CHAPTER EIGHT : PROGRESS

CONTENTS

8.01 The Importance of Progress Matters.

There is a pressing need to improve and maintain a better record of prompt completion of road contracts administered by the Department.

Apart from social benefit aspects, substantial economic losses can result from delays in completion. The investment that Government makes in the form of interim payments during the construction period produces no return until the road (or at least part of it) comes into public use and failure to complete on time confounds the economic return figures on which the viability of the project is based. More direct losses occur if the contractor successfully claims extra costs arising from delays not of his making.

8.02 Engineer Responsibilities

Progress matters are not essentially* a contractual responsibility of the Engineer and his staff, but the whole supervision team does have a clear duty to its employer, the Government, to bring the project to timely completion. This is one of the important aspects of the total management concept advocated in Chapter One. So, although there may be numerous causes of delay which neither the contractor nor the Engineer create (for example late land release, protracted services work, financing problems or national materials shortages), the supervision staff must actively do all they can to help overcome delays and encourage progress. It goes without saying that when it comes to progress matters over which the team does have direct influence, such as the provision of drawings and instructions etc, inspection, the giving of approval and the certification of payment, the team must maintain a continuing sense of urgency.

** But see the Table 3/APP, Sections B4, 5 & 6 with reference to some duties of the Engineer prescribed in the Conditions of Contract in the event of delay.*

8.03 R.E.'s Aids to Progress.

Particularising the foregoing generalities, the Resident Engineer should regard the following duties as an essential part of his job.

(1) Ensure through the early provision of Land Plans and close contact with the appropriate Land Office that the site is made available to the contractor at the proper time.
(2) Provide instructions and drawings covering variations or the necessary amplification or clarification of the original documents quickly.
(3) Ensure that site staff attend to inspection and testing duties promptly and issue approvals for sequential operations as soon as possible, or
inform the contractor of necessary corrections; warn the contractor in advance if deficiencies in preparation are observed.

(4) Prepare interim certificates on time and pass them on quickly for signature and processing.
(5) Use any departmental or other governmen tal influence to earmark, for the project, materials in short supply.
(6) Liaise with service authorities and pre-plan service diversions.
(7) Monitor progress on a regular basis and take corrective action where necessary.
(8) Report promptly to the Engineer delays to the scheduled programme which develop.
(9) Examine with the contractor possibilities for redesign or reprogramming which may be helpful in overcoming delays which are affecting, or threatening, progress (but see also last paragraph of Chapter 8.10)

8.04 The Monitoring and Control of Progress.

Turning to the subject of practical measures involved in the monitoring and controlling of progress, the most essential tool is the contractor's works- programme. In most contract forms the contractor''-~is required to present his proposals for the--'Engineer's approval within a stipulated period of the Notice to Proceed. Since the programme has both practical and contractual significance it should be found to be realistic before it is approved.

The importance of the programme is threefold:

1. It is the basis for the whole day to day and long term planning of the contractor's operations, procurement of materials and commitment of plant and labour resources. if it. is seriously impractical the contractor may find himself in a real, but previously undiscerned, delay situation late in the contract period, when he is unable to recover the backlog.
2. It is the yardstick against which all progress is measured and against which requirements for any necessary acceleration can be determined.
3. In the event of claims for delay costs it is the means of determining the effect of obstructions, and the cost of non-delay situation operations, against which the extra cost of the actual delay situation operations can be assessed.

8.05 Contractor's Programmes.

Programmes presented by the contractor should take one of the following three forms.

1. operational Networks,
2. Vector Charts, or
3. Simple Bar Charts.

The Engineer may, in addition, ask the contractor to submit simple calculations of material requirements and output in support of his programme.

Most road jobs have a relatively simple operation train so that critical path networks are often unnecessary. However, if complicated services or traffic diversions are involved (which is the case in many urban schemes) network programmes can be valuable. They are also useful for programming major structure operations. Further, general networks are valuable for extra time and cost determination in delay circumstances.

Vector Charts can be prepared for Bill of Quantities sections for more detailed groups of items) using vertical time scales and horizontal chainage coordinates. They are particularly suitable for roadworks because many work output requirements are proportional to chainage length and adopt common vector slopes.

Simple Bar Charts, prepared for groups of Bill of Quantities items on a horizontal time base with chainage or other location or structure data, are suitable for uncomplicated contracts.

Whilst Vector Charts or Bar Charts are appropriate for the roadwork operations of many contracts, they give little scope for the detailed planning of major structures and the combination of Vector or Bar Charts for roadwork operations, together with network programmes for major structures, can be a suitable approach.

Examples of the three types of programme are given in Figures 8A, 8B and 8C on pages 8/12, 8/13 & 8/14.

In the case of small contractors with little programming experience, the RE may assist in the preparation of the programme which must, however, be presented formally as the contractor's proposal.

8.06 Programme Approval.

In checking that the contractor's programme is practicable before approving it, the Resident Engineer should include the following points in his examination.

1. Is the length of the mobilisation period practical for establishing plant, offices and laboratory before the scheduled date of the first operations, or are special alternative arrangments for temporary supply of materials, hire of plant etc., practicable?
2. Is the scheduled sequencing of operations suitable? Are any special specified sequence arrangements observed?
3. Are the assumed quantities correct? A coarse ch eck on the Bill of Quantities should be run.
4. Is the output capacity of the proposed labour force and mobile plant fleet adequate to meet the scheduled rates of progress?
5. Are the acquisition rates of materials and stor age capacities adequate?
6. Is the output of static plant adequate?
   a. Quarry facilities °- drilling, blasting, loading, trucking.
   b. Crushing, screening, washing.
   c. Concrete plant
   d. Asphalt plant
7. Has the effect of daily weather patterns and seasonal weather constraints been taken into account?
8. Has the effect of major public holidays been allowed for ?
9. Has the disrupting effect of service diversions and existing road traffic been taken into account?
10. Has adequate float time for clearing up and contingencies been allowed?

In assessing the capacity of mobile plant, manufacturer's literature, reference books or selling agents' organisations can be consulted. The capacity figures obtained may need adjustment for equipment which is old or in poor condition. As far as static plant is concerned, hourly output ratings are usually quoted by the manufacturers but these are often highly optimistic. For example, the maximum output that can reasonably be achieved from an Asphalt Manufacturing Plant may be as low as 60% of the rated output.

If appropriate, the Engineer (or his Respresentative) should require the contractor to make any alterations that the examination of the original programme has indicated to be necessary. When the programme is acceptable in form and content, the Engineer should give his approval to the contractor in writing. Obtaining and checking the contractor's programme for approval is mandatory for the RE.

8.07 Progress Chart and 'S' Curve.

Once an approved programme is available, the Resident Engineer should ask the contractor to prepare a detailed Progress Chart and from it the financial progress 'S' Curve. Both should be checked by the RE. These are mandatory requirements.

Figure 8D on page 8/15 gives an example of a Progress Chart with which the 'S' Curve has been combined. It is equally possible to prepare the two as separate charts, of course, providing better clarity.

For the Progress Chart the work value of the programme month by month is assessed, broken down at least into Bill of Quantities Sections, but preferably subdivided into the major operational item groups. For example, the "Pavement" section will raise item groups for SubBase, Base and Surfacing. The monthly figures for each section or item group are expresed as a percentage of the total for the whole contract period and inserted against the "Scheduled" bar for the particular item.

As construction proceeds the percentage value of work completed month by month under each item group is determined, usually based on the interim certificate measurements. An open bar is provided for each item group below the "Scheduled" figure bar and the actual percentage completion figure is written in each month., The open bar is then coloured in to the limit that the "Actual" completion represents on the "Scheduled" bar. In this way it is possible to see, at a glance, the extent to which any item group or section is behind, or ahead of schedule and it is a simple matter to express this as delay or advance of so many months.

At the foot of the Chart, horizontal columns are provided for "Scheduled" and "Actual" monthly cumulative totals aggregated from completed work values in dollars, for all the item groups.

In determining percentage completion figures in assessments of progress or delay periods, the Predicted Final Cost (see Chapter 7.16) should be used, not the original contract sum. It will therefore be necessary to update the figures on the Progress Chart from time to time, although this is not considered necessary for changes less than 2%.

8.08 Regular Review of Progress.

The progress situation should come under monthly review by the Resident Engineer. The Progress Chart, if it is updated conscientiously, will reveal operations which are subject to delay, but it is also necessary to identify areas of potential delay in critical operations, or sequencing problems which may arise in the future. If the programmes consist of Bar or Vector Charts, these problems may not be very obvious and will only be revealed after careful examination.

Prints of the contract drawings which show progressive completion of the various items of work by colour coding are helpful in illustrating the current progress situation. They perform a joint function as Progress/Measurement Drawings and are dealt with in Chapter 7.09.

8.09 Progress Meetings.

The Resident Engineer should arrange for Progress Meetings to be held at his site office with the contractor at monthly intervals. It is desirable that the meetings should be attended by the Engineer and a director of the contracting company. In the case of supervision by consultants a principal of the firm (preferably the Project Manager) should attend. Where consultants are involved in design only, representatives may also be asked to attend in appropriate circumstances. At the meeting, the overall progress situation should be discussed, detailed causes of any delay should be identified and agreement reached as to how they should be overcome. I n addition to dealing with progress matters, the meetings are a useful forum for raising constructional and contractual points which the local site staff have been unable to resolve during the month, but on which the more senior personnel attending may be able to give rulings, or reach agreement.

'A site visit to the works should be undertaken by the members of the meeting on the same day.

8.10 Action in the Event o€ Delay.

It should be remembered that some Conditions of Contract forms * give the Engineer the right to require the contractor to revise his programme in the event o€ delay. If accumulated delay exceeds say 20% in financial terms this right should certainly be exercised. As a further and more formal step, Clause 46 of the CEWI, FIDIC and I.C.B. Conditions of Contract oblige the Engineer to notify the contractor if, in the Engineer's opinion, progress is "....too slow for the completion of the Works by the prescribed time ..." The contractor must then take steps agreed with the Engineer to expedite progress. Measures to expedite may well include the committing of additional resources of plant and labour. (See also Sections B2 and 4 of Table 3/APP)

As noted in Chapter 8.03 (9) the Resident Engineer should co-operate with the contractor to find ways of overcoming delay either through re-design or reprogramming.

However, on a point of contractual detail, if the circumstances of delay can be shown by the contractor to be not of his making, but the result of some external influence or the Employer's fault, then the contractor may be able to claim extra costs for the measures he takes in order to accelerate progress. Resident Engineers should therefore give no instruction, nor make any agreement with the contractor, without first informing their superior officer and discussing the implications with him.

** 203 CEW1 and I.C.B. C1.14.(2); FIDIC C1.14.2.*

8.11 Extension of the Contract Period.

In certain circumstances of delay it is necessary for the Engineer to extend the construction period beyond that provided in the contract.

Generally speaking grounds for extension are external influences on the contractors operations or default on the part of the Employer. The contract period must not be extended under circumstances which are entirely the fault, or contractual responsibility of the contractor.

Grounds for extension are formalised (not necessarilly exhaustively) in the Conditions of Contract. In the case of the, 203 CEWI and I.C.B. "Conditions" the major clauses to note are:

a) Clause 12 Adverse Physical conditions or obstructions.
b) Clause 42 Employers failure to provide the site.
c) Clause 44 Various causes noted in sub clauses a-i.

Similar provisions are to be found in the FIDIC "Conditions" except that whilst Clause 12 deals with the extra cost of Adverse Physical Conditions, time extension on these grounds is not mentioned specifically in the Clause.

In the Form 203A "Conditions" there is no " Adverse Physical Conditions or obstructions" clause (but this does not necessarily exclude claims for extension on these grounds). Clause 43 of Form 203A has sub clauses similar to those of Clause 44 of 203 CEWI except that inability to secure materials and the employer's failure to provide the site on time are entered as grounds for extension (extra costs connected with land delays however are ruled out by Clause 38.d).

A more comprehensive listing of the clauses in the various Conditions of contract which provide grounds for extension are given in Section B(5) and (6) of Table 3/APP.

Clearly it is important to consult the contract's particular Conditions of Contract when considering what grounds, if any, are appropriate for extension.

8.12 Determination of Extension Period.

The following points should be noted in determining extensions.

1. Delaying or obstructing influences do not in themselves constitute grounds for an award of extra time - there must an actual occurence of delay.

2. In spite of delaying factors the contractor is still required to use his "best endeavours" to avoid delays. These may include rescheduling his operations but clearly, if he incurs extra expense as a result of measures he takes, he may have a justifiable claim for reimbursement.

3. To qualify for extension the delay must be such as to unavoidably extend some works activity beyond the end of the original construction period. It is therefore necessary to examine the effect of the obstruction upon the most time-critical train of operations. Network programmes can be particularly useful in identifying the critical elements. The procedure followed is to restart the critical path at the date the obstruction ceases and allow the same construction periods for the remaining operations as the original programme allowed, unless some redesign or reprogramming makes it practical to reduce these periods. If there is no approved programme network an attempt trust still be made to establish the effect on time- critical operations.

4. On no account should several delaying events or circumstances be simply aggregated to give a total delay period, without assessing the critical effect as outlined in 3 above. The time allowed for the most critical delay may well envelope the time consumed by another.

5. The granting of an extension" of the contract period relieves the contractor of the liability for Liquidated Damages and usually opens the door to claims for extra cost which may be substantial. Officers determining extensions should therefore carefully ensure that there are genuine and justifiable grounds before doing so.

8.13 Co-incident Delays

It often happens that determination of the extension period is complicated by delays caused by the contractor, which are either totally or partially coincident in time with those for which the Employer carries responsibility.

In these cases, it is necessary to apportion liability between the contractor and the Employer when determining an extension, which will, in turn, affect the contractor's liability for Liquidated Damages. It is difficult to formulate

general rules for apportionment which apply to all circumstances and each case should be investigated on its own merits. Site staff should refer such cases to the Engineer or their Co-ordinator and ensure that the officer determining any extension is aware of all the facts affecting the issue.

Even if the contractor's delays are adjudged not to be a factor affecting the length of the extension period, they maystill be relevant to the assessment of costs awarded to the contractor for delay and extension.

8.14 Extension Certificate.

The decision to extend the contract period should not be taken hastily. The Engineer must be convinced that the contractor is not able to recover delay during the remaining part of the original contract period. On the other hand, if extension is denied or delayed when it is clearly justifiable and advisable, the Employer may face an irrefutable claim for cost incurred by the contractor in accelerating his operations to complete within the original contract period. It is therefore, a decision which requires careful and reasoned judgement.

If it is decided that an extension must be granted an Extension Certificate should be prepared for the Engineer's signature on Form JKR 203T Pin 4/83 "Certificate of Delay and Extension of Time". The Form quotes the length of extension and the reasons for it - a blank copy is shown in Figure 8E on pages 8/16-17.

8.15 Certificate of Non-Completion.

If the work included in the contract is not substantially complete by the end of the original contract period, and if there are no acceptable grounds for extension of the contract period, then the Engineer is to issue a Certificate of Non-Completion. Liquidated Damages as prescribed in the contract will, in this circumstance, be levied against the contractor.

It is normal before issuing the Certificate to send to the contractor a "show cause" letter seeking his views on any grounds for not issuing the Certificate. The letter can be sent in advance of the completion date if it is clear that there is no possibility of completion on time.

8.16 Extension of Insurances

In the event of extension of the contract period, the Resident Engineer should ensure that all the contract insurances (see Chapter 4.©4 c) are renewed by the contractor, as necessary, at their original expiry dates. In the event of failure of the contractor to effect renewal, the Engineer should arrange for renewal by the Department and deduct the cost of the premiums from monies due to the contractor.

8.17 Quality versus Progress.

One last word on the subject of progress. It has already been said that supervision staff should encourage progress and make strenuous efforts to overcome delay. 'They should co-operate with the contractor and give him their support to this end. However, in doing so, no one in the supervision team should ever relax specified standards which their engineering judgement tells them are essential, ignore the requirements of good construction practice, or abandon necessary testing or other control techniques, in an attempt to short-cut the time required to provide an acceptable result. The quality is remembered long after the completion date is forgotten.

TYPICAL NETWORK
PROGRAMME

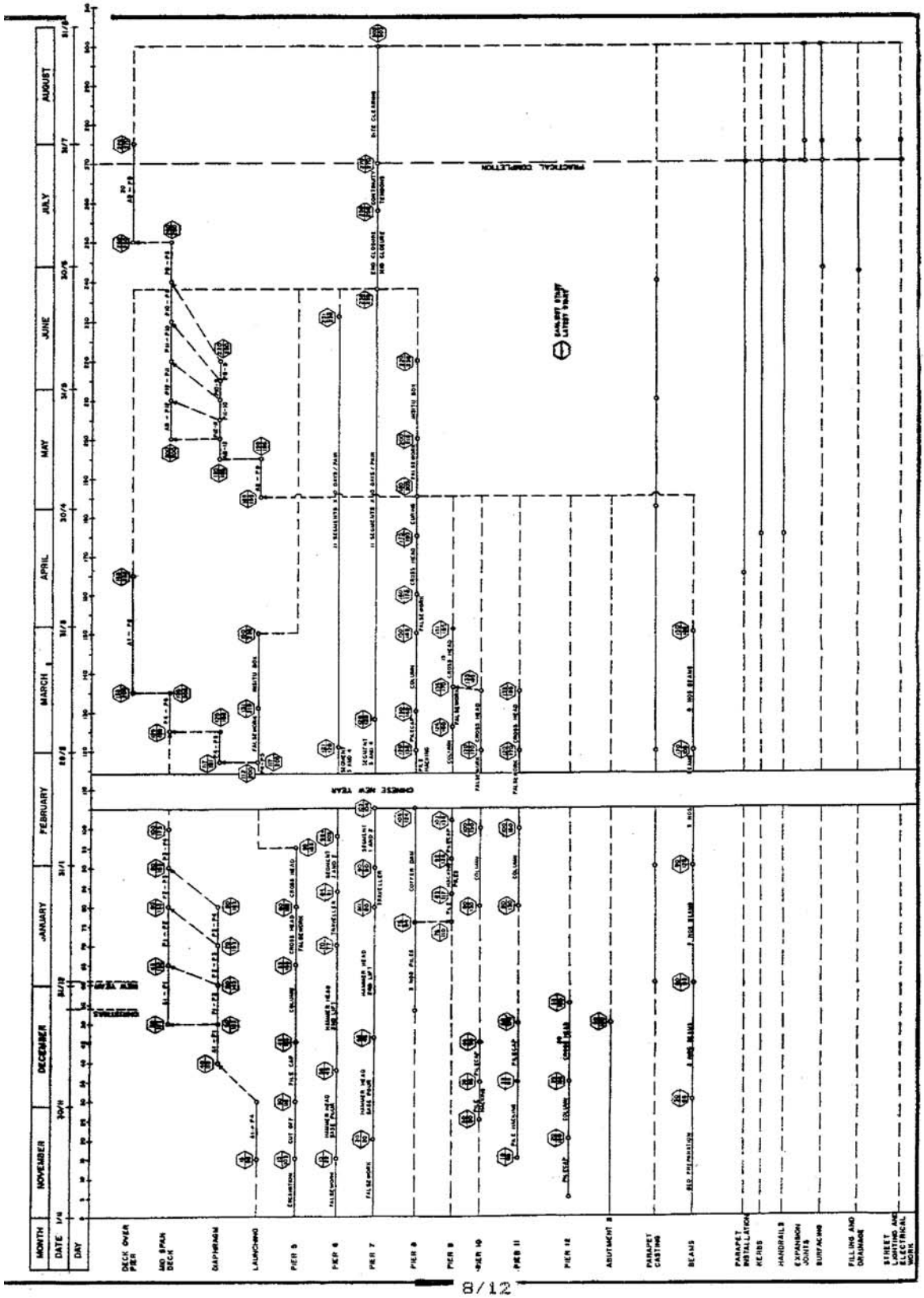

FIGURE 8A TYPICAL NETWORK PROGRAMME

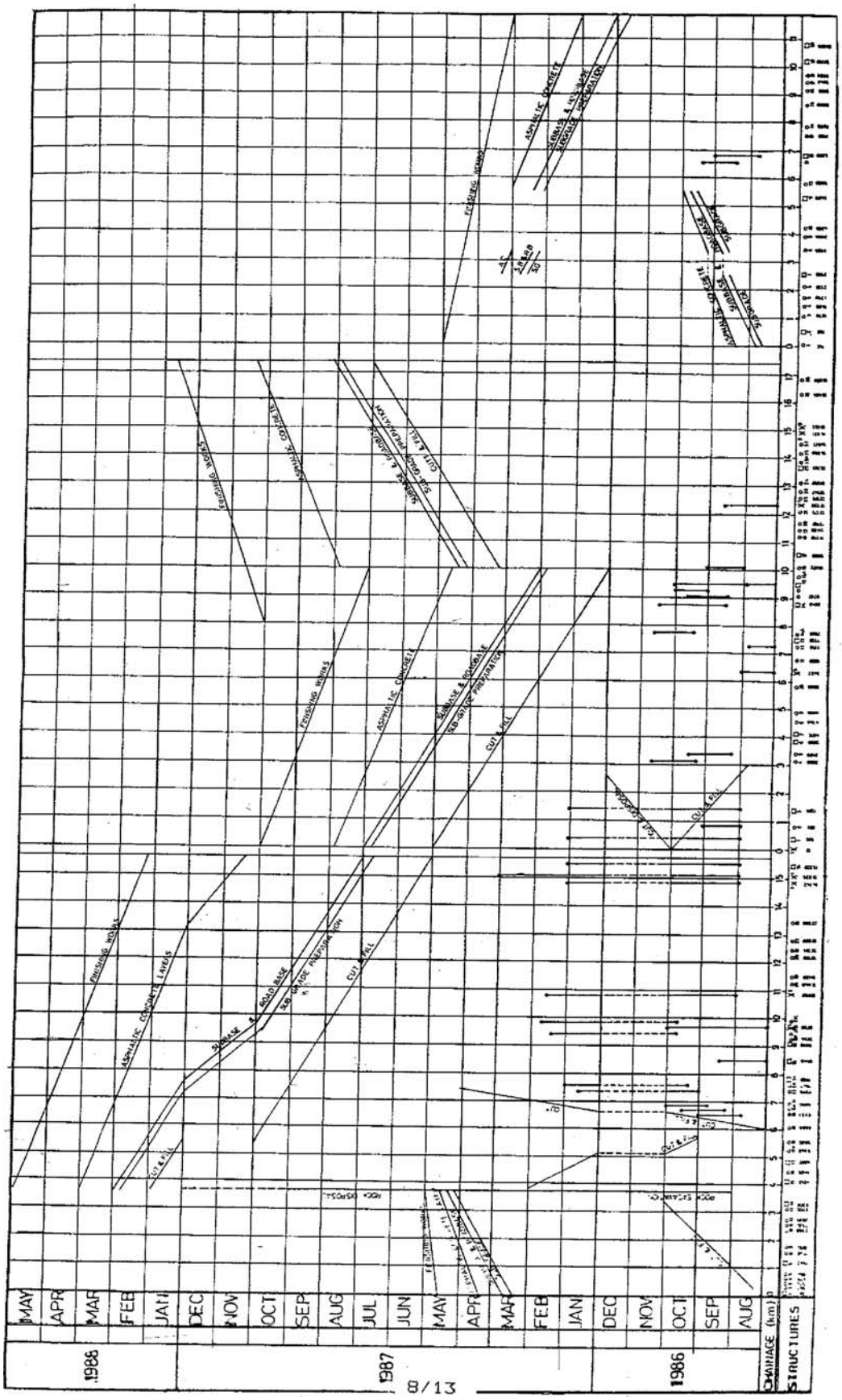

FIGURE 8B
TYPICAL
VECTOR
PROGRAMME

FIGURE 8B TYPICAL VECTOR PROGRAMME

FIGURE 8C
TYPICAL BAR CHART

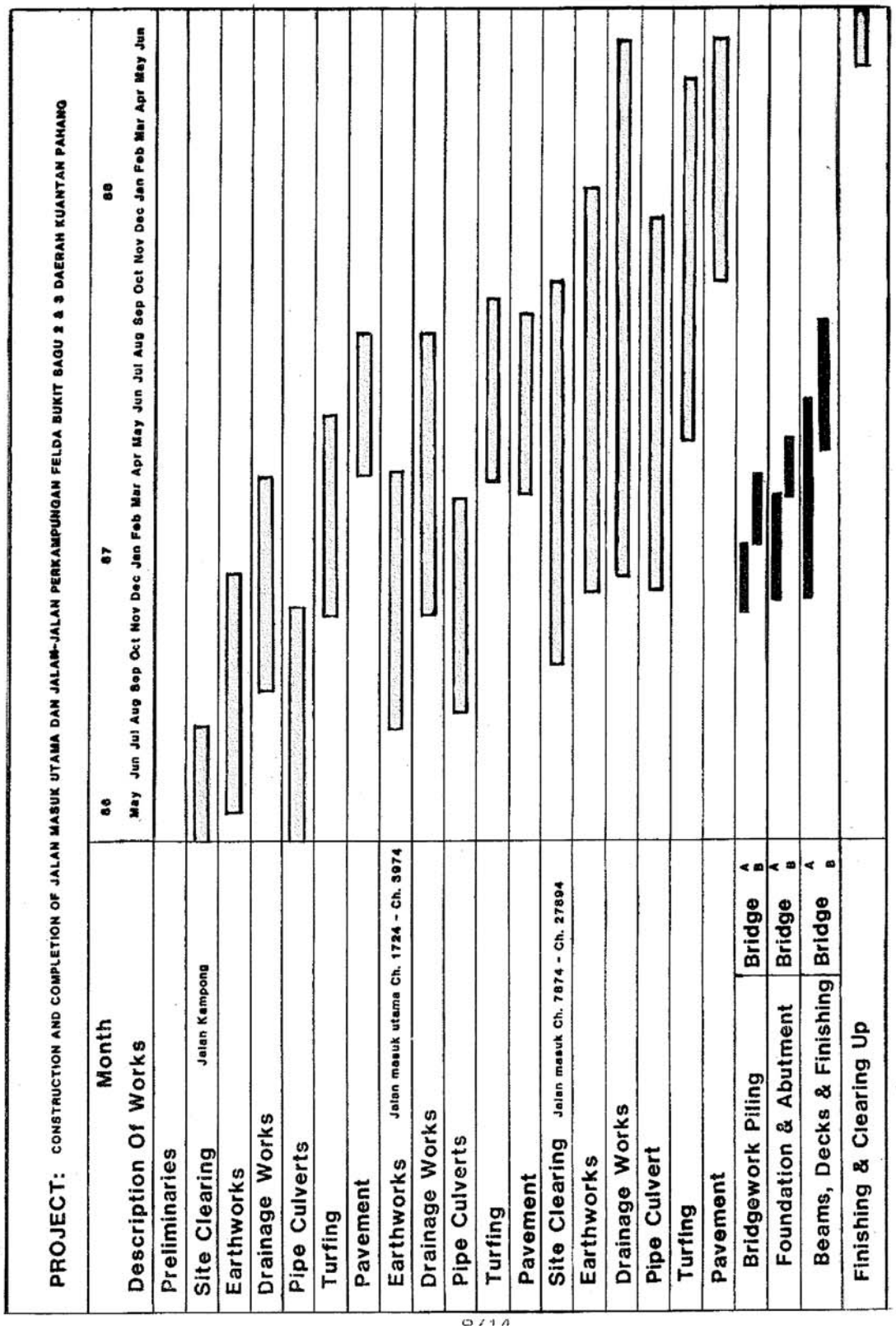

FIGURE 8C TYPICAL BAR CHART

FIGURE 8E

(JKR.203T Pin.4/83)

KERAJAAN.....
JABATAN KERJA RAYA

PERAKUAN KELAMBATAN DAN LANJUTAN MASA No.....
(CERTIFICATE OF DELAY AND EXTENSION OF TIME No.....)

Rujukan.....

Pejabat.....
.....
.....
.....
Tarikh..... .

Kepada.....
.....
.....
(Kontraktor)

Berdaftar dengan JKR dalam Kelas “....."

Kontrak No.....,.....:..... ....

Kontrak untuk.....

Bahagian*..... Section*

Dengan ini saya memperakui bahawa kemajuan dan penyiapan Kerja-Kerja/ Bahagian Kerja
I hereby certify that the progress and completion of the Works/Section of the

Kerja* seperti yang tersebut di atas mungkin/ telah* terlambat melewati Tarikh Siap seperti
Works as mentioned above is likely to be / has been* delayed beyond the Date for Completion*

yang dinyatakan dalam Lampiran kepada Syarat-Syarat Kontrak atau melewati Tarikh
stated in the Appendix to the Conditions of Contract or beyond the extended Date

Lanjutan Siap yang telah dibenarkan sebelum ini, iaitu.....
for Completion previously approved i.e.

dengan sebab/sebab-sebab berikut:
due to the following reason/reasons.

Sebab/sebab-sebab (reasonlreasons)	Klausa (Clause)	Tempoh Kelambatan dan Lanjutan Masa (Period of Delay and Extension of Time)
.....	.....	.....
.....	.....	.....
.....	.....	.....

1

FIGURE BE
continued

2. Menurut Klausa 43 Syarat-Syarat Kontrak, saya dengan ini membenarkan lanjutan masa
In accordance with Clause 43 of the Conditions of Contract, I hereby grant you an extension

selama.....untuk menyiapkan Kerja-Kerja/Bahagian Kerja-Kerja* di bawah
of time of *for the completion of the Works/Section of the Works* under*
Kontrak ini.
this Contract.

3. Berikutan dengan itu Tarikh Siap yang telah ditetapkan pada.....sekarang ini
The Date for Completion which has been fixed on *is now*

dilanjutkan kepada.....
therefore extended to

.....
Pegawai Penguasa
Superintending Officer

(Nama Penuh.....)
Name in Full

Nama Jawatan.....
Designation

.....
Tandatangan Pegawai yang diwakilkan bertindak, untuk dan bagi pihak KERAJAAN
Signature of Officer authorised to act for and on behalf of GOVERNMENT

s.k. Ketua Setiausaha
Kementerian Kerjaraya dan Kemudahan-Kemudahan Awam
Kuala Lumpur (U/P: Bahagian Penyertaan Bumiputra dan Kontrak)

Ketua Audit Negara

Akauntan Perbendaharaan

Bank/Syarikat Insuran.....
(yang menjamin perlaksanaan kontrak)

Pengarah Pengurusan
Ibu Pejabat JKR
Kuala Lumpur

Pengarah Cawangan.....
Ibu Pejabat JKR
Kuala Lumpur

Pengarah Cawangan Ukur Bahan
Ibu Pejabat JKR
Kuala Lumpur

Pengarah
JKR Negeri.....

Jurutera Daerah/Projek.....

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* Potong jika tidak berkenaan.
(Delete if not applicable).

† Sebutkan rujukan Klausa yang mana Kontraktor berhak mendapat Lanjutan Masa.
(State Clause reference by which the Contractor is entitled to extension of time).

‡ Sebutkan Tempoh Kelambatan dan Lanjutan Masa yang disokong (sama ada serentak atau berturut-turut).
(State Period of Delay and Extension of Time recommended (whether concurrently or consecutively)).

2

I—JPN J