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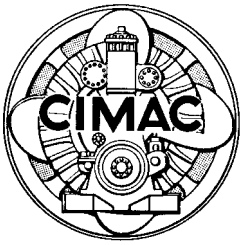
GUIDELINES FOR OPERATION AND/OR MAINTENANCE CONTRACTS

The International Council on Combustion Engines

Conseil International des Machines à Combustion

CONSEIL INTERNATIONAL DES MACHINES A COMBUSTION



INTERNATIONAL COUNCIL ON COMBUSTION ENGINES

CIMAC is an international organisation, founded in 1950 by a French initiative to promote technical and scientific knowledge in the field of internal combustion engines (piston engines and gas turbines). This is achieved by the organisation of congresses and working groups.

It is supported by engine manufacturers, engine users, technical universitites, research institutes, component suppliers, fuel and lubricating oil suppliers and several other interested parties.

The National Member Associations and previous CIMAC Recommendations still available are listed in the back of this publication.

This document has been elaborated by the Working Group „Operation & Maintenance Contracts“ and approved by CIMAC in December, 1998.

Le présent document a étè élaboré par le Groupe de Travail „Operation & Maintenance Contracts“ et approuvé par CIMAC en Decèmbre 1998.

FORWARD BY THE PRESIDENT

A great deal of time and money is involved in drawing up and negotiating a good quality contract for the operation and/or maintenance of large plant and equipment. If the contract is not good even more time and money may be used negotiating subsequent disputes. This situation is harmful to all, be they suppliers, operators, maintainers or customers. In 1996 CIMAC came to the view that this situation was likely to get worse rather than better unless something were done because it is now more common for suppliers and other contractors to be involved in O&M rather than for the customer to be responsible for it all

CIMAC Working Groups have a long tradition of preparing Recommendations and Guidelines for the internal combustion engine industry and its users. In performing this work we take the advantage of our unique position of having a wide and competent international membership.

Many of CIMAC's Recommendations have prompted ISO to issue a subsequent ISO Standard and we have been pleased to have made our contribution. This is unlikely to be the case with O&M contracts because no contract can be "standard". However early in 1997 a new CIMAC Working Group was formed, under the chairman ship of Ian Bedford, to investigate whether some of this unproductive time and money referred to above could be saved. These Guidelines are the first publication from this large and active Group and it should be of great help to our members and others involved with O&M.

I hope the Guidelines will be widely used. Should they prompt further suggestions to be made on this subject please contact a member of the Group or the Central Secretariat. CIMAC is a live and dynamic organisation and we will continue to promote activities which support all those involved with power generation, marine or locomotive engines be they builders, suppliers, users, operators or maintainers.

S.G. Dexter, President
10 Jan 1999

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GUIDELINES FOR OPERATION & / OR MAINTENANCE CONTRACTS

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GUIDELINES FOR OPERATION & / OR MAINTENANCE CONTRACTS

(Referred to in this document as O&M contracts)

1. Introduction

1.1 Operation and / or Maintenance (O&M) contracts are becoming increasingly popular as customers require their suppliers to take a more active role in the ongoing operation of their equipment. However, there is a wide variety of O&M contracts, they are used in a wide range of circumstances, and different organisations have different views as to what is actually covered in an O&M contract. This can lead to confusion, both in the tendering stage and also when the O&M contract is running, when there can be disagreements between the customer and the contractor over responsibility for particular aspects of the O&M contract.

1.2 The following Guidelines have been drawn up by a cross-section of organisations involved in both the tendering and running of O&M contracts. The intention has been to use this experience of O&M contracts in order to improve future O&M contracts for all parties involved in them.

1.3 These Guidelines are not meant to be prescriptive, as there is no “right” contract format that will suit every circumstance in which an O&M contract could occur. These Guidelines should be used as an “Aide-memoire” when an O&M contract is being negotiated to ensure that all the various aspects of the O&M contract are considered during the tender stage, rather than argued about if problems occur during the contract period.

1.4 Specific terms and conditions relating to the particular country and industry in which the O&M contract is to be performed should be stipulated.

2. Contract Structure

2.1 There is basically an eight stage approach to setting up an O&M contract, namely:

1. Identify the boundaries of the plant that is to be covered by the O&M contract

2. Identify the O&M practices to be applied.

3. Identify the operating regime of the plant

4. Identify the work that is going to be performed on the plant, either by the customer, the contractor or other parties, in order to achieve that operating regime.

5. Identify the inputs and outputs across the O&M contract boundaries (fuel supply, kilowatts, operations, front-line maintenance, performance guarantees (if applicable), etc.) and assign responsibilities.

6. Establish the mechanism by which the contractor will be paid for his services.

7. Establish the contractual structure (Terms & Conditions, statutory requirements, etc.).

8. Establish a regime for contract performance monitoring (audits, inspections, etc.).

3. Definitions

3.1 The definitions for the various terms used in the O&M contract should be established. Many of the technical definitions have already been defined in ISO 3977 (Gas Turbines - Procurement) and these should be used wherever possible; any variations from this ISO 3977 standard should be detailed. Specific definitions that relate to the particular O&M contract under negotiation should be described.

4. Operating Regime

4.1 The customer should stipulate in the enquiry document, and in the subsequent O&M contract, the anticipated operating regime of the plant. This should include the number of running hours per year, the number of starts, loading regime (base load, peak load, standby, etc.), fuel specification, scheduled outages that could be used for maintenance activities (e.g. factory closure during summer holidays), etc. This will enable the contractor to develop a maintenance strategy.

4.2 If the actual operating regime turns out to be different from the planned regime, then there should be some mechanism for adjusting the contract conditions (see Contract Variations).

5. Scope of Supply

5.1 The scope of the O&M contract, and the services that the contractor will be performing, should be defined as accurately as possible in the enquiry document and in the subsequent O&M contract.

An outline scope of supply should be provided by the customer, using the check list provided in the Appendix as a basis, to identify the equipment or services that will be required to ensure the satisfactory running of the plant.

5.2 The interfaces or boundaries of the plant should then be precisely defined, preferably in an Addendum to the O&M contract, down to the appropriate flange or junction box. This can be done by referring to the appropriate drawings or diagrams associated with the plant.

Phrases such as "Equipment supplied under the Main Contract" or "Balance of Plant" are too vague when describing the scope of the O&M contract and could therefore lead to confusion of responsibility; these phrases should be avoided.

5.3 Responsibilities for the different items of equipment or services should be clearly assigned between the parties.

6. Spare Parts

6.1 The O&M contract should specify the categories of spare parts that are required, who will procure them, own them, where they will be stored, who will be responsible for their storage & safe-keeping, maintenance & insurance, who will be responsible for replacing any used spares, who will be responsible for certification, and who will cover any transportation costs and other fees or taxes.

6.2 The categories of spare parts could include, but may not be limited to, the following:

consumables
wear and tear spares
on-site stockholding
major inspection kits
lease or loan assemblies
major strategic spares

6.3 If lease or loan Assemblies are required, either as part of the scheduled maintenance procedures or to cover for unscheduled outages, then the responsibilities of the parties would need to be developed.

7. Repairs

7.1 The O&M contract should address how repairable components should be handled.

8. Upgrades and / or Modifications

8.1. The O&M contract should address the process and the contractor's ability to offer upgrades and / or improvement modifications to the plant during the contract period. A Contract Variation may be applicable in such circumstances.

9. Condition of the Plant at the End of the Contract Period

9.1 The O&M contract should state the contractor's obligation with respect to the condition of the plant during the contract and at the end of the contract period. This may involve an audit of the maintenance history at the end of the contract period to confirm that the agreed maintenance programme had been performed by the contractor.

9.2 At the end of the contract period, there may be some remaining warranties on some components that have been overhauled or replaced during the contract period. The conditions of the warranties on such individual components or services should, for this residual period, revert to the standard warranties that would have been offered by the contractor if that component or service had been provided under a normal purchase order.

10. Contract Remuneration / Schedule of Payment

10.1 The mechanism and schedule by which the contractor will be paid for his services should be clearly identified in the O&M contract.

10.2 The contractor could, for example, be paid a fixed periodical fee, a variable periodical fee depending on availability, running hours or kilowatt-hours generated, on the basis of some form of risk-and-reward sharing, or a combination of these. Mobilisation and de-mobilisation charges should also be considered.

10.3 The formulae for determining price variations (e.g. inflation, currency and tax fluctuations, etc.) during the contract period will be clearly identified in the O&M contract.

11. Contract Duration

11.1 The start date and duration of the proposed O&M contract should be clearly specified. The duration could be based on a fixed term or the number of operating hours.

11.2 The contractor should provide the details of the scheduled maintenance programme for the equipment and identify the maintenance activities which fall within the contractual period.

12. Contract Variations

12.1 There will generally be occasions when the contractor is required to perform work which falls outside the scope of supply of the original O&M contract; there needs to be some mechanism whereby the O&M contract price can be adjusted to allow for these circumstances.

As a minimum, the O&M contract should include agreed rates for field service personnel and reference to the provision of additional services such as engineering & technical support, condition monitoring, lease engines, spare parts, etc..

13. Contract Performance Measures

13.1 The O&M contract should specify any contract performance measures that will be used.

Such contract performance measures could include :

Power output and degradation
Driven unit performance
Thermal efficiency
Exhaust emissions
Lubricating oil consumption / deterioration rate
Availability
Reliability

13.2 The formulae for calculating these contract performance measures, and the method and the period over which they should be measured, should be clearly defined. Wherever possible these should be simply auditable.

14. Bonus / Malus

14.1 In association with the contract performance measures, there should normally be “Bonus / Malus” payments in order to incentivise the contractor. The form of this Bonus / Malus system should be clearly defined and auditable.

15. Limitation of Liability

15.1 The O&M contract should include a clause similar to the standard FIDIC (Federation Internationale Des Ingenieurs Conseils) clause on the liability for consequential damages, for example:

“Neither party shall be liable to the other for any loss of profit, loss of use, loss of production, loss of contracts or for any other indirect or consequential damage that may be suffered by the other, …….”.

Indemnities against third party claims arising from the contract should be considered.

15.2. Consideration should be given to a limitation on direct damages.

16. Insurance

16.1 The O&M contract should clearly identify the types and levels of insurance to be maintained by each party during the contract period. This should extend to include sub-contractors of all levels and / or suppliers. Certificates evidencing such insurance should be made mutually available amongst the parties at the start of the O&M contract, and should include periodic renewals throughout the contract period. Notice of cancellation, non-renewal, or restrictions in such insurance should be promptly disclosed.

16.2 Consideration should be given to co-insurance by the contractor on the customer’s insurance or vice versa.

17. Quality

17.1 The customer should require the contractor to submit his Quality Manual applicable to the O&M contract and to give details of his quality accreditation showing compliance at the outset.

18. Technical Support

18.1 The O&M contract should stipulate the level of technical support required of the contractor during the period of the O&M contract.

18.2 The contractor should describe how he will provide technical support under the O&M contract and demonstrate how this would operate in practice, including the qualifications of his personnel.

19. Health & Safety and Environmental Protection

19.1 The responsibility for providing first aid and medical facilities (including medical evacuation if required), together with any special protective clothing or equipment (overalls, gloves, rubber boots, goggles, hard hats, etc.) should be stipulated in the O&M contract.

19.2 A “Permit to Work” system should be part of the O&M contract. The system to be followed should be specified at the outset.

19.3. The responsibility for the interface between the local regulatory authorities, in terms of environmental protection (effluent discharge, noise pollution, etc.), operating permits, planning permission, handling and disposal of hazardous waste, etc. should be stipulated in the O&M contract.

19.4 The responsibility for implementing risk assessments on the plant should be identified in the O&M contract.

19.5 The responsibility for the site accident reporting system should be identified in the O&M contract.

20. Training and Personnel Competency

20.1. It is the responsibility of the customer, contractor and any other parties to demonstrate that the personnel that they provide to fulfil their responsibilities under the O&M contract are properly trained, are competent to perform the work that they are undertaking, and are cognisant of site environmental, health and safety procedures.

21. Information Exchange

21.1 A process for information exchange should be established for continuous service and product improvement.

21.2 The O&M contract should specify the extent of the records that the O&M contractor should keep and the information that should be handed over to the customer during and at the end of the O&M contract period.

This information may include:

Daily operational log sheets
Maintenance history
Field service reports
Overhaul reports
Performance reports
Calibration certificates
Parameter analysis for example, fluid qualities where applicable
Key Performance Indicator data

This exchange of information should preferably be by electronic data link. The contractor's access to the customer's electronic data systems should be defined.

Appendix

CIMAC O&M Contract Guidelines
Check List

EQUIPMENT TO BE MAINTAINED :

(Equipment specified to be defined)

	NUMBER OF UNITS	BY CUSTOMER	BY CONTRACTOR
Prime Mover (Driver)	☐	☐	☐
Driven Machine	☐	☐	☐
Gearbox	☐	☐	☐
Auxiliary	☐	☐	☐
Control Panel :			
* Local	☐	☐	☐
* Unit	☐	☐	☐
* Station	☐	☐	☐
Lube Oil Console	☐	☐	☐
Fuel Supply Console	☐	☐	☐
Air Filters	☐	☐	☐
Coolers	☐	☐	☐
Starter Motor	☐	☐	☐
Main Switchgear	☐	☐	☐
Motor Control Centre	☐	☐	☐
Transformers	☐	☐	☐
Batteries	☐	☐	☐
Fire Detectors	☐	☐	☐
Gas Detectors	☐	☐	☐
Fire Extinguishers	☐	☐	☐
Cooling Towers	☐	☐	☐
Condensers	☐	☐	☐
Boilers	☐	☐	☐

Consumables To Be Supplied :

(Details of ticked items to be attached)

	By Customer	By Contractor
Fire Fighting Medium	☐	☐
Oil	☐	☐
Water	☐	☐
Fuel	☐	☐
Office Supplies	☐	☐
Telephone	☐	☐
Fax	☐	☐

Items To Be Supplied :

	By Customer	By Contractor
Tools	☐	☐
Special Tools (Equipment Specific)	☐	☐
Special Jigs & Fixtures	☐	☐
Insurance	☐	☐
Compliance With Laws (Local Authority Interface)	☐	☐
Spare Parts	☐	☐
* Consumable	☐	☐
* Insurance	☐	☐
Performance Diagnostic Equipment	☐	☐
Specialist Test Equipment	☐	☐
* High Voltage Testers	☐	☐
* Borescopes	☐	☐
* Vibration Analysis Equipment	☐	☐

Systems To Be Maintained:

(Details Of Ticked Items To Be Attached)

	By Customer	By Contractor
Exhaust Heat Recovery	☐	☐
Exhaust Treatment System	☐	☐
Inlet Temperature Control	☐	☐
Cooling System	☐	☐
Electrical Distribution	☐	☐
Water Treatment	☐	☐
Fuel Treatment	☐	☐
Process Gas Treatment	☐	☐
Starting System	☐	☐
Fire Detection System	☐	☐
Gas Detection System	☐	☐
Fuel Storage	☐	☐
Surge Control	☐	☐
Security / Surveillance :		
* Hardware	☐	☐
* Software	☐	☐
Lighting	☐	☐
Heating	☐	☐
Air Conditioning	☐	☐
Computers	☐	☐
Telephone	☐	☐
Telex	☐	☐
Diagnostic	☐	☐

Associated Hardware To Be Maintained :

(Details Of Ticked Items To Be Attached)

	By Customer	By Contractor
Enclosure	☐	☐
Building	☐	☐
Exhaust Stack	☐	☐
Accommodation :		
* Block	☐	☐
* Barge	☐	☐
* Houses	☐	☐
Workshop	☐	☐
Canteen	☐	☐
Roads	☐	☐
Paths	☐	☐
Open Spaces (Grass Etc.)	☐	☐
Laboratory	☐	☐
Pipework (to which flange)	☐	☐
Cabling (to which junction box)	☐	☐
Overhead Cranes	☐	☐
Lifting Jibs	☐	☐
Warehouse	☐	☐
Security / Surveillance :		
* Hardware	☐	☐
* Software	☐	☐
Offices :	☐	☐

Services To Be Supplied To Fulfil The Contract :

	By Customer	By Contractor
Fire Fighting Personnel	☐	☐
Painting	☐	☐
Craneage	☐	☐
Storage and Parts Management	☐	☐
Spare Parts Procurement	☐	☐
Security / Surveillance	☐	☐
Cleaning	☐	☐
Telecommunication	☐	☐
Medical / Safety / Health + Safety	☐	☐
Transportation :		
* On Site	☐	☐
* Off Site	☐	☐
* Helicopter	☐	☐
* Supply Boat	☐	☐
Site Lighting	☐	☐
Site Heating	☐	☐
Air Conditioning	☐	☐
Waste Disposal	☐	☐
Demolition and make good site	☐	☐
Emission Management	☐	☐
Personnel :		
* Management	☐	☐
* Operation	☐	☐
* Daily Maintenance	☐	☐
* Condition Monitoring	☐	☐
* Scheduled Maintenance	☐	☐
* Emergency Maintenance	☐	☐

	By Customer	By Contractor
Reporting :		
* Documentation	☐	☐
* Electronic Files	☐	☐
* Electronic Data Modem	☐	☐
Hardware	☐	☐
Software	☐	☐
Equipment Upgrades :		
* Service Bulletins	☐	☐
* Hardware Incorporation	☐	☐
Training of Personnel :		
* Contractors	☐	☐
* Customers	☐	☐
Scheduling / Planning	☐	☐
Testing	☐	☐
Quality Control	☐	☐
Equipment Audit :		
* at start of contract	☐	☐
* at end of contract	☐	☐

Commercial :

	Required	
	Yes	**No**
Pay Through :		
* kWh Produced	☐	☐
* Volume of Product	☐	☐
* Flow of Product	☐	☐
* Machine Running Hours	☐	☐
* Other (please specify)	☐	☐
Indemnities	☐	☐
Risk / Reward Clauses	☐	☐
Key Performance Indicators	☐	☐

Contract Duration	Years
Hours Per Year	Hours
Payment Terms	Days

	By Customer	**By Contractor**
✷ Tolls / Taxes	☐	☐
Ownership of Spares	☐	☐
Ownership of Tools	☐	☐
Ownership of other Property	☐	☐
Lease of Property	☐	☐
Lease of Services	☐	☐
Guarantees	☐	☐
Import Duties :		
✷ * on Spares	☐	☐
✷ * on Consumables	☐	☐

✷ *Tax Changes in the Country of Contract Performance during the Contract will in any event form the subject of a Contract Variation.*

Other CIMAC Recommendations (Prices exclude packaging and postage!)

No. 1	Recommendations for Diesel Engine Acceptance Tests, 1968	Out of Print
No. 2	Recommendations for Gas Turbine Acceptance Test, 1968	Out of Print
No. 3	Recommendations of Measurement for the Overall Noise of Reciprocating Engines, 1970	Out of Print
No. 4	Recommendations for SI Units for Diesel Engines and Gas Turbines, 1975	Out of Print
No. 5	Recommendations for Supercharged Diesel Engines, 1971 Part I: Engine De-rating on Account of Ambient Conditions Part II: Engine Acceptance Tests	Out of Print
No. 6	Lexicon on Combustion Engines, Technical Terms of the IC Engine and Gas Turbine Industries, 1977	Out of Print
No. 7	Recommendations regarding Liability - Assured Properties, Publications and Fuels for Diesel Engines, 1985	DM25.00
No. 8	Recommendations regarding Requirements for Heavy Fuels for Diesel Engines, 1986 (superseded by No. 11)	DM25.00
No. 9	Recommendations concerning the Design of Heavy Fuel Treatment Plants for Diesel Engines, 1987	DM40.00
No. 10	Recommendations regarding Liability - Assured Properties, Publications and Fuels for Gas Turbines, 1985	DM36.00
No. 11	Recommendations regarding Fuel Requirements for Diesel Engines, 1990	DM08.00
No. 12	Exhaust Emission Measurement - Recommendations for Reciprocating Engines and Gas Turbines, 1991	DM25.00
No. 13	Guidelines for the Lubrication of Medium Speed Diesel Engines, 1994	DM10.00
No. 14	Standard Method for the Determination of Structure Borne Noise from Engines, 1994	DM08.00
No. 15	Guidelines for the Lubrication of two-stroke Crosshead Diesel Engines, 1997	DM10.00

Availability of CIMAC Recommendations

Copies of this and other CIMAC publications can be ordered (subject to availability) from:

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