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Producing a programme under the NEC form of contract

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The NEC suite of contracts puts far greater contractual requirements upon the contractor to produce and manage a detailed programme than other forms of contract currently in existence within the construction industry. The contract requires this programme to be regularly updated and resubmitted for acceptance by the project manager (who acts on behalf of the employer), thus becoming the new accepted programme under the contract, superseding any previously accepted programmes. When administered properly, this should lead to both parties having a clear understanding of how the contractor plans to carry out the works in accordance with the works information and any associated liabilities in relation to the movement of the completion milestones. This paper will give an overview of the considerations required to create a programme under the NEC Engineering and Construction Contract (the most commonly used contract within the NEC suite) and offer some advice as to how section 3 (time) of the contract should be interpreted and managed efficiently to the benefit of both parties.

1. CLAUSE 31: PROGRAMME REQUIREMENTS

It is probably fair to say that the construction programme is under-utilised and under-valued on many if not most construction projects and rarely used to its full potential. The benefits of an up-to-date programme reflecting both the stage the contractor has reached and how the contractor plans to complete the remaining works is fundamental to the team working efficiently and effectively to achieve success in any project. The NEC form of contract has long recognised this and translated it into firm contractual obligations that bind parties rather than just hoping or assuming that they will independently manage such a process. While this now means that the NEC requires the contractor to manage the programme, there is nothing that the contract is asking for that the contractor should not already be doing to efficiently manage its works. The resultant by-product is that there is a clear contractual mechanism for agreeing change between the parties as it happens and not waiting for the traditional end-of-project 'sport', where both parties spend time/effort/resources in trying to agree the entitlement to any extensions of time and the resultant final account figure.

The NEC has not created any fundamentally new 'rocket science' procedures. What the contract asks the contractor to do

is to produce and manage a programme to a good level of detail, and for the project manager to recognise and accept the contractor's plans as a true reflection of where the parties are at. Other forms of contract probably assume that this process of using and updating the programme will just happen. Like many of the NEC clauses, the programme aspects are just good practice project management, with the contract simply formalising the fact that these processes must take place.

1.1. Clause 31.1

Clause 31.1 confirms that a programme can either (a) be bound into the contract or (b) constitute a first programme issued for acceptance after award of the contract within the timescales indicated within the contract data part 1. If a programme is incorporated into the contract then this in effect becomes the first accepted programme.

It is fundamental that a detailed, thorough programme by the contractor should be provided at tender stage. From the project manager's perspective this would demonstrate that the contractor (a) has the ability to produce a programme and use the associated software, and (b) has clearly demonstrated that it understands the project and has reflected this in a clear logical format. For this reason the produced programme should be a significant factor in the assessment of the overall tender submission and be reflected as such in any scoring or weighting that the employer may use to evaluate the tender. From the contractor's viewpoint, rather than simply providing a series of ticked boxes, a detailed programme should verify that the determined contract period is achievable and thus that the resultant tender price submitted is much more likely to be correct. Too many contractors base their price on the employer's completion date in contract data part 1, and only when they win the work do they consider a detailed programme and actually find that the date is unachievable or will require considerably more resources than originally envisaged and priced for.

This first programme is very important when we consider clause 50.3, which allows the project manager to withhold 25% of the price for work done to date (the interim contractor valuation) if an accepted programme is not in place or has not been issued showing the information that the contract requires. This is the only place in the whole of the contract that allows the project manager to withhold money from the contractor, and demonstrates the importance it puts on the programme process. This is, however, only applicable to the first programme. Once it

is accepted then this clause no longer applies; it assumes that the contractor will maintain this level of detail and content from there on in. The project manager does have recourse, however, in other ways, inasmuch as if ever a subsequent programme is not compliant with clause 31.2 (see below) then he is not obliged to accept that programme.

1.2. Clause 31.2

This clause is one of the longest in the whole contract and provides a comprehensive list of what should be included within each programme issued for acceptance. It includes the following

- (a) starting date, key dates and completion date
- (b) planned completion
- (c) order and timing of the operations which the contractor plans to do
- (d) provisions for float
- (e) provisions for time-risk allowances
- (f) dates when, in order to provide the works, the contractor will need
 - (i) access to any part of the site
 - (ii) acceptances
 - (iii) plant and materials provided by the employer
 - (iv) information from others
- (g) any other information requested within the context of works information (WI)
- (h) statement of how the contractor plans to do the work, identifying principal equipment and resources which he plans to use.

The following sections consider in more detail each of the points listed above to help the contracting parties understand where exactly the contract is leading and how it might best be managed.

1.2.1. Key dates. One aspect of the NEC contract is that there is no mechanism for the employer to nominate individual subcontractors or suppliers, as it would be unclear who would be responsible for any delay or additional cost for underperformance. The contractor might feel that any liability should be borne by the employer, while the latter might blame the former for not managing the subcontractors properly. The contract therefore does not allow for this and the only place to put any such requirement is in the WI. However, the employer should consider carefully how it includes this and how much choice it is giving the contractor in terms of approved subcontractors or suppliers.

Key dates are a new addition to the Engineering and Construction Contract (ECC3; third edition launched in June 2005). ECC2 only had sectional completions and completion dates as contractual milestones. These did not really help the employer to add constraints without having to take over that section of works. Key dates now require a contractor to meet certain conditions by a certain date, for example the completion of some construction work prior to letting in an electrical company to install a panel, then completion of the remainder of works in that building. These key dates should be identified at tender stage, as they cannot be added mid-contract unless by agreement.

The main aspect of key dates is that if a contractor fails to meet the condition stated by the agreed date, then any cost resulting

from this failure that the employer incurs will be payable by the contractor. Unlike delay damages, which are defined in contract data part 1, these costs will not be defined in advance. For this reason it is very important that these key dates are managed on the programme and that the contractor is aware, as the dates approach, of any implications that may result from not meeting them. The key dates should be managed in accordance with the early warning and compensation event (CE) processes, inasmuch as if there is the possibility of a delay in meeting a key date then an early warning should be raised; if an event will be delayed by something not under the contractor's control or liability then a CE is notified.

1.2.2. Completion date and planned completion. The fact that these two requirements feature as separate items should make it clear that they are distinctly different and need to be treated as such in the programme. There should always be 'completion date' and 'planned completion' milestones in every programme. The 'completion date' is a fixed milestone and is the trigger point for which delay damages are applicable. It can only move due to one of two contractual mechanisms. It can move out (i.e. back) as a result of agreed CEs that affect the contractor's ability to complete by the current planned date. Equally, there is only one mechanism under the contract that will bring a completion date in (i.e. forward). This is acceleration (clause 36). Interestingly, this is not due to negative CEs, which, while almost certain to bring a direct cost saving, will not move this contractual milestone.

Planned completion is, in simple terms, when the contractor 'plans' to finish. It is linked to the contractor's last planned site activity. It can be moved in or out in time depending on whether the contractor is ahead or behind in terms of progress. planned completion can move due to 'anything', but will not necessarily have a direct effect on the completion date (Figure 1).

1.2.3. Order and timing of contractor's operations. 'Order and timing of activities' can most easily be demonstrated by the traditional logic linked bar chart programme to show the activities planned and the dependencies between them. This paper will not deal with which programme software you should adopt for a given project. They are all much of a muchness in terms of what they do, although some are less powerful than others, making them restrictive in what they show and how they show it. It is also important to remember that while the programme software is very clever, an individual programme is created from the information keyed by the operator. As with most procedures or systems, 'rubbish in = rubbish out'. Planners are generally clever people who can make any number of activities fit between two fixed milestones! However, whether the programmes are realistic and achievable within the timescales shown is a completely different matter.

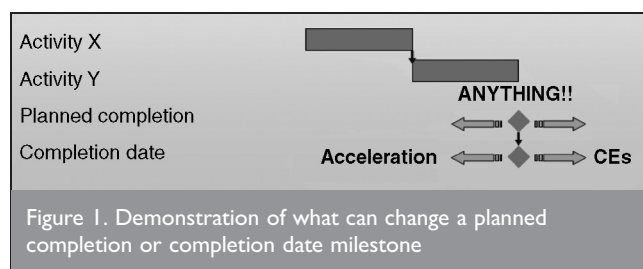


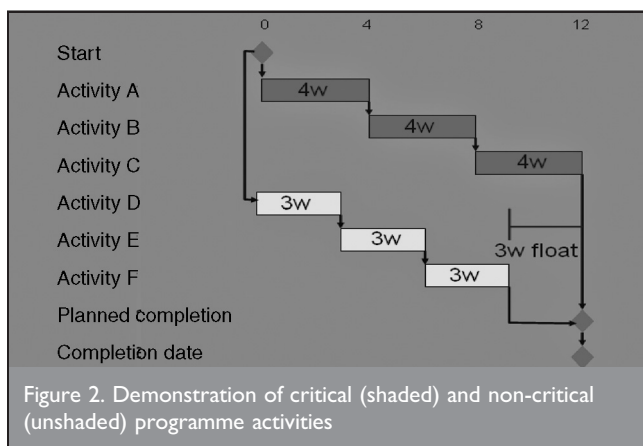
Figure 1. Demonstration of what can change a planned completion or completion date milestone

1.2.4. *Float and time risk allowances.* These are two of the main considerations in terms of ‘float’ on a project, the other being the difference between planned completion and completion date, which is commonly known (and referred to in the NEC guidance notes) as ‘terminal float’. This paper will consider in detail the three types of float, how they should be managed and, most importantly, who owns which float under the contract.

(a) *Float*

Also known as ‘total float’, this demonstrates which activities can slip in time without affecting planned completion and those that cannot. Float is something that is generated by default within the programme software, not something that has to be created manually. Once logic has been created by the use of links (B cannot start until A has finished, C cannot start until B is complete, etc.) then this will determine the planned completion, which will follow on from the last planned activity. By default this will create the ‘critical path’, which sets the overall duration of the project at that point in time and hence the earliest date that you believe you can complete the project by. Questions have been raised as to why the programme requirements in the contract do not ask for critical path. It is actually there by default, inasmuch as the critical path is simply where float equals zero and the contract asks you to demonstrate float. In the simple programme below, activities A, B and C form the critical path and the logic states that by default the remaining activities have elements of float (i.e. can afford to slip by a short time period without currently affecting the ability to finish by the planned completion date). In Figure 2 activities D, E and F can afford to slip by up to 3 weeks collectively without affecting planned completion.

Establishing who owns this float in the contract is quite simple: it is shared. To put it another way, it is also whoever gets there first, although it is important that the parties do not have a race to see who can use it up first! It is shared inasmuch as it is available to accommodate either the effects of a CE or lack of progress/re-sequence by the contractor. In the example shown in Figure 2, if activity D is delayed by denied access to that area by, say, 2 weeks, this will deny the ability to start it in week 1 and it will not be able to start until week 3. This also pushes out activities E and F respectively, which now means that there is only 1 week of float remaining before planned completion. This



would mean that while this event is a CE (something that the contractor could not have planned for and is thus not his risk/liability under this contract), any direct cost would be considered and evaluated, although here it does not have any time effect. Equally, the contractor could have chosen to have started activity D 2 weeks late, perhaps due to lack of materials, but that would not have affected the planned completion at that time either.

It is in both parties’ interest to have activities with as much float as possible (i.e. that they be completed as early in the project as is feasible), as this limits the risk of the project over-running. Contractors might also question why they cannot show a contract programme with no float; in other words, every activity is critical and will affect planned completion if it slips by even a day. In most cases if everything in a programme is critical then it is likely by default not to be achievable or realistic. This would be a reason for a project manager not to accept a programme (see reference to 31.3). Whether it was acceptable or not would also depend on any elements of time-risk allowance included, which leads to the next form of float that the contract requires to be shown.

(b) *Time-risk allowance (TRA)*

This is actually quite a simple element of float but it is often much misunderstood and mismanaged. The contract requires the contractor to demonstrate what elements of risk it has applied to a given activity when ascertaining its duration. In truth, in the past this would have been considered during the estimating phase, but not necessarily formally recorded and named ‘time-risk allowance’ (TRA).

During the estimating/tender period, it might have been considered that an activity would take 13 days to complete based on the resources being used and the optimum output expected of a certain gang size in the particular site conditions. However, those 13 days were probably the best that could be achieved. Therefore, a consideration as to the likely risk for that activity in terms of, for example, weather, downtime, inefficiencies, etc. should be made, which might result in a duration of 15 days for the estimate and programme purposes. Fifteen days will be carried forward to the programme; the contract requires the contractor to show how much of that period is TRA. The most simple and effective way to show this in terms of the programme is to add an extra column titled ‘TRA’. The programme will then show this activity as being of 15 days’ duration, but with a TRA of 2 days.

The project manager should primarily be interested in critical path items that have some elements of TRA to both provide a greater degree of comfort and ensure that the completion date is achievable. TRA is not, however, available to absorb the effects of CEs. In the example shown in Figure 3, if activity A is denied access by, say, 3 days and agreed to be a CE, it cannot use up the 3 days TRA allocated to it and thus not show a delay to planned completion. The 3-day delay would be added as a CE on the programme, it would delay the start of activity A by 3 days, the 4-week duration would be retained along with the remainder of the critical path and thus planned completion

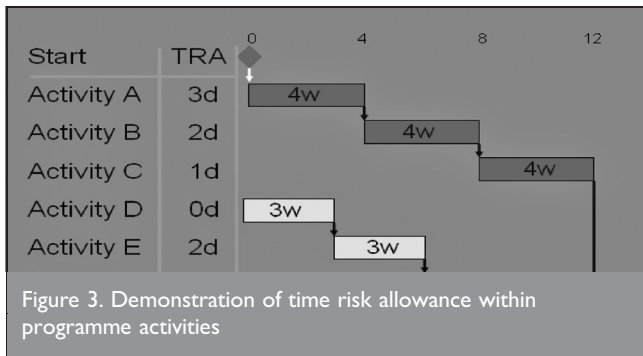


Figure 3. Demonstration of time risk allowance within programme activities

(and ultimately completion date as well) would be delayed by 3 days.

To summarise these points, TRAs are risks allocated to an individual activity and are contractor owned.

(c) *Terminal float (difference between planned completion and completion date)*

This, the final element to be considered in terms of float, is owned by the contractor. This is made clear in clause 63.3, which reinforces the fact that the completion date moves out by the amount that the planned completion moves out on the last accepted programme due to the effects of a CE. This does seem logical, as it may well be that the contractor has expended additional cost to actually finish early for its own benefit; it would then not be right if a CE ate into that period, preventing the contractor from leaving the site earlier than planned.

If planned completion is 2 weeks earlier than the completion date in the accepted programme, and a CE affects the critical path (and hence planned completion) by 2 weeks, the completion date also moves out by 2 weeks, maintaining the 2-week differential between the two milestones. If the contractor takes 2 weeks longer to carry out an activity and this is not a CE, then planned completion would move out by 2 weeks and the completion date would remain where it was, with the contractor using up his own terminal float.

It is important to consider what benefit this actually gives the contractor, as it is not the case that it picks up any specific defined cost for the period between planned completion/completion date. There is thus no direct financial benefit. Equally, there is no issue with defect liability or maintenance periods, as these would apply from the completion date, which would/should follow quickly on from planned completion. The only real benefit in having a planned completion prior to completion date is the limitation in exposure to delay damages under the contract, which would apply should the completion date be exceeded.

For a project manager, the only way within the contract to bring back a completion date if terminal float has been established is to request acceleration under clause 36. This is explored in more detail below.

1.2.5. *Dates when, in order to provide the works, the contractor will need access, plant/materials, acceptances etc.* This group of

contract requirements can be summed up by saying 'any employer or third party interfaces that have the ability to affect the contractor's works should be shown on the programme'. However, they will not normally be shown with the same level of detail that the contractor will require for its own activities. Either an activity or a milestone can demonstrate to all concerned the date that the contractor needs a design signed off, free issue material, or third parties to have completed an element of work before it can proceed with the next stage of its work. As long as these are shown clearly on the accepted programme, and things such as acceptance periods shown are in accordance with the WI (one cannot limit employer approval periods to those in the WI), then it should be clear what the resultant effect would be should that element not occur as programmed. It is very important that the contractor has a suitable level of detail in its programme. If there is an element of work that is, for example, 8 weeks long and a CE affects part of that works, how can it be clearly demonstrated how much of the 8 weeks has been affected? If this activity is broken down into smaller chunks then this assessment will be clearer and much less subjective.

This should result in the contractor's programme being integrated, which will work to the benefit of all parties. The contractor describes all of its own activities with a good level of detail, as well as any employer/third-party activities that interface with them. The contractor can also provide the project manager with a filtered programme of the employer's deliverables that, provided they are met by the dates shown, will maintain the contractor's ability to complete the programmed works on time.

1.2.6. *Any other information required within the WI.* As with any project, it is necessary to understand the contract that one is entering into and the implications of the specific contractual clauses. The above are clauses common to all unamended ECC contracts, but there may be additional requirements in the project-specific WI that also need to be carried out or demonstrated. For example, there could be specific or additional reports to be carried out with each programme submitted for acceptance, or there could be the requirement to use specific planning software for the production of programmes.

1.2.7. *Statement of how the contractor plans to carry out the works.* The wording of clause 31.2 has subtly changed since the issue of NEC2, which used to read 'a method statement of...'. The words 'method statement' in certain circles conjured up a misleading image of a more traditional health and safety 'method statement' required for a site task. There have been projects that the project manager did not accept under ECC2 because the contractor had not (a) produced an all-encompassing 'method statement', (b) issued all of the project method statements for a given project, or (c) shown the statements in its programme. This was not the original intent of the contract.

The programme itself can easily demonstrate some of the information that the statement is asking for. It is possible to show resources in the programme, in particular labour levels. Indeed, it is difficult to see how a programme can be properly evaluated without having resource levels. The bars shown may seem to be achievable in a given week, until you consider that each activity needs six operatives and the cumulative number of resources you are showing as being required is more than the

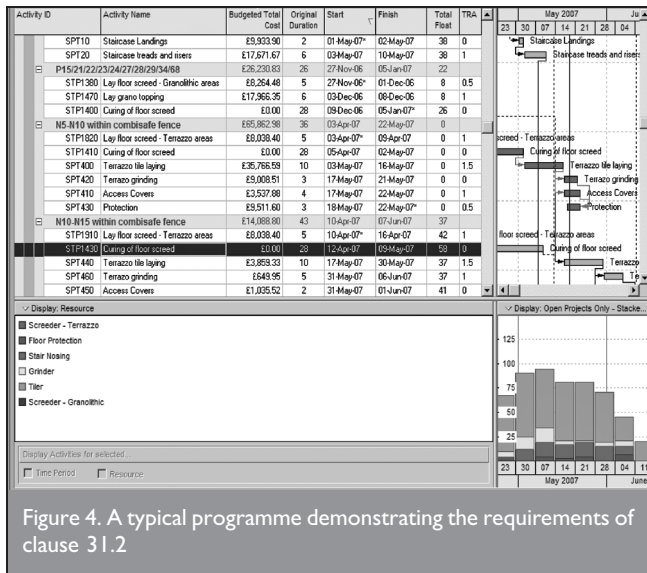


Figure 4. A typical programme demonstrating the requirements of clause 31.2

total of the resources available to you. In that instance one would either have to delay some activities or put less resources into each of them, which in turn is likely to extend their duration. This can be included as an additional column in the programme showing number of resources. One could also have another column showing key equipment required for each operation. There is a balance to be struck here, as one may end up with many columns on the programme (activity, start date, finish date, float, TRA etc.), but it is a case of showing the important columns alongside the bar chart itself for each programme produced (Figure 4).

The statement, practically speaking, becomes what might be called a programme narrative, focusing on forthcoming activities, critical path, and, importantly, what has changed and why since the last accepted programme. This statement should be issued with every programme submitted for acceptance to provide the project manager with a clear vision of what the programme is about. This should also speed up the acceptance process. If the project manager can see what has changed and why, the only thing he needs to assess is whether he agrees with the assessments and that it is not the contractor's liability if it has affected the planned completion.

1.3. Clause 31.3

Under clause 31.3 the project manager has to accept or not accept a programme within 2 weeks of submission. This has to be notified separately to the contractor (clause 13.7) and give reasons why if the response is non-acceptance. The four reasons under the contract, plus a selection of examples, are shown below.

- (a) Contractor's plans as shown are not practicable, for example
 - (i) multiple trades working in same vicinity, which is neither practical or safe
 - (ii) an activity starting prior to one finishing, which is impossible
 - (iii) an activity duration which is not achievable.
- (b) The programme does not show the information which the contract requires, for example
 - (i) float or time-risk allowance
 - (ii) when the contractor requires employer free issue material

- (iii) key dates as stated in the contract data for the project.
- (c) The programme does not represent the contractor's plans realistically, for example
 - (i) contractor shown doing works that have already been completed
 - (ii) duration relies on eight operatives to achieve the output required, yet the contractor has only two operatives working on that activity while the duration remains the same
 - (iii) the sequence shown does not represent how the operatives are actually doing the work at the point in time that the programme was issued.
- (d) The programme does not comply with the WI, for example
 - (i) it does not show an element of work that is clearly part of the WI
 - (ii) the WI requires a certain type of method to be used and the programme has used a different one.

If the project manager chooses not to accept for any other reason, then by default that would be a CE under clause 60.1(9).

It is important to recognise that whether a programme has been accepted or not is not a condition precedent for the contractor proceeding with the works – that is, it cannot refuse to work until such time that the programme has been accepted. It is equally important to recognise that if the project manager does not respond within 2 weeks of the programme being issued, then the latter is deemed not to have been accepted. There are no deemed acceptance conditions at all within the contract, other than three very specific ones associated with the acceptance of CE quotations or notifications.

The accepted programme is one of the most important aspects of the contract for both parties in terms of understanding and contractual liability. The impacts of this will be considered in more detail in a subsequent paper.

2. DEFINED TERMS ASSOCIATED WITH THE PROGRAMME

There are a number of defined terms that are spread throughout the contract that have implications for time/programme that are useful to consider when producing any programme. Capitalisation of the first letter of a term indicates that it is a defined term, for which a definition can be found in section 11, while italicisation indicates that it will be quantified within contract data part 1 of a particular contract. For ease of reading, all NEC contract terms in this paper are set in lower-case, non-italic type.

- (a) Contract date – the date when the contract came into existence (there is a legal interpretation of when this happens, but in its simplest terms it can be defined as when both parties enter into the contract).
- (b) Starting date – identified in contract data part 1 (normally the same as contract date, but can be later when an employer has engaged a contractor but does not want it to start work on the project for a while).
- (c) Accepted programme – programme identified in the contract data or the latest accepted by the project manager.
- (d) Possession/access date – identified in contract data part 1.
- (e) Completion – when the contractor has done all the work stated in the WI by the completion date and completed any defects that would prevent the employer from using the works

(note: this does not mean defect free, but would stop the Employer from using the works).

- (f) Completion date – as specified in contract data unless changed in accordance with the contract.
- (g) Planned completion – when the contractor plans to complete its work.
- (h) Key date – stated work is to meet a certain condition by a certain date as stated in contract data part 1.
- (i) Sectional completion – if secondary option X5 is chosen, the Employer will take over a certain area of the works by a certain date.

3. CLAUSE 32: REVISING THE PROGRAMME

What the contractor shows in each revised programme

- (a) actual progress achieved on each operation and effect upon remaining work
- (b) effects of implemented CEs
- (c) how the contractor plans to deal with delays and correct notified defects
- (d) any other changes that the contractor proposes to make.

Put more simply, the contractor should update its programme to reflect the reality of how it perceives that it intends to carry out all remaining works. Any factor that has changed the logic or duration of activities has to be reflected. A very simple test when updating a programme is to run a filter of the next week's works that it shows are planned to be carried out. Are those the activities that are really intended to be done? If not, then whichever way you look at it that cannot be the correct contract

programme issued for acceptance. The programme should demonstrate the reality of what you know at any given point in time. To be sure, it may be out of date should something change 5 minutes after it was issued, but a line has to be drawn somewhere.

4. CONCLUSIONS

The contract puts considerable pressure on the contractor in terms of the level of detail required. It is, however, in the contractor's interest to show this anyway, as there is no requirement requested in the contract that the contractor should not want to be doing for its own efficient project management. There has to be the level of effort made available to create the programme and to maintain it for the life of the project to provide both parties with the transparency and understanding they require. Once created and accepted, as well as being a practical management tool for the contractor, it will also become a key commercial tool in assessing any entitlement, particularly when CEs are notified. Projects that do not set this up often become problematic and arrive at the very situation that the drafting of the contract was trying to avoid in the first place. A well-presented and understood programme will go a very long way to limiting any disagreements that the parties might otherwise have.

The companion paper mentioned above will look in more detail at how to manage the programme for the life of the project, and in particular how to assess early warnings and CEs in terms of the effect on the accepted programme.

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