast, this can signify that the works are behind programme. It should be noted that monitoring against a cash flow forecast can only be taken as indicative. The most accurate form of measurement is always a physical assessment of the works carried out on site versus the programme.

The cash flow forecast can also be used internally by contractors to monitor their own progress (or subcontractors' progress) or used to assess the movement of any float in the programme.

It takes on extra significance for NEC contracts, as the programme and activity schedules are specifically referenced within the contract conditions. Therefore, cash flow forecasts that are produced in accordance with these documents can be used by the project manager to assess any compensation events, early warnings or programme revisions before accepting them.

While cash flow forecasts can be used to monitor progress on site, both the preparation of the cash flow forecasts and the valuation have to be accurate to ensure comparisons are valid. It goes without saying that the further along the design and tender process the project is the more detailed and accurate the cash flow forecast will become.

2.1.3 Managing cash in a business

Cash drives all businesses and the management of the flow of cash in and out of a business is essential to the survival of any company. It is also important for sole practitioners for their own business planning and forecasting.

The payment terms of most contracts means that work is usually paid for in arrears, so it is important that contractors and consultants understand what their liabilities are and when they are likely to be paid.

Overdrafts with banks are often used to manage any shortfalls but delays in payments, disputes with clients or renegotiation of overdraft terms can have disastrous consequences to the future of businesses.

2.1.4 Forecasting business performance

Before appointing any company (whether a contractor or a consultant) it is crucial that their past and likely future performance is carefully analysed. An organisational cash flow forecast is particularly useful in predicting how a business will perform in the future and whether they will be able to adequately cope with the works being considered. It is also prudent to check the company cash flow of any key subcontractor or supplier being proposed.

Some of the key details to review are the overdraft level, the frequency that the business is using the overdraft facility and the potential effect if the bank removed the overdraft facility. It is also important to review the company's largest clients and analyse the effect of a reduction or omission of business from one or more of these. It is a simple equation that must be reviewed – is the business bringing in as much money (revenue) as it is spending (expenditure)?

2.1.5 Stakeholder management

There are often third parties or stakeholders who have a vested interest in the cash flow of a company or construction contract and often for very different reasons. Funders will want to know that a business is sound and solvent before agreeing to loans. Shareholders will be interested in company performance and ensuring that their dividends are as high as possible. This may impact a company's ability to make decisions for the long term at the expense of the short-term profits for the shareholders. The construction contract cash flow will feed into the overall company cash flow forecast and any errors or slippage in a particular project cash flow could affect the company's overall cash flow and performance.

Banks, local authorities and other guarantors who fund construction contracts will often want to review the cash flow forecast of a construction contract. Employers who are dependent upon debt finance for their projects will be especially interested in reviewing and vetting the cash flow forecast before entering into contract, as any errors in the cash flow forecast could leave the client in a situation where they are unable to meet their liabilities for a certain period.

2.1.6 Managing consultants' resources

Cash flow forecasts are typically used in a company to manage resources. Resources may include staff, training, equipment, premises, etc.

Companies must be sure that they can meet their liabilities in terms of wages, insurances and other overheads before employing additional staff. An organisational cash flow forecast can help to inform these decision-making processes. There is often a fine balance between adequately resourcing for a given period and over committing.

It is important to understand that just because a business is successful or profitable does not mean that it cannot have cash flow problems.

Some very successful and profitable companies have experienced business failure due to inability to manage cash flow adequately. Many contractors have entered administration simply due to short-term inabilities to meet current liabilities. This may be due to late payments from clients, tying up too much capital in assets (known as cash-farming) or withdrawal of overdraft facilities from funders.

The quantity surveyor can assess the cash flow forecast of a company before selecting tenderers for a project.

2.2 Standard contracts, methods of valuation and cash flow forecasting

2.2.1 Types of valuation

Each of the standard forms of contract has different methods of valuing the work for the purposes of an interim payment. Some forms include options that have to be chosen by the employer and agreed by the contractor before entering into contract.

There are four main methods of valuing the work, with an inherent trade-off between the predictability of cash flow forecast and accuracy of the value of works carried out to date (see Table 2 and Figure 1 (see 2.2.5)).

	Type of payment	Description	Accuracy
1	Stage payments	Pre-agreed amounts are paid at pre-set times regardless of progress on site	Provides high predictability of cash flow but low accuracy of value of works done to date
2	Milestone payments	Pre-agreed amounts are paid upon completion of pre-agreed elements	Provides high predictability of payments but low predictability of when they may become due
3	Payment against an activity schedule	On pre-agreed timescales, progress against an activity schedule is monitored and pre-agreed payments are made for activities that have been completed	Provides reasonable predictability of cash flow forecast but only reasonable accuracy of value of works done to date
4	Valuation of works done to date (third-party certification)	At pre-agreed periods the value of work on site is assessed	Provides lowest predictability of cash flow forecast but high accuracy of value of works done to date

Table 2: The four main methods of valuing the work

2.2.2 The effect of valuation method on cash flow forecast

2.2.2.1 Stage payments

Stage payments are often used under design and build contracts and are effectively pre-agreed values to be paid to the contractor at pre-determined times. These are not tied to milestones and are the least accurate assessment of works carried out. There is a benefit to the employer knowing the exact amount due at any given time but this increases the risk of overpaying (or indeed underpaying) the contractor. A valuation of works done on site could therefore be very different to a third-party certification if they are not tied to milestones.

2.2.2.2 Milestone payments

Milestone payments are a type of stage payment but instead of being triggered by reaching a given date, payment is triggered by completing a pre-agreed target (milestone). In its simplest form this could constitute a single payment at the completion of the building, but more likely they will be tied to elements (e.g. completion of foundations, completion of frame, etc.). It is also possible to be very prescriptive and have milestone payments associated with sub-sections of elements (e.g. completion of laying rebar to first floor). The more prescriptive the milestone payments the more accurate the assessment of works will be. However, this inevitably leads to a less accurate predictability of the cash flow.

2.2.2.3 Activity schedules

The NEC Option A and Option C includes the requirement for an activity schedule, which is a form of milestone payment. The fundamental difference is that milestone payments are made when the particular milestone is complete, whereas an activity schedule is assessed at regular intervals and payment made against completed activities only. Therefore there may be a time lag between completion of an activity under an NEC Activity Schedule and recognition of that completed activity, whereas with a milestone payment a contractor can ask for certification once the milestone is complete.

2.2.2.4 Third-party certification

This is when a third party (usually the quantity surveyor) prepares a recommendation for payment in respect of the works carried out to date by visiting sites and assessing the value of preliminaries, works carried out, materials on-site, materials off site (if applicable), and any instructed variations. This provides the most accurate assessment of works carried out on site to date.

2.2.2.5 Actual Cost/Target Cost

If an Actual Cost/Target Cost contract (such as NEC ECC Options C and D) is used, and if both parties agree, the interim valuations are assessed by ascertaining the contactor's actual costs plus any agreed fee percentages. This can be carried out by reviewing actual invoices. It should be noted that these are not lump sum contracts and there is a risk that actual costs could exceed the target cost.

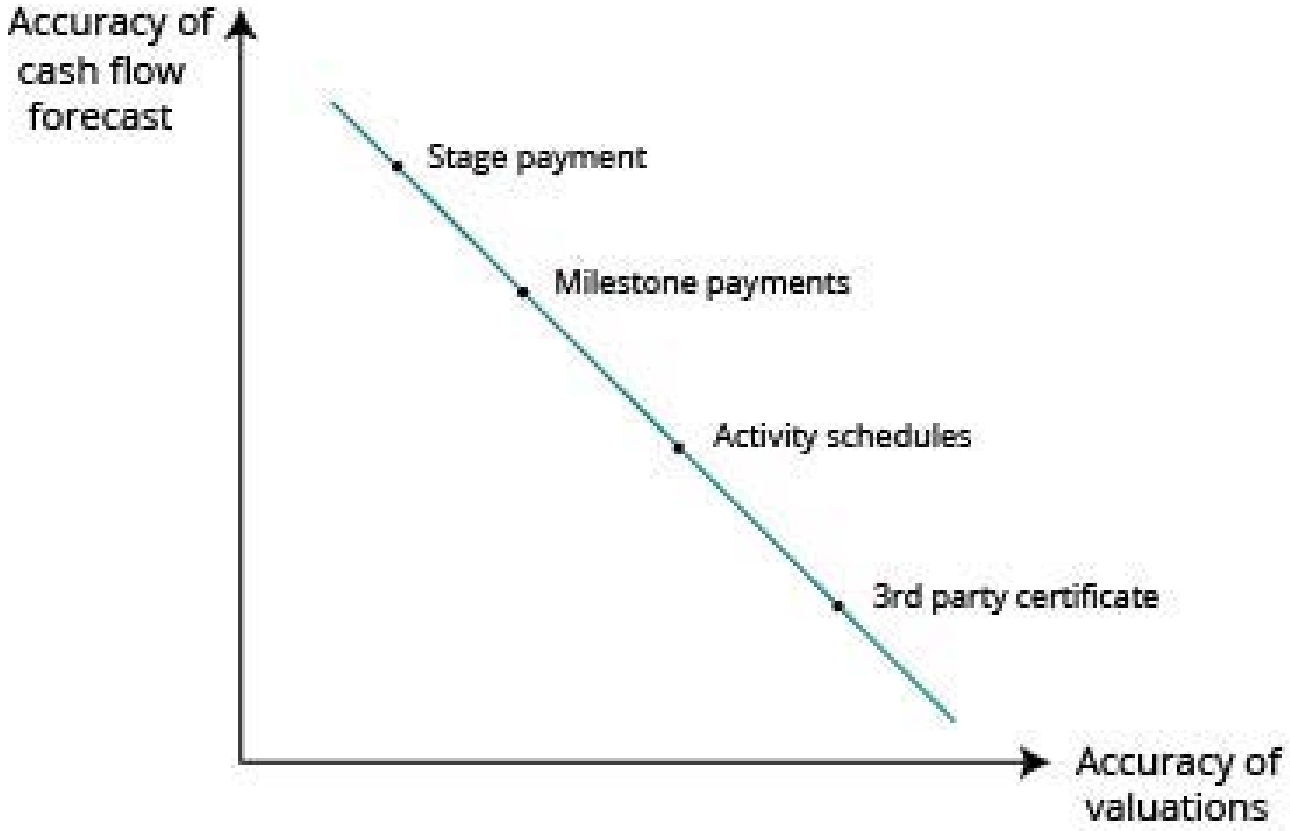

Figure 1: Trade-off between accuracy of the cash flow forecast and accuracy of the valuation of works carried out on site

2.2.3 Contractual procedures

Different forms of contract may have different timescales between application and payment. All these factors must be considered when producing a cash flow forecast. It is also worth noting that amendment to contracts may change the standard timescales and these should be checked before producing the cash flow forecast.

2.4 The Construction Act 1996 (as amended)

Otherwise known as the 'The Construction Act', The Housing Grants, Construction and Regeneration Act (HGCRA) 1996 fundamentally attempted to improve payment practices in the construction industry by improving cash flow and helping to resolve disputes quicker. Its effect on cash flow forecasting was profound as it set the following rules in law.

- Providing the right to interim, periodic or stage payments.
- Requiring that contracts should provide a mechanism to determine what payments become due and when, and a final date for payment.
- Requiring that the payer gives the payee early communication of the amount it has paid or proposes to pay.

- Providing that the payer may not withhold money from the sum due unless it has given an effective withholding notice to the payee.
- Providing that the payee may suspend performance where a sum due is not paid in full by the final date for payment.
- Prohibiting pay when paid clauses that link payment to payments received by the payer under a separate contract.
- Providing a statutory right to refer disputes to adjudication. The adjudicator's decision is binding until finally determined by legal proceedings or arbitration at the end of the contract.

The Construction Act was amended by the Local Democracy, Economic Development and Construction Act 2009.

- The Act now applies to all construction contracts whether they are in writing or not.
- The requirement for payments to be by instalments is un-amended as long as the contract period of 45 days or more, or for lesser durations if the parties agree.
- Parties are free to agree the amounts for payment and the intervals.
- Every construction contract has to provide a mechanism to determine what payment becomes due and when, and a final date for payment. This has to be agreed between the parties.
- Payment can no longer be conditional on the performance of obligations under another contract. Therefore performance on another contract cannot affect the payment entitlement under the contract.
- A mechanism now has to be in place for determining who should give notice of payment due (either the employer or contractor) and the basis on how the sum is calculated has also been made clearer. The Act has been amended to ensure the employer pays what is due before the due date unless they give notice with reasons why not, or if they believe the contractor is insolvent. If the employer fails to pay and does not give notice in accordance with the Act, or if the contractor is not insolvent then the contractor can suspend all or part of their obligations in respect of the contract work.

  However, this right ends when payment is made in full by the employer (albeit any costs and expenses are to be paid by the employer).
- The requirement for adjudication, in the event that the parties cannot agree the payment amount, remains.

2.5 Curves and formulae

Cash flow curves and formulae are often used early in the design process to give employers a guide as to the predicted cash flow forecast. This is usually before a contractor has been appointed; therefore an agreed programme or activity schedule cannot be used to inform the cash flow forecast. The employer may want a guide to the cash flow early in the process

to assist with funding agreements and also to assist in procurement and contract choice. Different procurement routes and contracts may result in different contract sums but equally they may also result in different cash flow profiles.

It is therefore entirely feasible that a higher contract sum with a more generous cash flow profile may be favourable to an employer with regards to their overall business case.

2.5.1 S-Curve

The S-curve stands for 'standard' curve but it also takes the shape of the letter 'S' when shown on a graph (see Figure 2). This represents the lower level of periodic expenditure at the beginning of a contact (due to site set up and relatively inexpensive enabling works) and the lower level of expenditure at the end of a contact (due to the vast majority of materials being on site, reduced number of trades on site and reduction of contractor's staff overhead). These S-curves are ascertained by a formula, which uses data from previously similar construction projects.

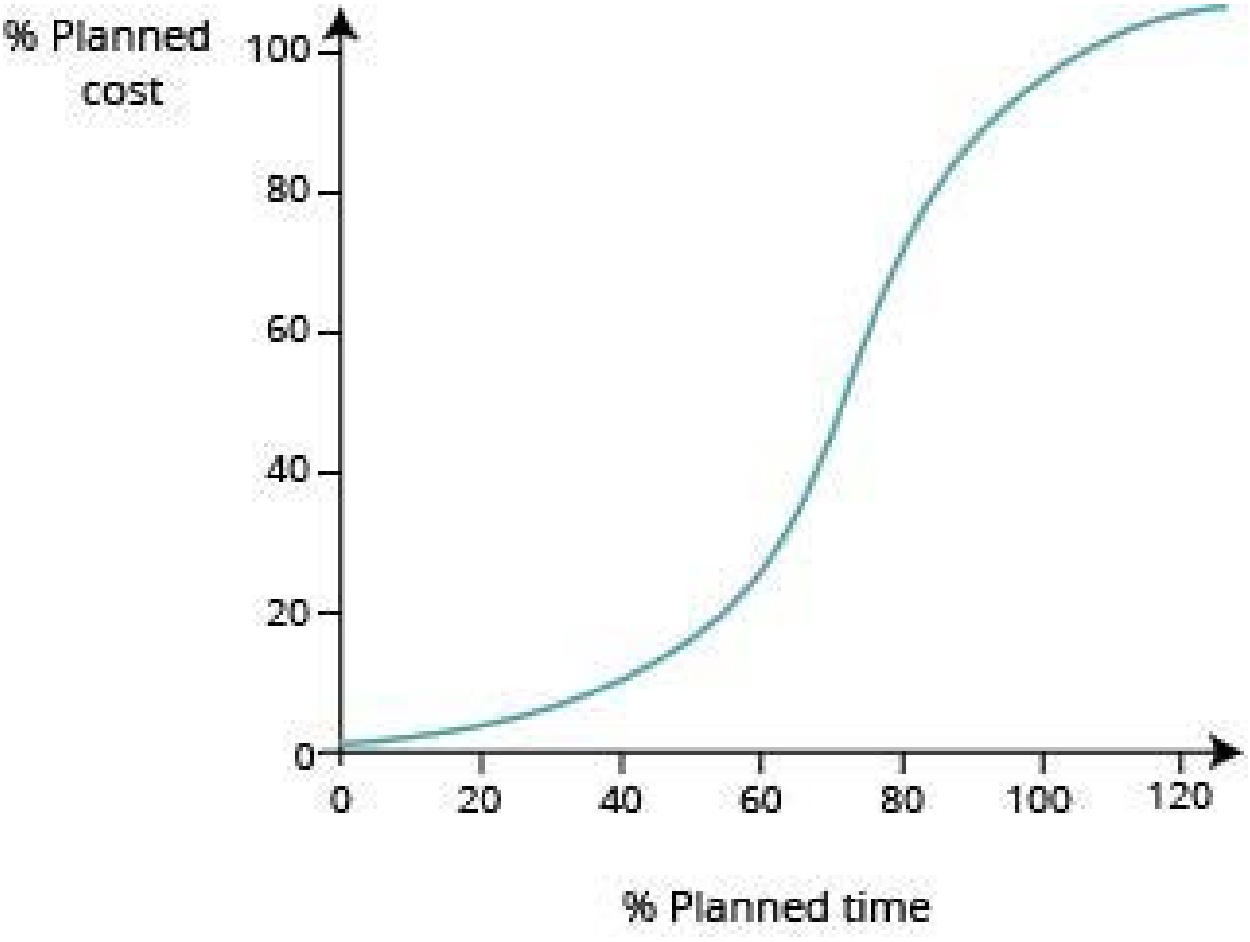

Figure 2: An S-curve

2.5.1.1 DHSS expenditure forecasting model

The DHSS expenditure forecasting model was created by KW Hudson for forecasting expenditure on capital projects, particularly for hospital projects. It is in no way limited to

hospital projects and has become one of the most popular methods for deriving S-curves. It is still widely used today by quantity surveyors but alternative formulae are now also available. Its reliability must be considered, particularly given its original intended use and age, when producing a cash flow forecast.

2.5.1.2 Other special curve

Many organisations (such as quantity surveyors, project managers and developers) have developed their own special curve formulas, which represent their own specific field. There are no hard and fast rules about what is needed to create an S-curve as long as the benchmarked projects are suitable and the basis of the model is explained to the employer.

2.5.1.3 Computer modelling

In recent times more advanced computer models and simulations have been used to produce cash flow forecasts. However, these are still based on the same principles as the S-curves but provide more flexibility in terms of their ability to analyse the sensitivity of the variables.

2.5.2 Advanced cash flow forecasting

Once a project has been tendered or a contract has been entered into with the contractor, the cash flow forecasting can become more accurate.

If the contract incorporates stage payments or milestone payments, it becomes relatively simple to plot this information and create an accurate cash flow forecast. For third-party certification contracts the contractor's programme and pricing document (whether builders' quantities or a bill of quantities) can be used to provide a more accurate cash flow forecast. While it is feasible to predict the cash flow by relating the pricing document to the programme this can be very time consuming and the accuracy is often no better than using an industry S-curve formula.

3 Practical application: Level 2 – Doing

This section looks in more detail at the practical applications of producing a cash flow forecast and the information required to improve the accuracy of the forecast. This section deals specifically with cash flow forecasting at construction project level (see Figure 3) but many of the principles will equally apply to organisational cash flow forecasting.

Wherever possible the cash flow forecast should be produced in conjunction with the main contractor who will often be able to provide more detailed and specific information, although it is recognised that this will often not be possible at the early stages of a project.

A differential must also be made between the overall cash flow profiles for a project, which will be the accumulation of a number of separate cash flow profiles for the many cost centres in a project (see Figure 4).

3.1 Contractor versus employer's approach to cash flow forecasting

It should be noted that there is generally a difference in the approach to producing a cash flow forecast between an employer and a contractor.

Different considerations will be important to each party, in terms of payment dates and presentation of the cash flow forecast, and some issues will not be applicable in all cases or will differ between one party and another (i.e. the employer may hold retention against the contractor, but the contractor may not hold retention against their subcontractors). The remainder of this section does not differentiate explicitly between these approaches. The user of the cash flow forecast should be kept in mind when reviewing the following sections.

3.2 Identifying the employer's brief for the cash flow forecast

Before undertaking a cash flow forecast it is imperative that a brief is taken from the employer to make certain that it provides the information that the employer requires. The following are examples of the types of questions that should be asked.

- Is it for the employer or contractor?
- Should it be produced for the whole development or just the construction contract?
- Should it show values at valuation date, certificate date, invoice date or payment date?
- Should gross or net values be used?
- Should it show cumulative payments, interim payments or both?

Different construction contracts have different payment terms and timescales, which have a significant impact on the cash flow profile of a project. It is always important to check

whether the employer intends to amend contracts to provide different payment periods for the employer.

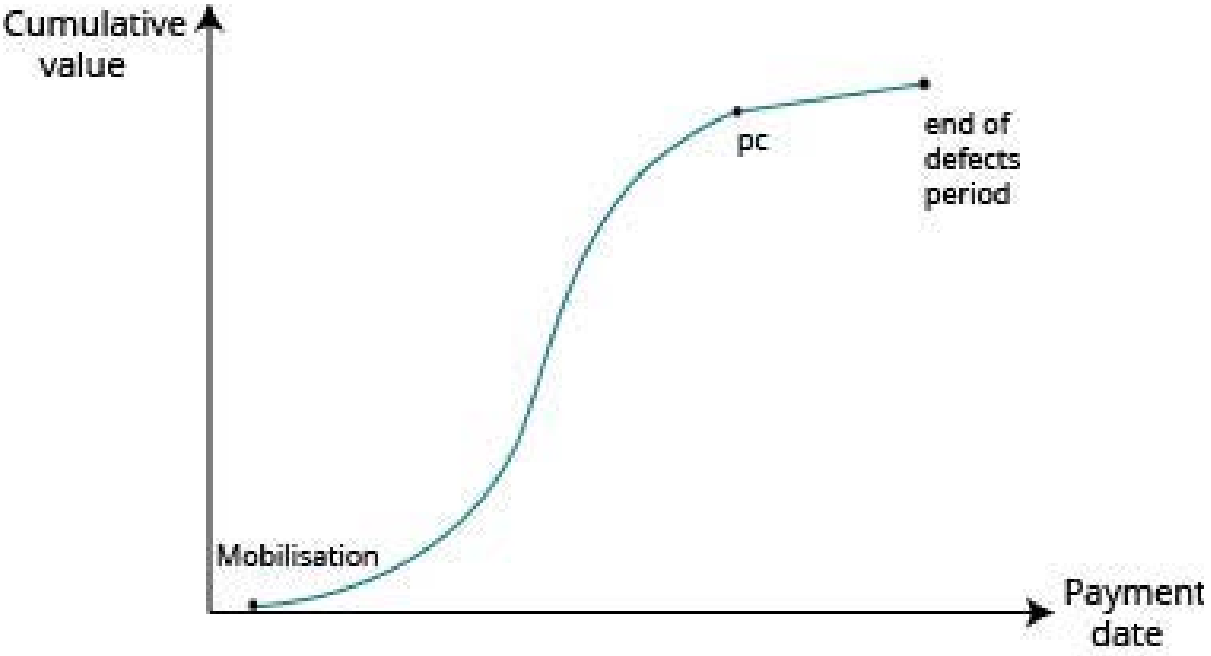

Figure 3: An example cash flow for a typical construction project

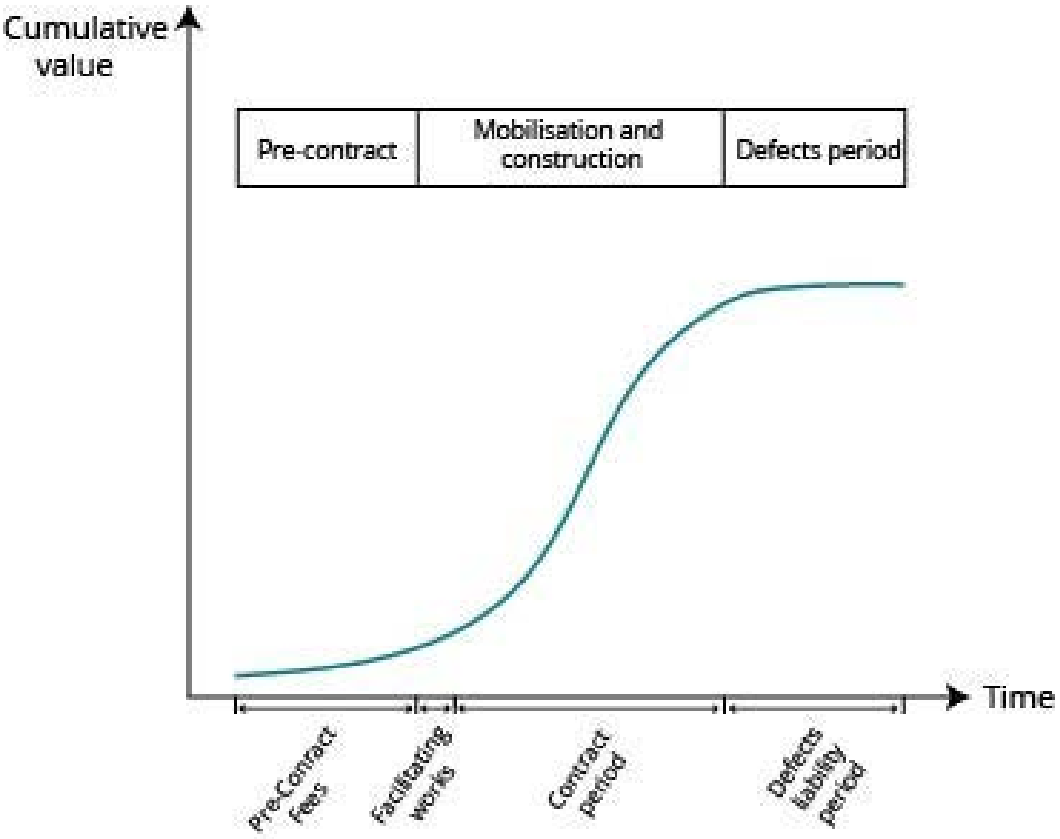

Figure 4: The cumulative development cash flow

An employer should decide whether the cash flow forecast is to show the valuation date, certificate date, invoice date or actual payment date.

Whatever is decided should be clearly noted in the cash flow forecast; otherwise a problem could arise if, for example, the employer assumed that the valuation date was shown when it was actually showing the payment date. The time lag between the valuation date and payment date could leave the employer short of the necessary funds.

3.3 Project programme – start date/ end date

The current design status of a project will dictate the level of accuracy of the programme. At the early stages of a project it may be no more than an aspiration, but by the time the contractor is appointed the programme should be developed to quite an advanced stage. It is always worth investigating the programme as much as possible as the usefulness and accuracy of any cash flow forecast relies on the quality of the information fed into it. Even at an early design stage it may be worth asking for contractor input to the programme.

There may be separate enabling works and main works contracts and these may even overlap in some scenarios. If any of the separate contacts are of substantial value, it is worth producing separate cash flows and merging the data to produce an overall development cash flow.

3.4 Construction and project value

The cash flow forecast can either be produced based on the construction contract value or the overall project value. The construction contract value will be the amount due to the main contractor only and will not normally include elements such as fees, VAT, direct contracts, etc. Therefore a discussion should be held with the employer (or any person requesting the cash flow forecast) to ensure that it contains the necessary information.

It is important to understand the subcontractor's trades and how their package value is spread.

Taking electrical services as an example, work will traditionally involve first fix works (containment and cabling) in the early period of their programme.

This will be followed by the delivery of big price equipment (e.g. 'Switchgear') and then finally, the light fittings will be installed. The overall value therefore needs to be weighted to give a more accurate reflection. This can be said for a lot of packages that have high value items contained within a longer programme. The quantity surveyor should have an adequate understanding of building processes to be able to provide a confident and accurate cash flow forecast.

3.5 Adjustment for cyclical events (holiday periods, industry shut downs, winter working, etc.)

When plotting the time data from the programme, any cyclical events that will affect progress on site must be taken into account. The most common of these events will be Christmas, Easter and other statutory public holidays, but may also include project specific events (i.e. examination periods for schools or colleges).

Certain sensitive projects may require work to be carried out during nights or only at weekends and this may also need to be factored into the forecast.

Less predictable events (such as the effect of adverse weather in the winter months) are harder to input into the forecast, but the overall programme should attempt to take seasonal variations into account.

3.6 Public holidays (Christmas and Easter)

Although Christmas and Easter are mentioned above it is worth reviewing these periods in greater detail as they have such as significant impact on the cash flow profile of a project. The construction industry, and in particular subcontractors and suppliers tend to shut down for two weeks over the Christmas period, however, the effect of this can have a more lasting effect upon the cash flow of a project. Valuations may have to be made slightly earlier in December so as not to clash with the shut down period. The payment date in January will therefore often be a week or so earlier than anticipated. This relatively minor adjustment will not make a huge difference to an indicative cash flow forecast at an early stage of a project, but could have a significant impact if a client is relying on drawdowns from a funder on the basis of a cash flow forecast.

3.7 Retention percentage and period

Many standard forms of construction contract include a provision for retention to be held on each payment of a project. The retention is usually a percentage of the construction value, usually around three to five per cent, but can be a fixed sum. A proportion of the retention is usually returned at the point of practical completion with the remainder due to the contractor at the end of the defect liability period (or defects period). This period is usually between 6-12 months but can be whatever the parties to the contract agree it to be.

An accurate cash flow forecast will have to take account of retention, especially when showing the net payment at the end of each interval. It will also mean that there will be a long period between practical completion and the final certificate where the cash flow is static, with a final jump at the end, which signals the return of the final part of retention (see Figure 5).

3.8 Rectification period

Sometimes referred to as defects liability period, most contracts include a mechanism for retaining a portion of retention after practical completion of the project (usually for between 6- 12 months). The result of this mechanism strongly affects the cash flow forecast, as a large proportion of the retention (usually half) is kept with the employer for a long period after practical completion (see Figure 5).

For example, on a £10,000,000 project with three per cent retention, half of which is returned at practical completion, the client will retain £150,000 for a long period after practical completion.

This information is especially important for the contractor, managing their organisational cash flow to ensure they have properly taken account of the retention held. Most contractors simply pass this same mechanism to their subcontractors and suppliers but this still means that somewhere along the chain a substantial lag will appear before payment is made.

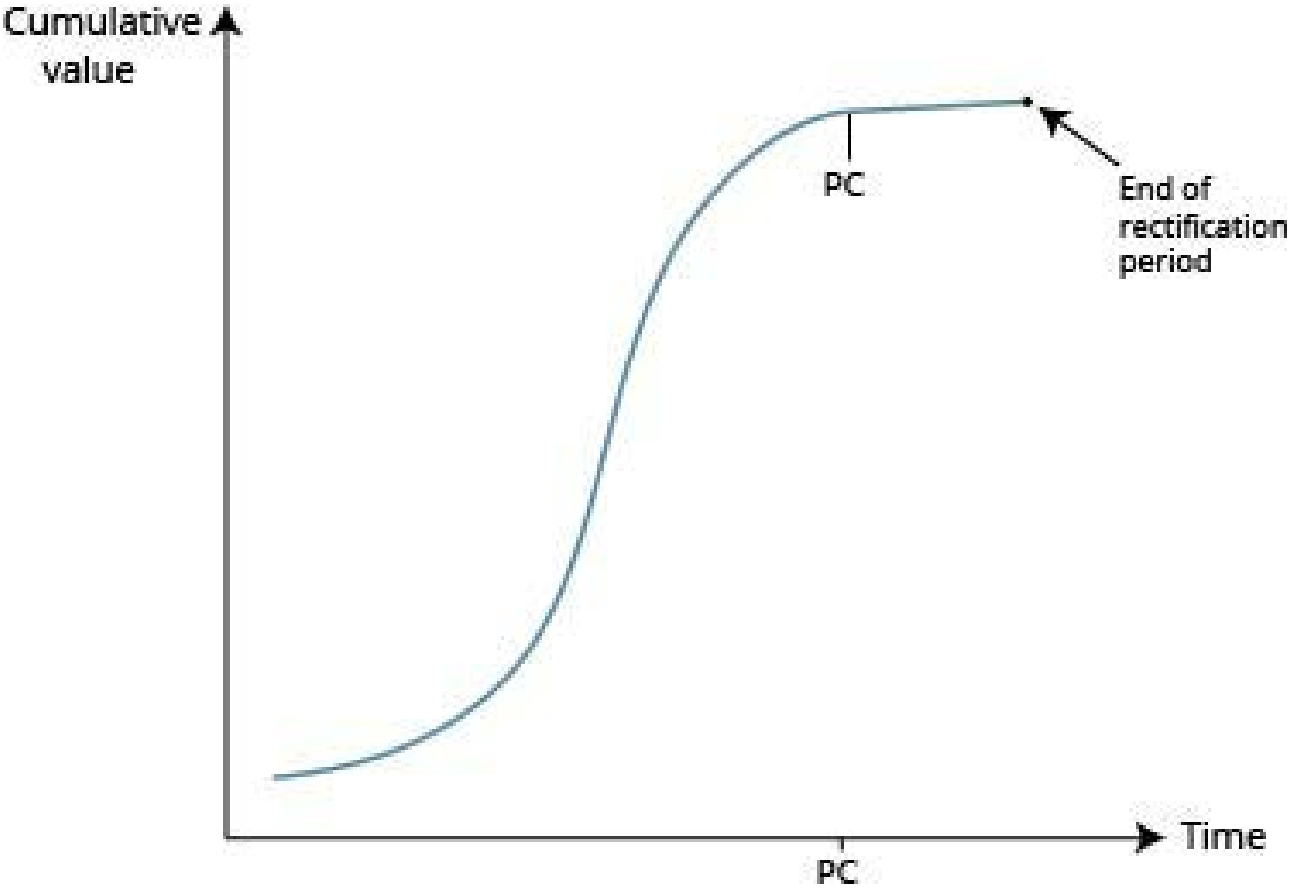

Figure 5: Graph showing the effect of payment at the end of rectification period

There may be circumstances where defects that are not corrected by the contractor in a timely manner are carried out by an alternative contractor, procured directly by the employer and the cost of the work is offset against the remaining retention.

3.9 Certification period (delay from valuation to certificate)

This refers to the period between the third party (usually the quantity surveyor) issuing the valuation (or recommendation for payment) and the relevant payment certificate being issued. It should be noted that the value shown on the valuation and payment certificate could differ if the contract administrator deems that works have not been carried out in accordance with the contract. It is therefore important to use the certificate values when plotting 'actual' payments against the forecast, as opposed to the valuation amounts.

A schedule of interim certificate dates should be listed up to one month after practical completion. From these the contractor may provide an application for payment no later than seven days before the date for issue of the interim certificate. While it is standard practice for the main contractor to submit interim valuations to the quantity surveyor, the contract does not make this an obligation and the quantity surveyor is ultimately responsible for valuing the works, with the schedule of interim certificate dates being the key dates in the process.

3.10 Payment period (delay from certificate to payment)

The payment period is the time lag between the payment certificate being issued and the payment being made. The typical time lag is normally 14 days in a standard form of contract but can substantially differ if client amendments have been made to the contract.

The information used for the cash flow forecast will have a significant impact on the results so care must be taken when inputting timescales on the cash flow forecast.

3.11 Sectional completion and partial possession

Most contracts include a mechanism for either pre-determined parts of the building to be handed over early (sectional completion) or for previously undefined areas to be handed over with the contractor's consent if they are completed earlier than planned (partial possession). If sectional completion is used then it will be relatively straightforward to factor this information into the cash flow forecast, as dates will be included against each of the sections in the contract.

Each of these sections will have their own unique completion dates and retention amounts and periods. This means each section will have its own unique S-curve. The easiest way to deal with this is to produce a separate cash flow for each section, based on its unique information, and merge them together to give an overall cash flow.

The time lag between completed sections will affect the profile of the overall cash flow. If all sections complete within a few weeks of each other, it will not have a significant impact on the overall development cash flow. If a section completes significantly earlier than others (i.e. say a school has a block finished 12 months earlier than the rest of the school), this will clearly have a rather more marked impact.

Different sectional completion elements may also have individual retention releases (relative to their value) and this should be incorporated into the cash flow forecast.

3.12 Currency

Although it may seem obvious it is clearly important to identify the currency of contract or cash flow forecast, particularly when dealing with employers or contractor's based overseas. The consequences of such a misunderstanding can be disastrous and clearly should be avoided.

Currency also plays a bigger part in terms of exchange rates for employers paying from a different source. The employer may rely on the cash flow forecast to change monies into the currency of the contract. Changing more than is actually required at a given date may not be advantageous to the client, particularly if the exchange rate is not beneficial to the employer.

If the project includes materials from other countries, this may affect the contractor's outward cash flow to the suppliers and subcontractors, principally if the contracts with these subcontractors and suppliers are dependent on the exchange rate.

3.13 Variations

Most contracts have a means for allowing variations to the contract, which may change the amount due to the contractor. The cash flow forecast should therefore make some attempt to include for likely spend on variations. The identified risk allowance can be used for this exercise. If a priced risk register has been produced for the project, the value of this should be included in the cash flow. However, if the risk allowance is based on a percentage, this should also be included in the forecast.

As well as effecting the price of the contract, a variation may also affect the programme of the contract. In fact, a variation may have no effect on the contract value but could increase or reduce the programme. If the risk allowance is included in the forecast, the employer should be made aware that the programme effects of any variations are not factored in, as they will be unknown.

3.14 Forecasting risk allowance spend

The RICS New rules of measurement for estimating and cost planning (NRM1) calls for risks to be split between four categories:

- design development risks
- construction risks
- employer change risks, and
- employer other risks.

At early stages risk allowance will often be expressed as a percentage of the construction total, in which case it can just be fed into the standard S-curve.

For a more detailed and accurate cash flow forecast, a priced project risk register should be used to produce a cash flow profile. The risk spend can therefore be fed into the overall project cash flow. This can be done by applying 'close out dates' to each of the risks on the register and these can be used as the assumed expenditure points for each risk.

3.15 Provisional sums

It is not always clear when a provisional sum is to be expended, especially for undefined provisional sums. Work subject to provisional sums will also usually not be instructed and agreed at exactly the same amount as the provisional sum allowance contained in the contract sum (i.e. the actual amount on the valuation certificate reflects the actual cost of the work, whereas the provisional sum is an estimate) In practice, it is also not uncommon for them to be substantially more (or less).

While a cash flow forecast may include the value of the provisional sum within it, there is clearly an associated risk. The risk of the actual cost of the work for each of the provisional sums being more or less than the estimate should be added to the risk register and factored into the risk spend profile.

3.16 Fees and other development costs

As described in section 3.4, a cash flow forecast will often be based on the construction contract value. If the client required a full development cash flow, other 'cost centres' will also need to be added to the overall cash flow profile. The following list is an example of other cost centres and is not exhaustive.

3.16.1 Consultant's fees

- Consultant's fees will have a unique cash flow profile, which will spread over a far longer period than the construction contract period, and paid at different times. This is because the appointment of the design team can take place months or years before the contractor is appointed.
- It can be predicted on an S-curve over the length of the development in the early stages but once a full fee schedule has been developed this should be used to inform the fee cash flow forecast with dates of appointment used to generate the cash flow. Often consultants will provide their own cash flow forecasts as part of their bid.
- As well as the core design team (QS, Architect, Structural, Services) other fees (such as acoustician, party wall surveyor, etc.) will need to be taken account of to give an accurate cash flow forecast.
- Fees are often included with the contract value of a design and build contract. This must be considered when putting together both cash flows to work out which pot they sit in.

- When producing an overall development cash flow, the payment terms of the different cost centres must also be taken into account.

3.16.2 Direct contracts

- Examples of other direct contracts could include the loose furniture, fittings and equipment works, enabling works, decanting works or even demolition works.

3.16.3 VAT and other taxes

- VAT is a complex area and payment terms to the HMRC are complex.

See section 4 for more details of VAT.

3.16.4 Internal costs and transfers

- Some companies have to provide internal transfers between different departments or internal companies. This can often be particularly difficult to predict as the information on payment terms and structures is often sensitive information, which is not given out easily. It should be noted that although an internal transfer or payment may seem like a simple exercise with little effect to the employer, these kinds of arrangements and payments can often be the most difficult and sensitive to overcome.

3.17 Materials on and off site

3.17.1 Materials on site

- Materials on site generally will not affect the cash flow forecast, unless the contractor is bringing on more materials than envisaged. This may be a cause for concern in relation to contractor insolvency. The quantity surveyor should not recommend payment to be made for materials that are brought onto site well in advance just to boost the contractor's cash flow. A cash flow forecast should be carried out on the assumption that materials will be brought onto site as and when required unless otherwise stated.
- There may be occasions when materials do have to be on site well in advance of use in the construction. This may be, for example, to reduce delivery costs for a product from abroad by bringing all shipments in and storing them, or if there is general concern regarding availability of supplies and the contractor wants to secure these. These issues should be considered early on and amendment should be made to the cash flow.

3.17.2 Materials off site

- Materials off site can be a complicated subject and can have a significant impact on the cash flow forecast. If payments for materials off site are agreed for any element on a contract, the cash flow forecast should be revised accordingly. Taking the use of bathroom pods as an example, on a typical project the costs of the bathrooms would be payable as the individual bathrooms become complete. However, if pre-fabricated

bathroom pods were used and materials off site were allowable, then payment for them may become due much earlier. For a major element this can significantly shift the emphasis of the cash flow forecast. Traditionally the bathrooms may not have been completed until near the end of the project whereas with this example, payment for the pods may become due during the middle part of the contract as the pre-fabricated pods are completed off site. This aspect is of particular interest with the increasing use of Modern Methods of Construction (MMC), where there might be a considerable value of the cost of the project being manufactured in the factory. Reference should also be made to the level of Pre-Manufactured Value (PMV) that is present in each project, together with issues of ownership and transfer of title.

It should be noted that there is a clear distinction between English and Scottish contracts. The Scottish Building Contracts Committee (SBCC) versions of JCT forms of contract do not recognise payment for materials off site. The mechanism to cover payment for such items would be the use of a separate Contract of Purchase.

3.18 Input from specialists

While S-curves can do a good job of predicting the cash flow forecast for a standard development type, their use is diminished when dealing with very bespoke, specialist or complicated projects. In these situations specialist advice may be required to ascertain the effect on cash flow. An example of this may be the building of a nuclear power plant, whereby the construction of the actual technical facilities may be a significant percentage of the cost of construction. In this situation a proper understanding of the techniques involved would be needed from a specialist before undertaking the cash flow forecast.

3.19 The need for regular adjustments to reflect progress and events on site

A recurring theme of all the above points is the use of a cash flow forecast as an iterative exercise that should be adapted and amended throughout the development project as more detailed information becomes available. The early cash flow forecast may be produced on an S-curve basis, but detailed design will give more information; and once a contract has been signed with the contractor an employer should have a fairly accurate representation of their likely payments.

Even this should not be the conclusion of the exercise and the cash flow forecast should continue to be monitored and updated to reflect the following; all of which will be likely to affect the profile of the cash flow:

- actual progress on site (in front or behind cash flow)
- actual variations against the risk allowance
- changes in sequencing
- formally awarded extension of times

- acceleration in the event of falling behind programme
- partial possession.

3.20 Effect of delays

The interpretation of delays and how a cash flow can be used for that purpose is discussed in the next section, but on a practical basis it should be remembered that a delay to the contract will affect the timing and amount of payments and may well have a knock-on effect on the sequencing of the remainder of works.

The cause of the delay may change the effect. For example, adverse weather may close the site for a set period of time, in which case the cash flow simply moves back by the same period (unless acceleration is undertaken, which can also affect the cash flow profile). However, delay caused by a significant variation may change the whole sequencing and rationale of the project, in which case it may be more sensible to re-review the entire cash flow for the remaining period as it may have too many knock-on effects.

4 Practical considerations: Level 3 – Advising

This section looks at the practical considerations to be made when producing and analysing cash flow forecasts.

An RICS member should consider the following when advising on the uses of a cash flow forecast and in particular when using the cash flow forecast to monitor progress on site or when assessing claims.

4.1 Cash flow representation

- Graphs can be used to graphically illustrate the cash flow forecast.
- Graphs can show either the cumulative or a periodic cash flow (see Figure 6).
- Periodic payments can be shown on a bar chart.
- Might show both cumulative and bar chart together.

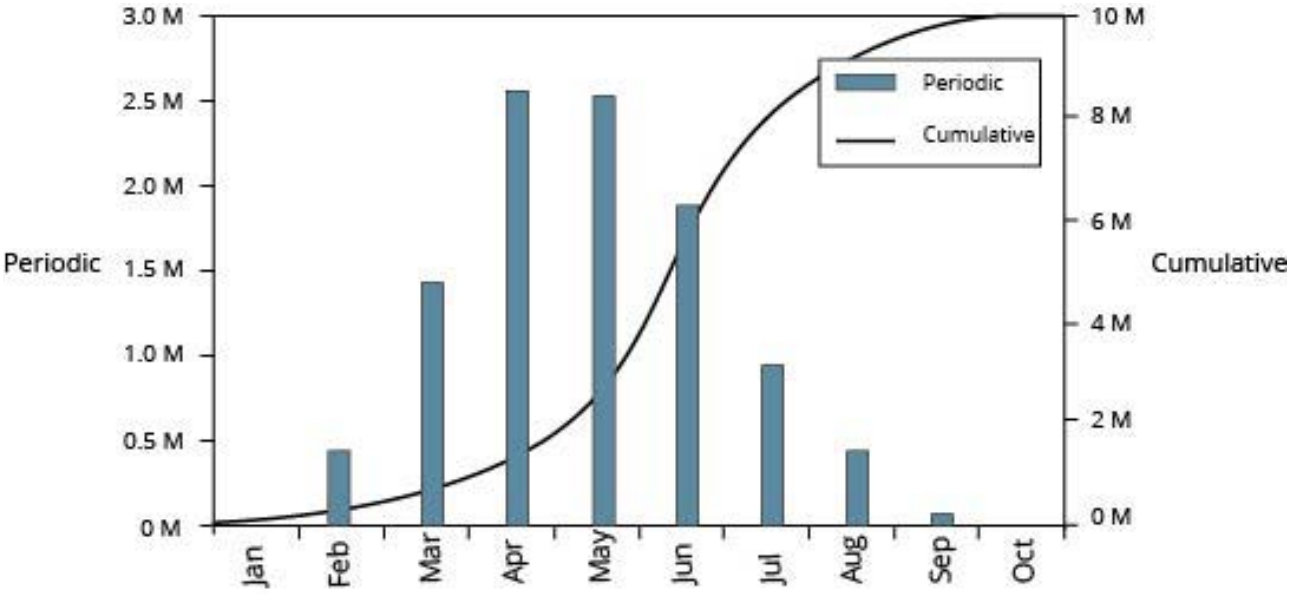

Figure 6: Graph showing the relationship between periodic and cumulative payments

4.2 Reasons for variances to cash flow

Once a cash flow forecast is established then it should also be used to monitor variances to it. It can be used as a tool to compare the forecast with the actual payments and ascertain what these results show. If the cash flow forecast has been based on the programme or an

activity schedule then it can be inferred that variances to the forecast must mean variances to the programme. This is not always strictly true as the variances may be a result of re-sequencing or other factors, but it does provide a good guide and may prompt questions.

If the valuation for a particular month is significantly lower than the cash flow forecast, it could be inferred that the contractor is simply behind their intended programme.

Some of the reasons for actual payments being below the cash flow include:

a site conditions

b adverse weather

c re-sequencing of works (perhaps due to procurement of subcontractors)

d materials being stored off site (and not claimed for)

e project progressing slower than anticipated

f materials not being delivered on time, and

g cash flow not being accurate in the first place.

Similarly, the actual payments may be above the cash flow forecast, which could pose funding problems to the employer. If the actual payments have been certified and deemed to be correct this should also prompt searching questions. Some of the reasons for a contractor being ahead of cash flow are:

a front-end loading

b contractor being ahead of programme by working faster than envisaged

c re-sequencing of works meaning that higher value works are carried out earlier

d materials being stockpiled on site far before they are required

e materials off site not taken into account when producing cash flow forecast

f the inclusion of variations

g contractor purposely accelerating the works to complete earlier (and therefore expending less preliminaries)

h the sign of a distressed contractor (or subcontractor) or supplier, and

i cash flow not being accurate in the first place.

4.3 Actions to be taken when variances occur

Whether the actual payments are above or below the forecast, it is always wise to discuss with the contractor before making any assumptions. The very nature of cash flow forecasting, particularly when using S-curves, is that they are simply forecasts and no matter

how detailed or complicated they are they can never hope to capture all the intricacies of a live construction project. Employers should be advised of this at all points of the process.

4.4 Items for consideration when analysing cashflow forecast

It should be remembered that any cash flow forecast based on third party assessment or activity schedules are a forecast and not a fully accurate assessment, unless stage payments are being used, which are extremely accurate by their very nature.

As a construction development progresses so should the cash flow forecast. It would be unwise to rely on a forecast carried out at the beginning of a project throughout the development, particularly if important changes have been made to the design, value or programme (see Figure 7).

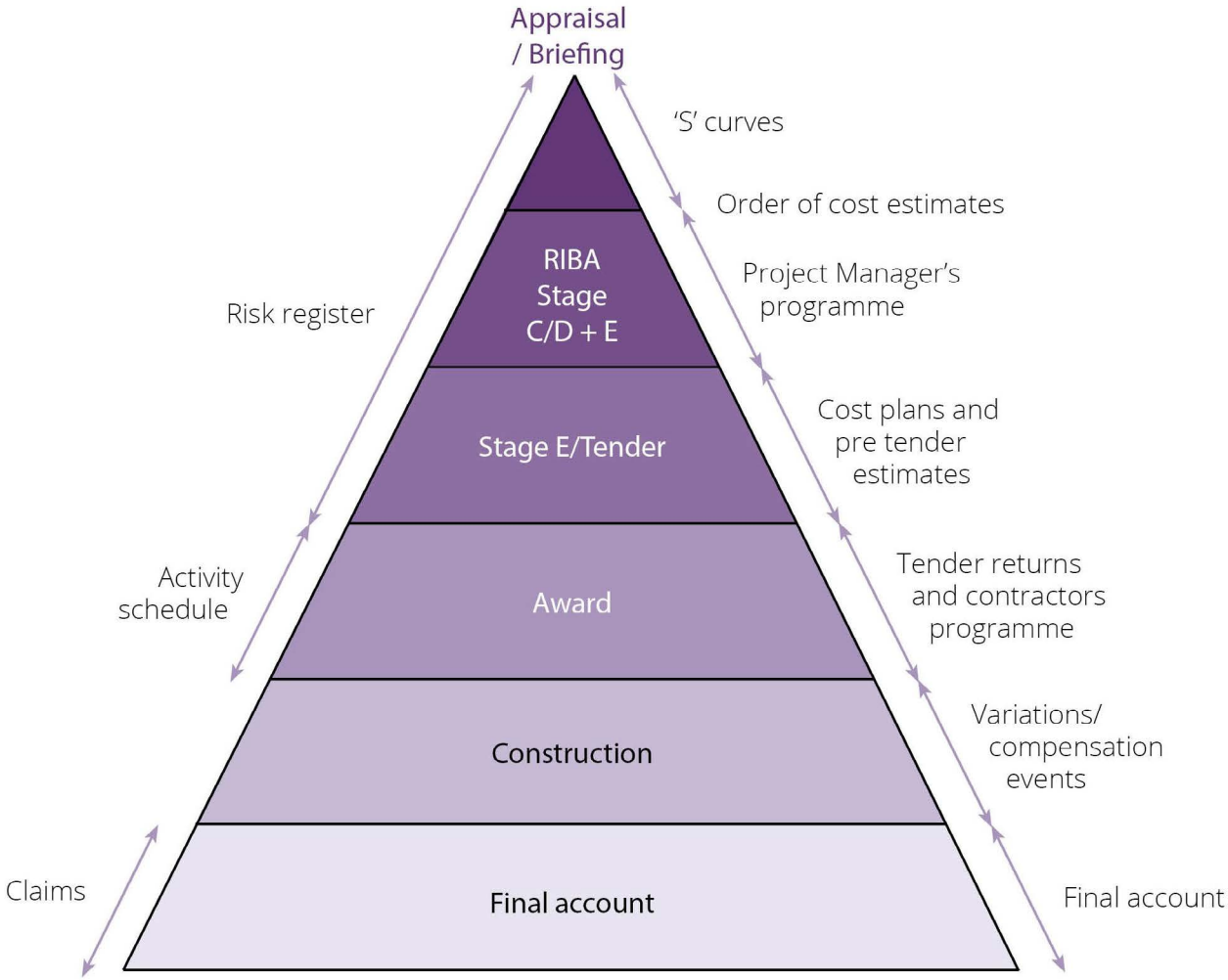

Figure 7: The relationship between the stage of the project and the information used in the production of the cash flow forecast

It is essential that the actual payments are analysed against the forecast and adjustments made to the forecast as necessary. If a payment has been made that differs to the forecast, it would seem unreasonable to expect the employer to rely on the cash flow forecast for the following payment without updating it to show the current actual situation.

4.5 Risk factors inherent in construction cash flow forecasting

The following list gives an indication of the sort of items that should be considered as potential risks to the accuracy of the cash flow forecasts. This is by no means a definitive list and indeed a major risk is the fact that every project is different and comes with its own set of circumstances.

While cash flow forecasts are valuable tools they also come with inherent risks, which must be considered.

Perhaps the biggest danger comes from the reliance on a cash flow forecast without proper understanding on how it was produced, the limitations of the data that informed it and a failure to adjust the assumptions as circumstances change. For example:

a effect of changes in design specification – may change sequencing of works, value of works or overall programme of works

b effect of inflation – the value of money may be different at the time of payment to the time of production

c effect of interest and exchange rate – particularly where supplies or labour are being sourced from overseas

d complexities of the building – the more complicated and bespoke the building the less accuracy that can be placed in the forecast.

e estimating error, and

f changes in sequence to mitigate delays.

4.6 Effect of claims and loss and expense and liquidated damages

At the early stages most cash flow forecasts would not pre-empt a claim from the contractor for loss and expense, or a reduction of the amounts paid due to the deduction of liquidated damages (or delay damages). However, both of these factors can have an acute effect on the accuracy of the forecast.

4.6.1 Claims for loss and expense from contractor

Claims for loss and expense may be made against a qualifying event listed in the contract and will usually also involve an extension of the contract period. As soon as it becomes apparent that a claim may be made by the contractor, the employer should be advised that

the accuracy of the cash flow forecast may be compromised. An assessment of the likely settlement of the claim should be made and the cash flow updated accordingly. This may involve producing a best-case and worst-case assessment so that the employer understands their potential liability.

The timing of the claim is also important and will often depend on the economic circumstances of the time. It is not uncommon for claims to be settled many months after the end of the contract period. In this circumstance the cash flow forecast should be updated regularly so as to inform the client of any slippage in the likely payment of claims. This is also significant as an additional payment may be due to the contractor some time after practical completion.

4.6.2 Liquidated damages

If a contractor is late delivering a project through no fault of the employer, most construction contracts will include a provision for the employer to claim liquidated damages from the contractor. This will have the effect of reducing the employer's financial liability to the contractor but employers should be advised not to forecast the benefit of liquidated damages until they have been formally agreed with the contractor. As liquidated damages are meant to be a genuine pre-estimate of likely loss then there should be no real 'saving' to the employer, simply a transfer of liability from one source to another. This will affect the construction cash flow but not necessarily the overall cash flow position.

The cash flow forecast can be used to help paint a picture when assessing the legitimacy of a contractor's claim. It should be noted that a claim should be based on determining a series of issues which were out of the contractor's control and that are so defined in the relevant clauses of the particular form of contract. It is unlikely that an application for loss and expense would be rejected on the grounds that the cash flow forecast did not show a marked difference to actual expenditure alone. However, if the employer can show that payments were made in accordance with the contractor's cash flow forecast then this would need to be considered when assessing the claim.

This is why it is important to update the cash flow in conjunction with the contractor as early as possible. On the other hand, the contractor can use the cash flow forecast to support their entitlement claim to loss and expense.

They may be able to use the cash flow forecast to show they were on their intended programme up until a relevant event caused them to slip behind. An example may be a significant variation to the scope of the works.

4.7 Re-sequencing and acceleration

A change in sequence of the construction works could impact the actual payment against the forecast. Some reasons for re-sequencing the works include:

- to recover time due to previous slow progress (acceleration) – this may be instructed by the employer as a variation
- late procurement of subcontractors or suppliers – programme having to be updated once appointment made
- change of subcontractor or supplier
- to accommodate employer's variations
- site conditions encountered
- adverse weather
- insolvency of subcontractor or supplier.

4.8 Effect of VAT

The nature of VAT in construction is a complicated subject and specific advice should be sought to establish which payments are subject to VAT, and the rate to be applied.

On the assumption that VAT is incurred on a project then it is usually paid for at the time of payment to the contractor. It is not uncommon for the cash flow forecasts to exclude VAT but if the employer has asked for VAT to be shown this can be done. Difficulty arises where the project, or parts of the project, are subject to different rates or VAT is not applicable.

In most cases the VAT is added to the invoice and paid by the employer but may then be claimed back from HMRC at a later date. The effect on the cash flow is therefore considerable as the employer will be without funds for a period of time. This may cause a dip in the cash flow near the end of the project where the VAT is paid back to the employer from HMRC.

Changes in VAT legislation can also cause a variance to the cash flow forecast. As construction projects can be for a long duration a change in legislation may have time to impact on the payments of a project. The changes in legislation could mean a change in the overall level of VAT, the products and services VAT applies or does not apply to, or a change in the level of rating to certain construction services or products.

4.9 Effect of alternative procurement routes

4.9.1 Traditional versus design and build and cost reimbursable/target costs

A traditional construction contract would generally separate the construction cost from the design fees and the risk allowance. However, a design and build contract sum would probably include an element of design fees (either novated by the design team or in-house designers) and an element of risk allowance. Therefore a change in procurement route from traditional to design and build may require an amendment to the cash flow forecast to take account of the inherent design and risk within the contract sum analysis.

Cost reimbursable and target cost contracts are not lump sums. Therefore the cash flow forecast would initially only be based on the estimate or the target cost. The employer would have to pay the actual costs, plus any agreed fees and taking into account any pain/gain share. In this scenario the cash flow forecast must be updated regularly to reflect the actual costs as they emerge.

4.9.2 Construction management (and other package-based procurement routes)

Package-based procurement routes should not lead to a vastly different overall cash flow profile to a traditional procurement route at a high level, but at a micro level the cash flow forecast will have to be amended to take account of the intricacies of this type of procurement route (see Figure 8).

The contractual relationships in a construction management procurement route are directly between the employer and subcontractor's therefore the cash flow will effectively become an accumulation of lots of mini cash flows for each project (this is slightly different in management contracting and other packaged based routes where the contractual link is still with the main/management contractor only).

This will be similar to the contractor/subcontractor arrangements. Some of the key issues that will need to be considered for the employer in terms of cash flow forecasting are:

- payment terms for each subcontract may be different
- payment dates will fall throughout the month (usually with an increase at the end of the month) rather than at one point in the month
- the construction manager fee will need to be taken into account (see Figure 9)
- VAT applications may be different for each contract.

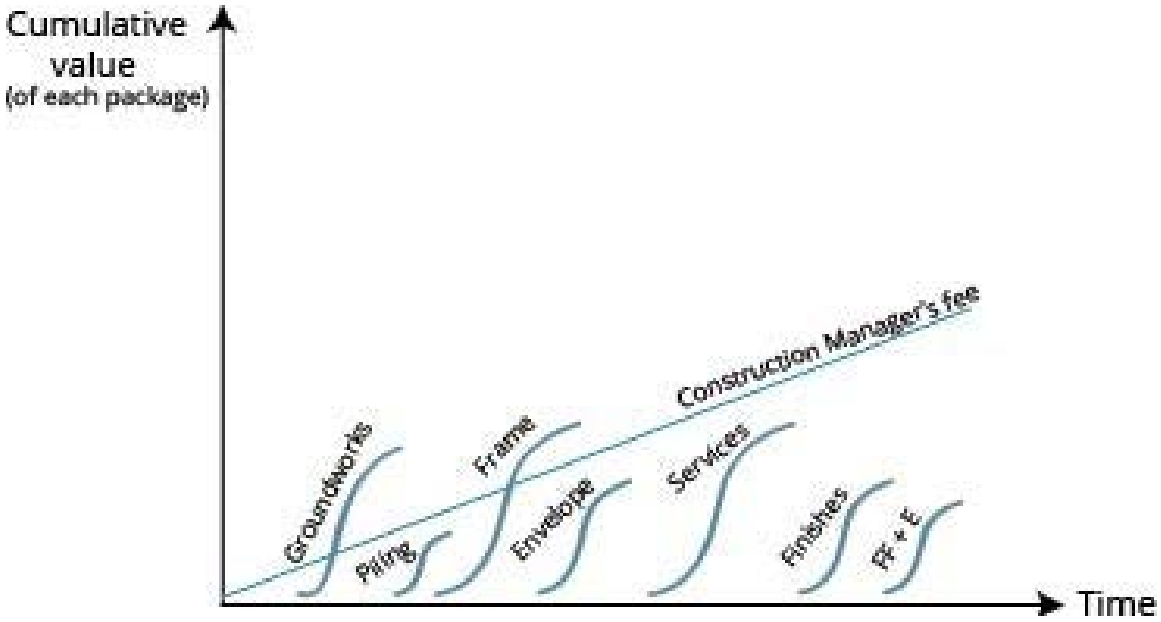

Figure 8: How the various cash flows interact through the 'life' of a development

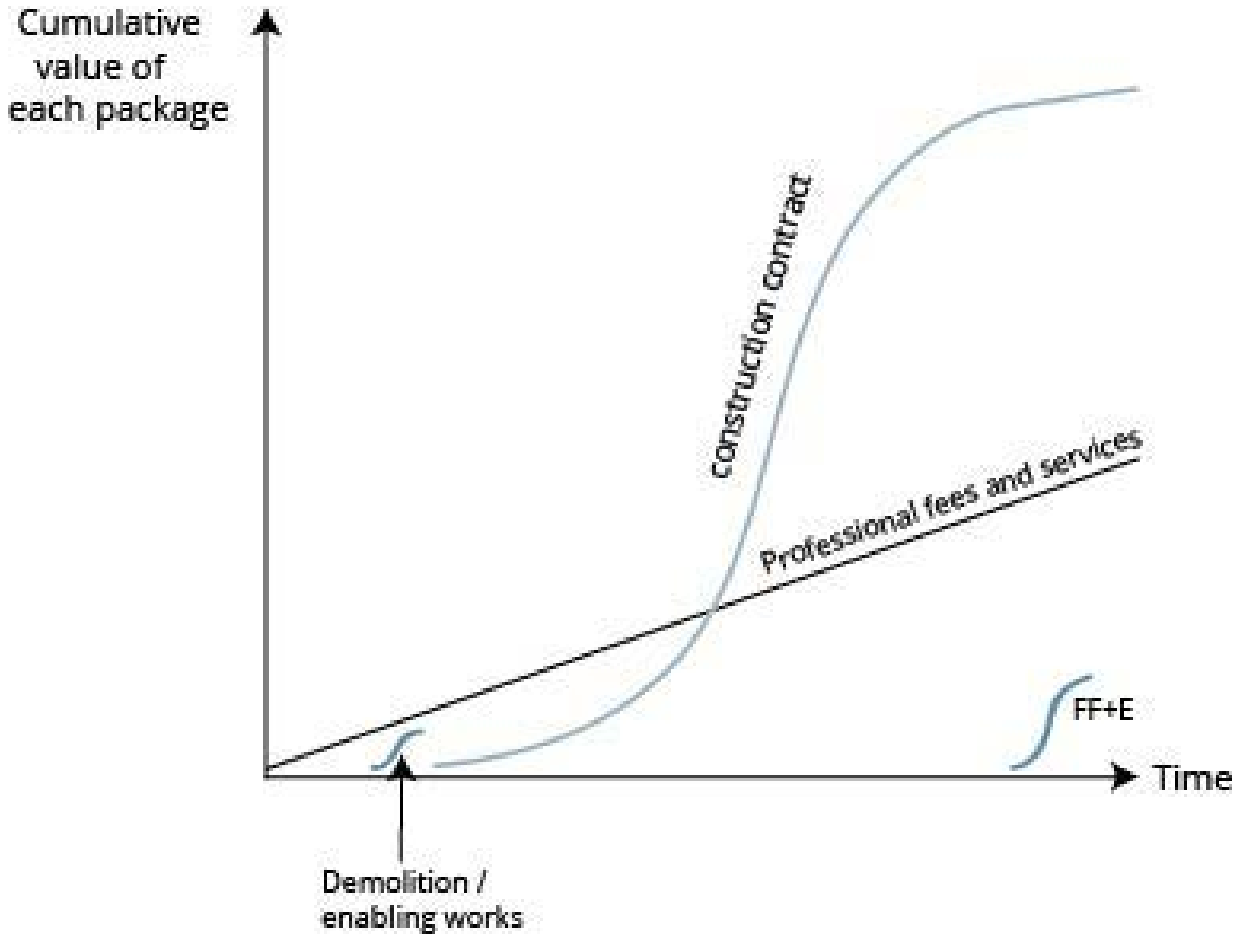

Figure 9: An example construction management type arrangement

4.10 General considerations

- The effectiveness of a cash flow forecast reflects the accuracy of the information used to produce it. The cash flow forecast should be updated once information is received which may affect it. The revision number and date should always be included.
- It is important to understand who the cash flow forecast is for and what the cash flow forecast needs to communicate. Find out if it should be showing the full development cost or just the construction cost.
- Keep advised about any legislation that may affect the basis of a cash flow forecast (i.e. VAT changes or revisions to the Construction Act).
- When using an S-curve formula, ensure that the basis of the formula is understood so that an explanation of the basis of the S-curve can be communicated to a client.
- Consider cyclical events that will delay payment throughout a construction contract (i.e. Christmas and Easter).
- The likely expenditure of risk allowances should be considered, perhaps by allocating dates to the project risk register.

- Any assumptions and exclusions and any relevant notes that affects the reader's understanding of the cash flow forecast should be clearly included.
- The information used to produce the forecast should be included, including the date on which it was prepared.

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