



CERN - TS Department

EDMS Nr: 473738
Group reference: TS-IC

TS-Note-2004-027
5 May 2004

MANAGEMENT OF TRANSPORT AND HANDLING CONTRACTS

I. Rühl

Abstract

This paper shall outline the content, application and management strategies for the various contracts related to transport and handling activities. In total, the two sections Logistics and Handling Maintenance are in charge of 27 (!) contracts ranging from small supply contracts to big industrial support contracts. The activities as well as the contracts can generally be divided into four main topics – ‘Vehicle Fleet Management’; ‘Supply, Installation and Commissioning of Lifting and Hoisting Equipment’; ‘Equipment Maintenance’ and ‘Industrial Support for Transport and Handling’. Each activity and contract requires different approaches and permanent adaptation to the often changing CERN’s requirements. In particular, the management and the difficulties experienced with the contracts E072 ‘Maintenance of lifting and hoisting equipment’, F420 ‘Supply of seven overhead traveling cranes for LHC’ and S090/S103 ‘Industrial support for transport and handling’ will be explained in detail.

1 INTRODUCTION

1.1 Mandates

The mandate of the Handling Maintenance section TS-IC-HM is to install and maintain handling and lifting equipment.

The mandate of the Logistics section TS-IC-LO is to carry out logistics, transport and heavy handling for accelerators and experiments.

1.2 Organization

In total 27 (!) contracts are in place in order to fulfill the mandates of both sections. Included in these 27 contracts are only Category B, E, F, and S major contracts.

The various types and diversity of the 27 contracts managed by TS-IC-HM and TS-IC-LO require a very good organization and coordination between the sections, the supporting departments such as Finance and Safety Commission, and the various clients. In addition, a fair amount of flexibility is needed to meet the often changing requirements.

1.3 Vehicle fleet management

CERN's vehicle fleet comprises more than 600 cars and more than 100 transport and utility vehicles. The annual budget turnover is in the order of ~3 MCHF.

The six B-type contracts and seven C-type contracts that are in place for the procurement, maintenance, repair, fuel supply, and vehicle rental are not considered in this paper since these activities and consequently CERN's vehicle fleet management follow well established procedures.

2 B-TYPE CONTRACTS

2.1 Contract B-1181/TS – Supply and installation of motorized doors

The blanket order contract with the Swiss company PORTEMATIC includes the supply and installation of motorized doors with dimensions ranging from 2 m*3 m to 9 m*12 m. The total budget volume was fixed to 1.4 MCHF over a period of three years with possible extensions of two times one year.

The contract was put in place for the expected new LHC installations and for the replacement of obsolete and non-conform motorized doors.

With no financial obligations regarding the order volume, this kind of contract offers the best possible flexibility and guarantees short delivery times. However this could not be applied to the supply of other equipment such as electrical hoists, as no company could offer an adequate product range that could meet CERN's requirements.

Table 1 – Contract summary B1181/TS

Contract	B1181/TS	Remarks
Adjudication Price	1'400'000 CHF	Budget envelope – no financial obligations.
Contract duration	25.01.2002 – 31.12.2004	Possible extension of two times one year.
Amendment n°	0	

3 E-TYPE CONTRACTS

3.1 Contract E072/TS – Maintenance of lifting and hoisting equipment

The new maintenance contract E072/ST was put in place in October 2002 merging two existing contracts. The new contract strategy is based on a 'dynamic maintenance plan' that adapts and focuses on the maintenance of the strategic important equipment for the installation of LHC and other important projects.

Supporting the LHC installation, one of the main problems had been, and still is, the integration of competence for performing maintenance service, with the help of modern computerized systems, on multiple computer steered equipment such as ROCLA, and MAFI, but also on sophisticated lifting equipment.

Furthermore the increased interventions/workload that will require additional resources in terms of manpower and budget are due to:

- Increased maintenance frequencies due to increased equipment use
- Integration of new equipment – in particular of Prototype equipment
- Intervention following inspection reports (SC-GS)
- Consolidation works
- Supplementary work such as implementing zones for cranes, displacing hoists, etc.
- On-call service for LHC installation
- Vandalism

The performance of the Contractor consortium CEGELEC/AMEC-SPIE/FENWICK globally corresponds to the expectations in terms of qualification, flexibility, pro-activity, coordination, and cooperation.

Nevertheless the major challenge still lies ahead. The new LHC installation schedule will require additional resources in terms of budget and manpower in order to guarantee the correct performance of equipment that is crucial for the installation.

Table 2 – Contract summary E072/TS

Contract		E072/TS			Remarks	
Adjudication Price		2'973'280 EUR			The important workload increase will require an increase of the budget envelope.	
Contract duration		26.09.2002 – 30.09.2005			Possible extension of two times one year.	
Amendment n°		1				
n° of Service Orders						
2002/2003/2004		17 / 20 / 3				
n° of Maintenance Orders (ODMs) in 2003	Preventive (PSI)	Corrective-Ameliorations (CA)	Corrective-Breakdown (CD)	Corrective-Reparation (CR)	Suppl. Works (T1)	
2421	765	168	1039	167	282	

3.2 Contracts E038/TS, E039/TS, E043/TS, E403/TS – Lift maintenance

There are four contracts in place for the maintenance of lifts in controlled areas. The specificity of the 45 lifts requires in general maintenance via the constructor. The maintenance on standard office building lifts is done by TS-IC-FM.

- E038 AS du Léman 14 lifts
- E039 OTIS 7 lifts
- E043 AS Ascenseurs 11 lifts
- E403 Schindler 13 lifts

The total budget volume of the four lift maintenance contracts is in the order of 200 kCHF.

The contract E403 is the only complete maintenance contract that includes also consumables and spare parts. The lifts maintained via this contract are basically all lifts that were installed for the old LEP accelerator and henceforth the strategic most important lifts for the LHC installation. Therefore the strategy of a long term complete maintenance contract shall be continued.

4 F-TYPE CONTRACTS

4.1 Contract F276/TS/LHC – Overhead traveling cranes (Lot 1)

The contract with the Spanish company TAIM comprises the supply, installation and commissioning of two 80 t overhead ‘gantry’ cranes in hall SX5. Both cranes were installed in 1999/2000 and have been working satisfactorily after a reasonable run-in period and the usual teething problems.

The second stage will be the transformation of these two overhead ‘gantry’ cranes to overhead traveling cranes following the lowering of the halls roof in order to reduce the environmental impact. This shall be done once the CMS detector assembling in hall SX 5 is finished and the detector parts lowered into the underground cavern SCX 5.

The supply includes also a 20 t overhead traveling crane that will be installed by end 2004 in the underground cavern UXC 55.

The main difficulty at present is to re-launch the Contractor since there was an important time lapse between the first delivery and the next.

Table 3 – Contract summary F276/TS/LHC

Contract	F276/TS/LHC	Remarks
Adjudication Price	257'997'220 ESP	1'550'594 EUR
Contract duration	19.11.1998 – 31.05.2003	Amendment n°3 for contract prolongation is under way
Amendment n°	2	150'755 EUR

4.2 Contract F280/TS/LHC – Overhead traveling cranes (Lot 2)

The contract with the Italian company ITALKRANE comprises the supply, installation and commissioning of sixteen standard overhead traveling cranes with capacities ranging from 8 t to 30 t. Thirteen out of sixteen cranes are already in service and running satisfactorily. The last three cranes will be installed in the first semester 2004.

The start-up of the contract was rather difficult due to the difficulties of the Contractor to adapt to the particular situation at CERN since the supply included the installation of cranes on the Swiss and French territory of CERN.

As soon as these difficulties were overcome the contract went on satisfactorily and a good cooperation between the Contractor and CERN was established.

Table 4 – Contract summary F280/TS/LHC

Contract	F280/TS/LHC	Remarks
Adjudication Price	2'740'710'960 ITL	1'415'459 EUR
Contract duration	18.02.1999 – 31.12.2004	
Amendment n°	8	228'395 EUR

4.3 Contract F327/TS/LHC – Supply of cryo-magnet transport vehicles for the PA18 area

The contract with the Finnish company ROCLA comprises the supply and commissioning of two special cryo-magnet transport systems that are based on the straddle carrier principle and steered by an inductive guiding system.

ST-HM took over the contract management from EST-ME after the delivery of the first two vehicles had caused a rather difficult situation. Both vehicles were finally not accepted and the payments blocked due to non conformities and poor performance.

In a first stage the communication with the Contractor was reestablished and the cooperation improved. CERN staff and the E072 maintenance Contractor were trained on the vehicles and are by now specialized on these vehicles. Together with the Contractor's support the reliability could be increased.

Nevertheless the LHC project management decided to order the third optional vehicle since the logistics for cryo-magnet assembly and testing in two and even three shifts require a 100 % availability of at least two vehicles at any time.

Unfortunately in April 2004 the maintenance team discovered that the welding of the upper pivoting system broke on both vehicles. The vehicles could be repaired provisionally within three days but the final investigations are still under way.

Under the present conditions the bank guarantee (10 % of the contractual value) will not be released by CERN after the end of the guarantee period.

Table 5 – Contract summary F327/TS/LHC

Contract	F327/TS/LHC	Remarks
Adjudication Price	1'284'200 CHF	
Contract duration	23.05.2000 – 15.11.2005	
Amendment n°	6	897'465 CHF

4.4 Contract F420/TS/LHC – Overhead traveling cranes (Lot 3)

The contract with the German company BRUNNHUBER comprises the supply, installation and commissioning of seven non standard overhead traveling cranes with capacities ranging from 16 t to 280 (!) t. In addition, the supply included two negative and one positive working platforms for the installation on the two UX15 cavern cranes.

The potential risk of giving such an important contract to this German company was considered low since the Contractor had already supplied a non-standard crane for CERN's radioactive intermediate storage 954 building satisfactorily in terms of delay and technical conformity. This assessment was confirmed by the supply installation and commissioning of the first three cranes that were all delivered in time and fully operational after a reasonable run in period. Amongst these first three cranes was the highly complicated crane PR774 for the ALICE underground cavern UX25, which required important engineering, design, and installation skills.

The following problems encountered with the supply and installation of the four remaining cranes for the ATLAS Experiment were caused by:

- Failed take over (BRUNNHUBER KRANBAU → PFAFF-SILBERBLAU GROUP → NORTH GERMAN INVESTMENT GROUP → BRUNNHUBER KRANTECHNIK / KRANSERVICE).
- Contractor's workforce dropped from originally ~130 down to ~75 employees.
- Cash flow problems (risk of insolvency).
- Contractor accepted orders above production capacity.
- Contractor advanced other projects faster than CERN's projects since the payment conditions were either more favorable and/or the expected penalties more important.

The following actions were taken together with the colleagues from the SPL and FI division in order to keep the damages limited:

- Reestablishing the communication and cooperation with the latest management.
- Setting up new payment conditions in terms of bank guarantees and payment delays.
- Keeping up the pressure to get the supply in time and conform to the technical specification by contacting them on a daily basis and by visiting them regularly.

In addition, the following compensations were negotiated and applied:

- 1 % penalty (price reduction) for the cranes that were delayed (9'943 EUR).
- Prolongation of one year guarantee and preventive maintenance for all seven cranes, which was originally foreseen as an option in the contract (37'960 EUR)
- 10 % reduction on the original proposed spare parts list (8'800 EUR – up to 26'375 EUR if all spare parts are ordered)

The cranes were finally delivered, installed and commissioned. Due to the delay not all technical features could be activated which led to an increased after sales service. This 'staggering' strategy was applied since at the beginning it was only important to handle non fragile equipment.

This 'staggering' strategy is still going on and the teething problems are more important since all cranes are one-of-a-kind prototypes.

Under these circumstances the occurred delays and temporary quality problems were unavoidable despite all the efforts and pressure imposed by CERN.

Nevertheless, the confidence in the new Contractor's management was reestablished to the point that a new contract F528/ST/CNGS was signed for a highly sophisticated crane that shall be installed in the CNGS target chamber.

Table 6 – Contract summary F420/TS/LHC

Contract	F420/ST/LHC	Remarks
Adjudication Price	3'393'010 EUR	
Contract duration	01.08.2001 – 31.12.2004	
Amendment n°	5	110'747 EUR

4.5 Contracts F445/TS/LHC – Supply of an all terrain mobile crane

The contract with the German company LIEBHERR comprised the supply and commissioning of a 160 t all terrain mobile crane for the handling of the cryo-dipoles.

The high capacity of the mobile crane was required to lift the cryo-dipole in a distance of 12 meters from the center point of the mobile crane in order to lift them in a right angle from the mobile crane for storage reasons.

The competition on the European market for mobile cranes with capacities of more than 100 t is very limited. There are only three, but very qualified companies, that can supply those cranes.

The supply, the commissioning and the operation of the LIEBHERR LTM 1160 as well as the project management was outstanding.

The contract ran out in March 2004 after the end of the optional second year of guarantee.

Table 7 – Contract summary F445/TS/LHC

Contract	F420/TS/LHC	Remarks
Adjudication Price	788'983 EUR	
Contract duration	05.12.2001 – 27.02.2002	
Amendment n°	1	10'650 CHF

4.6 Contract F528/TS/LHC – Supply of a suspended crane and rails for CNGS

Despite the problems encountered with contract F420/ST/LHC this contract was also given to the German company BRUNNHUBER. The particularity of the contract is that 51 % of the supply shall be 'Made in Italy' since the crane is for CNGS.

It comprises the supply, installation and commissioning of the highest sophisticated crane ever built for CERN. Although the crane capacity is only 7.5 t for the main hoist and 5 t for the auxiliary hoist, the working environment with a 5 % slope and the expected radiation levels require special protections, special material, and redundant systems. In addition, the crane can be operated via a monitor from a protected area. The supply and installation of the crane rails are included in the contract.

Based on the previous experience with this Contractor the new contract took into consideration a better cash flow scheme and fixed intermediate milestones that shall be respected, otherwise they will immediately result in penalties.

At present, the Contractor respected the intermediate milestones and TS-IC-HM very closely follows up its progress.

Table 8 – Contract summary F528/TS/LHC

Contract	F528/TS/CNGS	Remarks
Adjudication Price	777'642 EUR	51% supply by Italian origin
Contract duration	12.11.2003 – 31.12.2005	
Amendment n°	0	

5 S-TYPE CONTRACTS

5.1 Contract S090/TS – Industrial Support for Transport and Handling

The contract with the Portuguese-Italian-French Consortium concludes all transport and handling services for accelerators, experiments and the general CERN infrastructure.

Based on the Contractor's poor performance during the LEP dismantling phase it was decided to put in place a better qualified Contractor for the installation of the LHC and its Experiments.

The strategy to put in place a second Contractor proved nevertheless correct despite the fact that the newly assigned Contractor failed (for more details please refer to chapter 3.3.3).

The effect of putting a second contract in place increased the on-site competition and, unexpectedly, DBS Contractor considerably improved the services provided by taking the following actions:

- Putting in place a complete new qualified and motivated management team.
- Recruiting qualified 'non-local' staff by transferring staff from other regions.
- Setting up a clear work organization (Foremen, Team leaders etc.).
- Reestablishing the confidence and cooperation with the local authorities.
- Improving and optimizing the services by respecting all safety aspects.
- Increasing the weekly working hours and limiting the hiring of new manpower.

Based on these successful commitments the confidence in the Contractor was reestablished. In order to avoid any perturbations during the LHC installation (Machine and Experiments) it is recommended, if not compulsory, that the contract be extended for another two one-year periods until the completion of the LHC and its Experiments.

In addition, the introduction of transport service requests via EDH enabled the Contractor to organize and optimize the entire transport activity. Today, more than 90% of the transport requests are done via EDH.

The Contractor's workforce will reach its peak by the end of the year 2004 when the installation of the LHC magnets is at its nominal progress. At this time a maximum of about 170 transport and handling employees will work in two shifts, which requires a maximum of supervision in order to respect all safety aspects.

Table 9 – Contract summary S090/TS

Contract	S090/ST	Remarks
Adjudication Price	22'000'000 CHF	The important workload increase will require an increase of the budget envelope.
Contract duration	01.07.2000 – 30.06.2005	Extensions of two times one year requested to cover the LHC project.

Amendment n°	7	
n° of Service Orders		
2000/2001/2002/2003/2004	22 / 46 / 153 / 145 / 92	

5.2 Contract S103/ST/LHC – Transport and Handling service for LHC

The contract with the British-Polish Contractor Vanguard Industrial SA concluded all transport and handling activities for the installation of the LHC accelerator and its Experiments.

After just one year the Contractor breached the contract since they could not provide the requested and specified services.

The reasons for the failure were manifold but obvious:

- The Contractor realigned their offer to the lowest conforming bid by 17 (!) %
- The Contractor put in place an inexperienced management team.
- The Contractor did not analyze in detail the advantages and disadvantages of setting up the local office in France or Switzerland and wrongly assessed the particular situation in the Pays de Gex.
- The CERN contract adjudication is not compatible for service contracts since it does not take into account the possible extra costs for the Contractor when providing qualified 'non local' staff.
- CERN did not get the experience and know-how of the company (Pickford-Vanguard) that was qualified during the Market Survey phase. The Contractor's sub-division for 'Industrial relocation' (Vanguard Industrial) was taken over by an Investment Group just before starting the Contract at CERN. No further information could be obtained but it was obvious that the link to the Head Company was cut.

Table 10 – Contract summary S103/TS

Contract	S103/ST/LHC	Remarks
Adjudication Price	13'820'000 EUR	15% higher than estimated
Contract duration	01.01.2003 – 31.12.2008	Open contract period to cover the LHC project.
Amendment n°	1	
n° of Service Orders		
2003	142	

Although it took a lot of work to put the contract in place, lots of arguing to keep it going and some turmoil when the Contractor failed to turn up in January 2004, all this nevertheless had one good aspect. The competition due to the arrival on site of the new Contractor S103 (Vanguards) increased and boosted the performance of the existing contractor S090 (DBS) to a now fully satisfying provider of a qualified transport and handling service.

6 CONCLUSION

The service and supply contracts managed by sections TS-IC-LO and TS-IC-HM cover a wide range of activities and consequently require multiple facets of contract management.

Applying the correct rigueur and comprehension is essential for succeeding but it is nevertheless not a guarantee, since there are many parameters which cannot be influenced by CERN and which might lead to a breach of contracts as seen in contract S103/ST/LHC.

The changes in the LHC installation schedule will require a permanent adaptation and additional resources in terms of budget and manpower for the service and maintenance contracts, but will also require strengthening of the technical sector of both sections TS-IC-HM and TS-IC-LO.

Although the purchasing procedures are often considered as obstructive, the colleagues from the FI-PI group provide an important support during all contract stages.