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Manufacture of Wind-turbines for electricity Generation

DP/EGY/88/001 - Contract no. 89/57/GYL.

EGYPT

TITLE PAGE.

November 22th, 1990.

Manufacture of Wind-turbines for electricity Generation

DP/EGY/88/001 - Contract no. 89/57/GYL.

EGYPT

Final Report.

Prepared for the Government of Egypt
by the United Nations Industrial Development Organization,
acting as axecuting agency for the United Nations Development Programme.

Based on work of Wincon Wind Energy ApS.

under UNIDO Contract No.89/57.

Report made by: Director Jan Haahr.

Executing Officer: M. Kohonen, Acting chief, Contracts Section,
Division, Department of Administration.
UNIDO
P.O.Box 300
A-1400 Vienna
Austria.

Contents of Report

1. **SUMMARY OF WORK:**

   a) complete design with all technical documentation and engineering data.

   b) training of personel, engineers and technicians, the setting of quality standards and the establishment of quality assurance plan and procedures.

   c) supply of workshop layout, machinery and material specifications and know how for maintenance of production equipment and manufacturing.

   d) supply CIF-Cairo, plant site all special equipment tools, jigs, fixtures, molds and spare parts for the production of one prototype required for the transfer of technology package, in accordance with specifications in our offer and questionaire formulars dated January 6th, 1989.

   e) supply of parts not produced in Egypt for one prototype.

   f) guidance and supervision on the manufacturing of the prototype.

   g) guidance and supervision for the shoptesting of the prototype WTG-unit total.

   h) review of test results of the prototype testing and advise on corrective actions.

   i) cooperation with, and service for Germ.Lloyds for the specification work and approval of design and test specification for the local production of a gearbox in Egypt and test of such a prototype gearbox in DK.

2. **COPY OF INTERIM PROGRESS REPORT NO. 1 - 6.**

1.a) **COMPLETE DESIGN WITH ALL TECHNICAL DECUMENTATION AND ENGINEERING DATA:**

During meetings in Cairo, here in our office with our engineers and with engineers from Germanischer Lloyd the final design for the Egypt version of our Wincon W 110 and W 110 XT was final dicided, to make the type optimal for the Egypt conditions.

Complete set of drawings, technical documentation and engineering data was send in 1(one) set on July 7th. 1990 and further 3 sets of drawings in full scale was send together with alle machinery, material, tools and spare parts in a container on December 30th, 1989.

1.b) **TRAINING OF PERSONEL, ENGINEERS AND TECHNICIANS, SETTING OF QUIALITY STANDARDS AND ESTABLISHMENT OF QUALITY ASSURANCE PLAN AND PROCEDURES:**

In week 36/89 (September 1nd - 9th) 2 workshop leaders (Managers) from EISCO visited Wincon in DK for training and discussions, to prepare the training of the remaining four engineers and four discussion and definition of lay-out of the WTG production facility in Egypt. Details for this visit is described in Progres Report No.1 under 3.f.

From October 28th to November 25th 1989, four Engineers from EISCO visited Wincon for the planned 4 weeks of training in assembling of WTG's, control panels, service and maintenance, testing, setting of quality standards and establishment of a quality assurance plan and procedure.

Details for the visit and specification for the training and education is described in Progress Report No.2.

1.c) **SUPPLY OF WORKSHOP LAYOUT, MACHINERY AND MATERIAL SPECIFICATIONS AND KNOW-HOW FOR MAINTENANCE OF PRODUCTION EQUIPMENT AND MANUFACTURING:**

Workshop layout and specification, system brake-down for the planning of production line and proposal for machinery investment for the Windgenerator Factory in Egypt was discussed during the visit of the Managers from EISCO in September 1989 and handed over during the stay in DK. The four Engineers was trained in maintenance and new construction of machines, tools and jigs during their training period in November 1989.

Details, drawings and specifications in enclosed in Progress Report No.1.

1.d) **SUPPLY CIF CAIRO OF ALL SPECIAL EQUIPMENT, TOOLS, JIGS, FIXTURES MOLDS AND COMPONENTS FOR THE PRODUCTION OF ONE PROTOTYPE.**

All tools, jigs, fixtures, molds and components for the production of one prototype + three extra sets of full scale drawings was send in à 20'Container to EISCO via the Harbours: Aarhus and Alexandria. The container left DK on December 30th 1989 and arrived at the EISCO factory on February 14th, 1990. After the arrival all components, tools, jigs, fixtures and drawings was controlled by the Engineers from EISCO and our Mr. Tomas Lyrner and accepted.

Details, specifications and shipping documents is included in Progress Report No.3 and 4.

1.e) **SUPPLY OF PARTS NOT PRODUCED IN EGYPT FOR ONE PROTOTYPE:**

All needed parts as described in the contract was send by container shipment on December 30th, 1989 as mentioned above.

1.f) **GUIDANCE AND SUPERVISION ON THE MANUFACTURING AND FOR THE**
1.g) **SHOPTESTING OF THE PROTO TYPE WTG-UNIT.**

During the time for assembling of the prototype WTG from February 5th to March 1st, 1990 our Engineer Mr. Tomas Lyrner was in Cairo for the local training, guidance, supervision and shop-testing.

All details for this period is given in Progress Report No.4.

1.h) **REVIEW OF TEST RESULTS OF THE PROTOTYPE TESTING AND ADVISE ON CORRECTIVE ACTIONS:**

During the time from August 5th to August 17th, our Engineers Mr. Carsten H. Pedersen and Bent Petersen was in Egypt for the final shop-testing, transportation and erection, commissioning and site training og Engineers fra EISCO and NREA.

After the erection and commissioning all involved was trained in correction/changing of WTG-computer setting, and management system was connected to the WTG for a primary testing of this system and program.

The prototype WTG was running very fine and noice-less, and gives NREA a good possibility for the future testing and development program.

All details for this visit is described in Progress Report No.6.

1.i) **COOPERATION WITH AND SERVICE FROM GERM.LLOYD FOR THE SPECIFICATION FOR THE LOCAL PRODUCTION OF A GEARBOX IN EGYPT AND FOLLOWING TEST IN DK:**

The cooperation between the enginnering staff at the EISCO Factory, Engineers from Germ. Lloyd was established during a meeting i our factory in Hamburg on September 18th, 1989, and a meeting in our factory on November 23rd, 1989.

Calculations and dimensioning as much as possible is made by Germ.Lloyd and send to EISCO, and Germ.Lloyd is now ready to receive an order for the technical/quality control for the production of the gears.

FINAL REMARKS.

During the time for transfer of know-how, training programme in our factory as well as in the EISCO Factory in Helwan/Cairo and at the site in Hurgada, we have met and co-operated with very skilled engineers and workshop employees.

As long as our engineers are available for assistance and control, everything is performing well, but we have impression, that it will impossible for EISCO alone, to produce the turbines in the future without management from here, as well for the technical as for the administration and sales.

During the time for the transfer and training, we have seen, that the Suez Shipyard Comp. (The license keeper for the blade production) have done an exelent job. It is our opinion, that the transfer of know-how for blades as well as for the windturbine production, would have a better chance for succes, if the whole production and assembling will take place at the facilities in Suez, where all needed space and machines are available for the production of nacelle frame as well as WTG-towers.

If UNIDO and NREA in Cairo want to follow our recommendation, we are willing to change the name of license partner from EISCO to The Suez Shipyard Company.

Ulstrup, November 22th, 1990.

J. Haahr - Managing Director.

September 1989.

TITLE PAGE.

Manufacture of Wind-turbines for electricity Generation

DP/EGY/88/001 - Contract no. 89/57/GYL.

EGYPT

1st Interim Progress Report for the period:
June 15th to September 10th, 1989.

Prepared for the Government of Egypt
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme.

Based on work of Wincon Wind Energy ApS.

under UNIDO Contract No.89/57.

Report made by: Director Jan Haahr.

Executing Officer: D. Gardellin, Director General Services
Division, Department of Administration.
UNIDO
P.O.Box 300
A-1400 Vienna
Austria.

1. Report on Meetings in Vienna, Cairo, Hamburg and Ulstrup/Denmark on Planning of Manufacture of Wind Turbines in Egypt.
Period: June 15th to September 10th, 1989.

2. Contents of Report:

a. Meeting at UNIDO in Vienna.

b. Meeting at UNDP in Cairo.

c. Meeting at EISCO's office in Cairo.

d. Meeting at NREA's office in Cairo.

e. Meeting at Germanischer Lloyd's office in Hamburg

f. Meetings at Wincon's office in DK with Managers from EISCO in Cairo and Personel from Germanischer Lloyd.

3. Statement of investigations and action taken.

a. On Friday 23rd of June meetings was held at UNIDO in Vienna, for briefing and finalizing of contract with Mr. H.H.Seidel, Senior Industrial Development Officer, and Mr. G. Langlois, Contract Officer.

Details in the contract was discussed and full agreement was reached on the final contract.
Contract No.89/57.

b. On Sunday 24th of June meeting was held at UNDP's office in Cairo with Mr. T. Sabry, Senior Programme Officer, for planning of the following weeks program.

c. On Monday 26th of June meeting was held at EISCO's office in Cairo:

Participants:

T. Tablawi, NREA. Cairo

M.A.Karmalawy, Project Coordinator, NREA

Laila Shaleh. NDP, NREA.

Three un-named engineers from NREA.

T. Sabry, UNDP

Dia Tantawi, Chairman, EISCO

Two workshop leaders of EISCO

W. Kaddour, Chairman, Suez Shipyard.

Helge Petersen, Consultant for UNIDO

Arne Larsen, Director, MAT-Airfoil.

Jan Haahr, Director, Wincon Wind Energy.

3.c.1. Dia Tantawi, Chairman of EISCO asked for drawings and specifications of the wind-turbine, to make it possible for the engineers, going for training in Denmark, to prepare themself as well as possible before departure for the training programme.

Total package of drawings and specifications was send the adress of EISCO by Coureer (DHL)at July 7th, 1989.

3.c.2. A workplan for the cooperation and training programme in DK and Egypt was presented by J. Haahr, Director of Wincon Wind Energy ApS. Enclosed under Annex nr.1 & 2.

The workplan was agreed to by EISCO, and Mr. Dia Tantawi, promised to inform, as well UNIDO as WINCON about names and aducation of the EISCO engineers who will take part in the training programme as soon as possible and not later than 14 days after the meeting.

September 10th, 1989 we are still not informed who will be appointed and nominated for the training programme.

3.c.3. Dia Tantawi asked for the permission, to send two workshop leaders to Denmark, before the start of the training programme, to see the facilities of Wincon and discuss the lay-out of the future wind-turbine factory in Egypt. Agreement was reached, that the visit would take place in week 34, August 21st. 28th.

3.d. On Wednesday 28th of June a meeting was held at NREA in Chairman Sharaf El-Din's office.

Participants:

Sharaf El-Din, Chairman

T. Tablawi

T. Sabry

M.A. Karmalawy

Laila Saleh

Helge Petersen

Arne Larsen

Jan Haahr

3.d.1. Report for foregoing meetings was given and discussed and a general agreement was reached.

3.d.2. The problem of the local manufacture of a suitable gearbox at the factory of EISCO was discussed, and it was agreed to proceed as follows:

1. A gearbox which is a spare part for the wind-turbines at Ras Ghareb will be brought to EISCO and dismantled for study of possibilities for manufacture of the same quality at EISCO.

2. A gearbox produced by EISCO, originally a Russian type, will similar be dismantled by EISCO.

3. Wincon will arrange that an expert from Germanischer Lloyd will come to Denmark to meet the workshop-leaders during their stay at Wincon and discuss procedures and time table and advise on which gearbox will most suitable for production bu EISCO and for use in the wind-turbine. Later one expert from Germanischer Lloyd will visit EISCO in Cairo for advise and control.

4. Since a gearbox made in Egypt for the prototype cannot be finished in the planned time, a gearbox similar to the "Ras Ghareb Type" will be delivered from Wincon.

3.e. On August 24th, 1989 a meeting was held at Germanischer Lloyd's Head-quarter in Hamburg, and an agreement was reached for the cooperation with EISCO and Wincon for the advise on design, calculation, construction and control of the most suitable type af gear for the wind-turbine to be produced in Egypt of the Type Wincon W 110.

The following work will be made by Germanischer Lloyd:

1. Definition of Gear-type and size.

2. Gear-wheel calculations in accordance with DIN 3990

3. Calculations of bearrings and other components in the gear as well as the gear-house.

4. Advise for the selecticn of materials and heat-treatment.

5. One visit at EISCO's Factory i Cairo for advise and control.

3.f. In week 36/89 (September 2nd -9th) 2 workshop leaders from EISCO visited Wincon for training an discussions, to prepare the training of the remaining engineers from EISCO and for discussion of a lay-out of the future windmill factory in Egypt. Se enclosed under Annex 3.

The engineers visiting was the foolowing:

Ahmed Abou Rayya, Mecanical Engineer

Mohamed El-Nahas, Electrical Engineer.

During their stay, they was trained in the background for the constructions, and participated in testing and installation of components for the wind-turbines

On Thursday 7th a meeting was held between Germanischer Lloyd, Engineers from EISCO, and Wincon.

Participants:

Dieter Frey, Germanischer Lloyd
Jürgen Meyer, " "

Ahmed Abou Rayya, EISCO
Mohamed El Nahas, "

Jan Haahr, Wincon Wind Energy
Carsten Hoybye Pedersen, Wincon Wind Energy.

The meeting was held with the purpose to start up, the design of a gearbox to be manufactured by EISCO.

After som discussions, the following was planned to get the project startet:

1. Wincon supplies Germ.Lloyd with the necessary drawings and measures of the nacelle bottom, so it can be possible for Germ.Lloyd to see the exact possision of the installed gear, to be able to change the dimentions of the gear without changing other components of the WTG.

   Drawings will be send from Wincon in week 37/89.

2. EISCO will supply Germ.Lloyd with a complete list of:

   Maschines for gearwheel- and shaft manufacturing
   Possibilities for heattreatment
   Possibilities for steel and iron casting.

3. Germ.Lloyd will start the calculations for a rough dimensioning in week 37/89.

4. Germ.Lloyd will establish a direct contact til the engineering staff in EISCO emidiately, to get EISCO startet in making the drawings for the new gear.

5. When the drawings are finished, Germ.Lloyd will control the drawings and make the final calculations.

During the whole precedure, Germ.Lloyd and EISCO will work direct together, but both parties will inform Wincon about all details of progress in the matter.

CONCLUSIONS.

The project is well startet and all involved parties are now working for the best possible time-table for the transfer of now-how and specified machines and tools.

EISCO have not yet informed Wincon about the final arival date of engineers for training in DK, but are promising this info's before end of this week.

Wincon will still be able to finish training and deliver components for a proto-type, machines and tools in accordance with the time table made in June in Cairo.

Ulstrup, September 10th, 1989.

Wincon Wind Energy ApS.

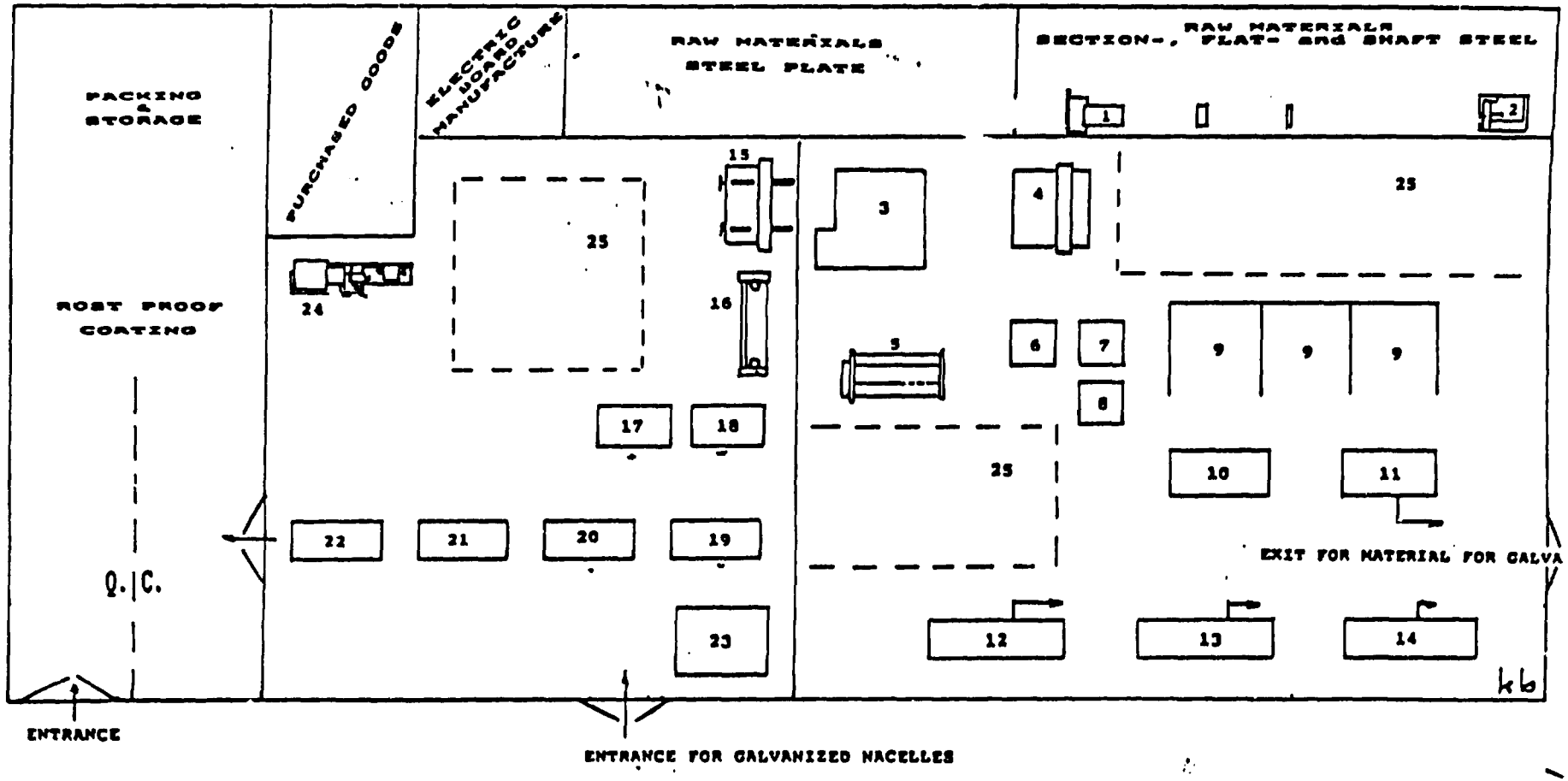
Jan Haahr - Director.

Technology Transfer of Know-How for Production of
WINCON Wind Turbines Type W 110 and W 110 XT
UNIDO Contract No.89/57/GYL.

Nacelle and Tower. Place +complete training.action		37	38	39	40	41	1989. 42	43	44	45	46	47	48	49	50	51	52	1	1990. 2	3	4	5	6	7	8	9	10	11	12	13 apr.
Training in DK.																														
1.Project leader (tech.-commerc.)																														
a.Design,Calc.Norms	DK	x		x	x																									
b.Sales Calc.	DK		x																											
c.Marketing,Economy	DK		x																											
d.Lay-out Factory	DK				x																									
2.Techn.Eng.Mek/Cons.																														
a.Lay-out-Factory	DK				x																									
b.Product.steel comp	DK	x	x																											
c.Tools & Fixtures	DK			x																										
d.Testequipm.Factory	DK			x																										
e.Design Egypt gear	DK		x	x	x																									
f.Quality Control mek	DK				x																									
3.Electrical Eng.																														
a.Lay-out Factory	DK				x																									
b.Product.contr.panel	DK	x	x	x																										
c.Tools and Fixtures	DK			x																										
d.Testequ.-Factory	DK			x																										
e.Quality Control	DK				x																									

acelle and Tower. Place		1989.																1990.												
complete training.action		37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	apr.
.Quality Control Eng.																															
a.Lay-out Factory	DK				x																										
b.Design,Norms,Appr.	DK	x	x	x	x																										
c.Testequipm.Factory	DK			x																											
d.Internal Q-control	DK				x																										
e.Extern "	DK				x																										
f.Analasys of tests	DK																														
.Production of Prototype.																															
Collection of parts	DK		x	x	x																										
Shipment	DK						x																								
.Production & Assambling in Egypt.																															
a.Tower and nacelle	EISCO					x	x	x	x	x	x	x	x																		
b.Electrical parts	EISCO									x	x	x	x																		
.Establishm.of Factory																															
a.Nacelle,ctr.panels	EISCO					x	x	x	x	x	x	x	x																		
b.Towers						x	x	x	x																						
.Design and Calc.Gear.																															
a.Design and Specif.	DK/Germ.	x	x	x																											
b.Drawings,Calc.	EISCO					x	x	x	x	x	x	x	x	x	x	x	x														
.Cooperation-Germ.Lloyd.																															
a.Specific.Norms.Adv.	DK/Germ.			x	x																										
b.Control Visit													x																	xx
0.Training Programme in Egypt.DK-Eng.																															
a.Eng.Project manager	EISCO										x	x	x	x	x	x											x			
b.Eng.Chief Eng.	EISCO														x	x										x	x			
c.Eng.Electrical man.	EISCO												x	x	x											x	x			

FACTORY FOR WTG PRODUCTION



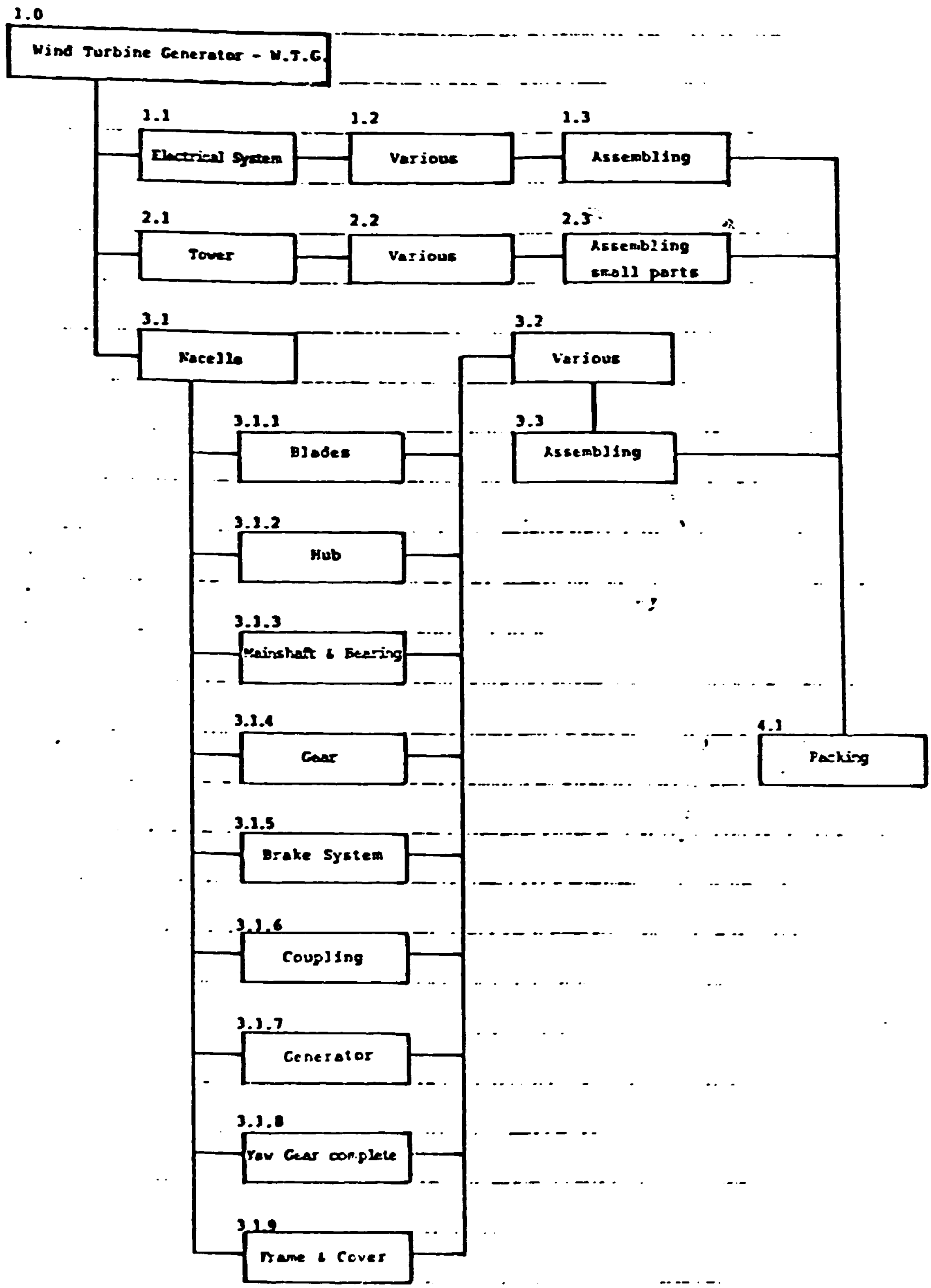
SYSTEM BRAKE - DOWN

W 110 XT

Date: [illegible]

Sign.:

Knud Elmsild



Proposal for:

Investment budget for Windgenerator Factory in Egypt. Machinery, Tools, Moulds and supplementary equipment.

Item number refering to section in specification file:	Type of machinery and name of supplier:	Price in DKK.
No. 1	Sawing Machine: KASTO Electrohydraulic Heavy Duty Hacksawing Machine, Type HBS 210/240	
	Suppl.: Poul Jensen Værktøj, A/S, Aarhus	26.145,
No. 2	Section Iron Cutter: Geka Hydracrop 70 S Punching and Shearing Machine.	
	Suppl.: Sandfeld A/S, Herning	123.360,-
No. 3	Flame Cutting Machine: EKO-PIKKU 1250/1500-3000 mm Track length.	
	Suppl.: C.N.Teknik, Bjæverskov	159.000,-
	Supervisor: 6 days for installation and training	25.000,-
No. 4	Heavy Bending Machine Hydraulic Press-brake Type CPHE 160/20.	
	Suppl.: Fasti-Werk Scandinavia, Odder	460.020,-

	Supervisor: 2 weeks for installation and training.	40.000,-
No. 5	Steel Sheet Roller Max. 12 mm. Bending Rolle: Model Fix-Pinch 2500 x 240 mm: High-Steel.	
	Suppl.: SCS Industri-værktøj A/S.	393.350,-
No. 6	Flange Roller. Type ASY-P-140 Angle Rolling Machine. Hydraulic Double Pinch.	
	Suppl.: Poul Jensen Værktøj.	716.700,-
No. 7	Flange Welding Stand. See specifikations in Price list from SCS Industriværktøj A/S.	16.000,-
No. 8	Flange Drilling Machine, Type BIMAK 32 mm. See Price list from SCS Industriværktøj A/S.	16.262,50
	Tools and fixtures made for Wincon by subcontractors.	12.000,-
No. 9	Pre Welding Boxes for Nacelle (3 sets).	
	Welding Machines: ESAB See price list and specification from ESAB.	131.835,-
	Hand Tools according to specification.	8.340,-

	63 m2. Welding curtain 180 x 130 cm, see specification and prices from SCS Industriværktøj A/S.	13.354.-
	Bench for tools and vice (3 sets). See specification and prices from SCS Industriværktøj A/S.	9.306,-
	Angle Grinder (3 sets) Type Bosch 1321. See specification and prices from SCS Industriværktøj A/S	5.088,-
No.10 & 11	Pre Welding Stand and Finish Welding Stand for Nacelle.	
	2 - Welding Machines: ESAB. See specification and price list from ESAB.	87.890,-
	Hand Tools according to specification.	5.560,-
	26 m2. Welding curtain. See specification and prices from SCS Industriværktøj A/S	5.511,-
	Bench for tools and vice (2 sets) See specification and prices from SCS Industriværktøj A/S.	6.205,-
	Angle Grinder (2 sets) Type Bosch 1321. See specification and prices from SCS Industriværktøj A/S.	3.392,-

	Hand Drilling Machine Type Bosch 1160. See specification and prices from SCS Industriværktøj A/S	1.869,-
	Bench Grinder Type PSD 200 See specification and prices from SCS Industriværktøj A/S.	3.737,50
No.12, 13 & 14	Top Towerpart Welding Stand, Middle Towerpart Welding Stand and Bottom Towerpart Welding Stand.	
	Welding Machines: ESAB See price list and specifi- cation from ESAB.	131.835,-
	Hand Tools according to specification.	22.668,-
	Table shelf arrangement . Type Finnerup See specification.	2.985,-
	Electrical Angle Grinder (3 sets), Type: Bosch 1321. See specification and prices from SCS Industriværktøj A/S.	5.088,-
	Bench Grinder. Type PSD 200. See specification and prices from SCS Industriværktøj A/S.	3.737,50

	Hand Drilling Machine Type: Bosch 1160 (2 sets) See specification and prices from SCS Industriværktøj A/S.	3.738,-
	Magnetic Drilling Machine, Type Bosch 1130. See specification and prices from SCS Industriværktøj A/S.	5.245,-
	Magnetic Drilling Stand, 32 mm. See specification and prices from SCS Industriværktøj A/S.	13.062,25
No.15	Steel Sheet Cutter. 4000 x 4 mm with manual back stop.	
	Suppl.: Poul Jensen Værktøj A/S.	269.900,-
No.16	Hydraulic Press-brake. Type: CPHE 80/40.	
	Suppl.: Fasti-Werk Scandinavia, Odder. (See Item 4).	435.900,-
	Supervisor: 1 week for in- stallation and training.	25.000,-
No.17 & 18	Nacelle cower assembly stands. (2 sets). See enclosed pictures.	
	Handtools according to specification.	4.073,-
	Fixtures - made by A/S Wincon	3.000,-

	Fixtures - made by A/S Wincon	1.500,-
	Hand Drilling Machine (2 sets) Type: Bosch 1160	3.738,-
	Nibbler - (2 sets) Type: Bosch 1530	6.804,-
	Jigsaw. Type: Bosch 1582	2.159,-
No.19 & 20	Stand for Nacelle Assembling. (2 sets)	
	Handtools according to specification.	8.534,-
	Table shelf arrangement. Type: Finnerup	2.985,-
	Jigsaw. Type: Bosch 1582	2.159,-
	Cars for assembling and transportation in factory. See picture enclosed.	8.000,-
No.21 & 22	Stand for testing of controlpanels.	
	1 - 55 kW a/c generator	30.000,-
	1 - 22 kW Synchron generator	30.000,-
	1 - 62 kW DC - motor	53.000,-

	Cables	10.000,-
	1 - DC regulator, 75 kW	14.500,-
	1 - Simulation System	30.000,
	1 - Control panel for test-equipment	30.000,-
	7 - Multimeters	7.000,-
	1 - Equipment for power measurement	25.000,-
	1 - Megger	3.000,-
	1 - High-voltage tester	10.000,-
	Miscl. equipment for controlpanel department.	66.300,-
No.23	Horizontal milling machine (second hand) (price for new machine approx. 2.6 mill. DKK)	720.000,-
No.24	Precision High-speed lathe. Type: Victor 500 x 2500, Swing in gap 680 mm.	203.980,-
No.25	Special fittings, tools, as Magnet Drilling Machine, Geared Torque Wrenches etc.	
	Suppl. Stahlwille A/S	46.360,-

No.26	Fork Lift Trucks.	
	1 - Caterpillar model V 60 D, Capacity: 3000 kg.	189.940,-
	1 - BV Electric Stacker, Model S -12 Capacity: 1200 kg.	58.960,-
No.27	Overhead Cranes.	
	1 - 1000 kg Crane for raw material area.	72.916,-
	1 - 8000 kg Crane for packing and storage area.	255.554,-
	Suppl.: Aarhus Elektro.	
No.28	Special fixtures. See pictures enclosed.	
	1 - Fixture for full welding of nacelle bottom part. Manuf. by A/S Wincon.	60.000,-
	1 - Fixture for fixing and first welding af nacelle.	15.000,-
	1 - Fixture for Transmission	4.900,-
	1 - Fixture for mounting of bearings.	3.200,-
	5 - Tube installation for Welding curtains.	7.500,-

	Fixtures for welding of tower sections. Manuf. by A/S Wincon		250.000,-
No.29	Various hand tools, table grinders, etc.		
	Suppl.: SKF.		25.950,-
	Total Machinery cost	DKK.	5.455.095.70

TITLE PAGE. December, 1989.

Manufacture of Wind-turbines for electricity Generation DP/EGY/88/001 - Contract no. 89/57/GYL. EGYPT 2nd Interim Progress Report for the period: Sept.10th to November 25th, 1989.

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Report made by: Director Jan Haahr.

Executing Officer: D. Gardeliin, Director General Services Division, Department of Administration.
UNIDO
P.O.Box 300
A-1400 Vienna
Austria.

/KV/

1. Report on Meetings in Hamburg and Ulstrup/Denmark on Planning of Manufacture of Wind Turbines in Egypt and Planning of training programme for 4 engineers from EISCO. Training of engineers in period: October 28th to November 25th 1989.
Period: Sept.11th to November 25th, 1989.

2. Contents of Report:

   a. Meeting at WINCON's Factory in Denmark.

   b. Meeting at Germanischer Lloyd in Hamburg.

   c. Meeting at WINCON's Factory with Mr. Helge Pedersen and Project Manager from Germanischer Lloyd.

   d. Training of four Engineers at WINCON's Factory in Denmark in 4 weeks.

   e. New Project manager from Wincon Assigned.

3. Statement of investigations and action taken.

   a. On Friday 15th of Sept. a meetings was held at WINCON in Ulstrup, for final planning of training programme, planning of visits at sub-contractors factories and planning of WTG erection programme during time of visit from Egypt.

   b. On Monday 18th of Sept. a meeting was held at Germanischer Lloyd's office in Hamburg with Mr. Jan Peter Securius and Dieter Frey, Dipl.Ing. and Dr.Ing., both managers from the certification organisation, for discussions about the level and time table for the planned design-work for the new Gear type, to be manufactured at EISCO in -Cairo.

   c. On Thursday 23th of November a meeting was held at WINCON's office in Ulstrup for presentation of the new designed gear for the UNIDO representative, Mr. Helge Petersen and the engineers from EISCO.

      Participants:

      Jan Peter Securius. Dipl.Ing.- Germanischer Lloyd.

      Helge Petersen, Consultant for UNIDO.

      Abdel Ghani Zidan Amer, Project Manager from EISCO.

      Rabie Abdel Wahab, Electrical Engineer from EISCO.

Samir Mohamed Salem, Mechanical Engineer from EISCO

Hassan Abdel Fattah, Foreman and Quality Control Manager from EISCO.

Carsten Høybye Pedersen - Chief Engineer - Wincon.

Tomas Örjan Lyrner - Project Mnager - Wincon.

d. Programme for 4 weeks training at WINCON IN Denmark and copy of list of questions raised during the stay, including dates for completision is enclosed in copies. All answers in writing is handed over to the trainees is handed over during the stay in DK.

Specified CERTIFICATE, certifying that the 4 trainees has been trained at The WINCON Factory for 4 weeks, was handed over to tre trainees on last day of training.

Copy of Certificates is enclosed this report.

All training documentation, drawings and descriptions will be send together with tools, machines and components in the container shipment in December/89.

e. By letter to UNIDO, Vienna International Centre, dated October 23rd, 1989, we asked for permission to replacement of Mr. Svend Duus by Mr. Tomas Lyrner as Project Manager. Acceptance from UNIDO / Mr. Morozov was given by telex no 1642 dated 7.nov.1989. 1821 gmt.

CONCLUSIONS.

The very well prepared trainees fullfilled the training in a very good spirit, they were well prepared every day for the programme, it was pleasure for all of us to have this nice gentlemen around us. They are with any doubt very keen on starting the project in Egypt here in December this year, if the promised factory space is ready as agreed. We will send the promised tools, machines and components in week 50/89 and are ready to start the training and assambling in Egypt mid. January 1990 as promised, as soon as factory space is ready, foundation for the prototype and tower is under construction.

Ulstrup, December 8th, 1989.

Wincon Wind Energy ApS.

Jan Haahr - Director.

Programe for 1 month visit at WINCON in Denmark.

Monday the 30th of october:

- WELCOME.
- "Sales" by Jan Haahr.

Tuesday the 31th of october:

- Going through the quality system of WINCON.

Wednesday the 1st of november:

- Proposal to the EISCO quality system.

Thursday the 2nd of november:

- Generel windturbine theori.

Friday the 3rd of november:

- Visit at the Ryaa windpark. Saw a "runaway" and went up in one of the windturbines.

Monday and Tuesday the 6th and 7th of november:

- Went through the drawings concerning the manufactoring of the bottom frame.
- Fixing of a W100 bottom frame in fixing fixture.
- Placing of the bottom frame in the welding fixture.
- Instruction in using welding fixture.
- Demonstration of:
  - correct use of a welding plant, - volt/ampere.
  - welding with a pipethread filled with powder.
  - weldings made different places on the frame.

Wednesday the 8th of november:

- Visit at Horsens Enge to see erection of a windturbine.

Thursday and friday the 9th and 10th of november:

- Going through drawings concerning bearing mounting.
- Bearing mounting including how to use a washingmashine and induction heater begins.
- Finishing the bearing mounting and instruction on how to use the grease filling system.

Monday and tuesday the 13th and 14th of november:

- Going through drawings concerning transmission assembling.
- The assembling of the transmission starts including how to use the hydraulic press tools.
- Finish the assembling of the transmission and instruction on how to use torque wrenches.

Wednesday the 15th of november:

- Visit at:
  - Volund, to see how the machining is done.
  - VL staal, who makes the WINCON windturbine towers.
  - SGD, where the surface treatment - painting is done.
  - the 2 Mega watt windturbine near Esbjerg.

Thursday the 16th of november:

- Going through drawings concerning yaw arrangement.
- Mounting of yaw arrangement and instruction on correct adjustment of tooth backlash.
- The yaw arrangement is finished mounted and tested.
- Visit to Århus in the afternoon and the evening.

Friday the 17th of november:

- Going through the drawings concerning transmission mounted on the bottom frame
- Mounting of transmission on bottomframe starts including instruction in correct upshimning of transmission and generator.
- Finish the transmission mounting including instruction on how to use a torque gaer wrench.

Monday the 20th of november:

- Visit at:
  - Herning galvanisering who makes the galvanizing for WINCON.
  - Vølund to see how the plates gets bowed.
  - Randers tandhjulsfabrik to see gear wheels be made.

Tuesday the 21th of november:

- Went through the drawings concerning assembling of the covering.
- Assembling the covering, including instruction in correct placing of the sound-proofing.

Wednesday the 22th of november:

- The final test of the nacelle.
- Going through the drawings concerning mounting of the covering.
- Mounting of the covering.
- Going through the erection manual.

Thursday the 23th of november:

-Meeting with German Lloyd.

Friday the 24th of november:

- Going through service manual.
- Handling out certificates.
- LEAVE.

JAN MAAHR

ANSWERS WINCON / EISCo

In accordance with the collaboration agreement between Wincon Wind Energy ApS and Egyptian Iron and Steel Co. section 2.4, 4 man month of education in Wincon's factory to overcome production difficulties is to be performed.

In connection with this part of the contract some questions are raised. In this text the answers will be written but not in order.

EGYPT IRON & STEEL QUESTIONS FOR WINCON TO BE ANSWERED

E1 Drawing of foundation in english ?

Completed [week 45 TL]

E2 English erection and service manual ?

JN Will be supplied in week 47

Completed [week 47 JN / CHP]

E3 Wood as material in platforms inside tower ?

YES

Completed [week 46 TL]

E4 Specification of rubber material used in torque rod ?

TL
Quality : EPDM-rubber
ASTM : D 2000 AA 610 C 12
Constant pressure : 5 MPa
Max presuure :10 MPa
Temperature range : 0-100 deg.C

Completed [week 46 TL]

E5 Specification of grease used as protection for the shining surfaces ?

JN Completed [ ]

E6 Specification of painting / surface protection of tower ?
Spec. is requested from SGD. URGENT !!

CHP

Completed [ ]

E7 Specification of properties of casting material GGG40 used in hub and extenders ?
Eventhough the specification supplied is written in danish the properties of the material ca be read

Completed [week 47 CHP]

E8 Specification of properties of steel Ck45 used in main shaft ?

TL Ck45 is the name according to DIN 17200
Material properties in percent:

C 0.42 - 0.50 %
P max 0.035 %
S max 0.035 %
N 0.15 - 0.35 %
Mn 0.50 - 0.80 %

Completed [week 46 TL]

E9 What safety equipment will be supplied from Wincon ?

One set of safety equipment will be supplied with the fist Wind turbine that will be sent in a container week 48.

Completed [week 46 TL]

E10 Drawings of blades (mat 9.2 m) for EISC ?

CHP/ Drawings are requested from M.A.T + Spinner.
TL MAT will not give awway drawings to EISCo, they claim that the tender for transfering knowlege of the blade only counts for SUEZ.

Completed [ ]

E11 The extra sealings on main shaft is not specified on the drawings.
JN

Completed [ ]

E12 How will the mounting of blades be performed ?

Will be explained in erection manual !

Completed [week 47 TL/JN]

E13 Alignment of tower after erection ?
Use the method to level 3 nuts diplaced 120 dgrees of the bolt circle of the foundation bolts.

Completed [WEEK 47 TL]

E14 Drawings of layout of Wincon factory ?

Has already been supplied to Ahmed Abou Rayya and Mohamed El Nahas that visited Wincon in the beginning of fall 1989

Completed [week 46 TL]

E15 Specification of welding material ?

Completed [week 45 MA]

E16 Copies of overheads showed at the wind turbine theory presentation ?

TL

Completed [week 47 TL]

E17 Copy of Riso Code in English ?

TL Completed [week 46 TL]

E18 General litterature of wind turbine theory in english ?

TL Wind Atlas which explains some theory about winds is supplied. More litterature will be requested from the library.

Completed [ ]

E19 10 sets of complete drawings are requested ?

JN In full size there will be supplied 1 set of transperent drawings and 2 set of drawing on paper.

Completed [ ]

E20 List of components in the wind turbine and deliverer ?

TL Will be supplied in week 47.

Completed [week 47 KM]

E21 Instructions, how to use computer program "energy2"

Completed [week 46 TL]

E22 Original data sheets (catalog) of all couplungs/connections used in driving train for W99xt

TL

Completed [ ]

E23 Packing list
NOTE! safety equipment according to E9 is to be delivered.

KM

Completed [ ]

E24 Packing list of mounting tools

MA Completed [ ]

E25 Specimen for damping material used for covering and rubber used in torque rod.

Completed [week 47 MA]

E26 List of all tools used in the assembly process.

MA Completed [ ]

E27 A plan for how to organize a mounting shop for wind turbines, the assembly speed is 1 WTG/day. The plan should consider number and distribution of workers and an estimation of consumed man hour / working moment.

JH

Completed [ ]

E28 Specifications of machines used at Volunds, sand blasting etc.

JN

Completed [ ]

E29 Specifications of welding machines used in Wincon

MA Completed [ ]

E30 Inspection plans may be corrected

MA Completed [ ]

E31 Specifications of chains locking device and hinge etc. used in tower shall be shipped in the container.

JN Completed [ ]

E32 Drawing of lifting device for tower should be supplied

JN Completed [ ]

E33 Drawing of plump bob shall be supplied

JN Completed [ ]

E34 Switch, twisted cables, should be added to the drawings of the tower

JN Completed [ ]

E35 A cover of tooth mesh for the slewing ring as protection against sand coming with the wind shall be designed.

CHP/
TL Completed [ ]

E36 Drawing of frame which support the computer box shall be supplied

JN Completed [ ]

E37 The switch twisted cables etc. and the worm gear (nacelle position) should if not already done be added to the packing list.

KM

Completed [ ]

E38 Power as a function of rpm for generator

TL Completed [week 47 TL]

E39 Notes made by wincon from meeting with GERMANISCHER LLOYD concerning gear design shall be supplied.

TL

Completed ☐

E40 Instalation and service manual for gear "FLENDER" shall be supplied.

TL

Completed ☐

27.12.1989/TL upgraded 8/12

Wincon Wind Energy ApS
Hagenstrupvej 38
DK-8860 Ulstrup - Denmark
Phone 45 6 46 33 22
Telex dk 69 120
Telefax 45 6 46 44 34

C E R T I F I C A T E .

We hereby certify, that:

Samir Mohamed Salem

has been trained at WINCON WIND ENERGY ApS factory in Denmark in the period from October 28th to November 25th, 1989 in the following program:

a. Quality standards and establishment of Quality assurance plan and procedures.

b. Workshop layout, machinery and material specifications and know-how for test and production equipment.

c. Theory of Wind Turbine design and examination of Drawings and Documentation, and Gear Design according to DIN Code.

d. Mounting of Mechanical Components for complete Nacelle and Nacelle cover.

e. Erection and service management.

f. Erection of Wincon wind turbine in practice.

g. Training in Estimation of Annual Energy Output by means of Computer Program.

Ulstrup, November 25th, 1989.

Wincon Wind Energy ApS.

Tomas Ó Lyrner	Carsten H.Pedersen	Viggo Jørgensen
Project Manager	Chief-mech.engineer	Chief-electr.engineer

Jan Haahr
Man Director

C E R T I F I C A T E .

We hereby certify, that:

Abdel Ghani Zidan Amer

has been trained at WINCON WIND ENERGY ApS factory in Denmark in the period from October 28th to November 25th, 1989 in the following program:

a. Quality standards and establishment of Quality assurance plan and procedures.

b. Workshop layout, machinery and material specifications and know-how for test and production equipment.

c. Theory of Wind Turbine design and examination of Drawings and Documentation.

d. Mounting of Mechanical Components for complete Nacelle and Nacelle cover.

e. Erection and service management.

f. Erection of Wincon wind turbine in practice.

g. Training in Estimation of Annual Energy Output by means of Computer Program.

Ulstrup, November 25th, 1989.

Wincon Wind Energy ApS.

Tomas O Lyrner
Project Manager

Carsten H.Pedersen
Chief-mech.engineer

Viggo Jørgensen
Chief-electr.engineer

Jan Haahr
Man Director

C E R T I F I C A T E .

We hereby certify, that:

Rabie Abdel Wahab

has been trained at WINCON WIND ENERGY ApS factory in Denmark in the period from October 28th to November 25th, 1989 in the following program:

a. Quality standards and establishment of Quality assurance plan and procedures.

b. Workshop layout, machinery and material specifications and know-how for test and production equipment.

c. Theory of Wind Turbine design.

d. Electrical mounting of Control Panel and Windmill Computer Panel.

e. Test and Inspection of Windmill Computer and Main Panel.

f. Introduction of Programming of Windmill-Controller.

g. Erection of Wincon wind turbine in practice.

Ulstrup, November 25th, 1989.

Wincon Wind Energy ApS.

Tomas O Lyrner	Carsten H.Pedersen	Viggo Jørgensen
Project Manager	Chief-mech.engineer	Chief-electr.engineer

Jan Haahr
Man Director

Wincon

C E R T I F I C A T E .

We hereby certify, that:

Hassan Abdel Fattah

has been trained at WINCON WIND ENERGY ApS factory in Denmark in the period from October 28th to November 25th, 1989 in the following program:

a. Quality standards and establishment of Quality assurance plan and procedures.

b. Workshop layout, machinery and material specifications and know-how for test and production equipment.

c. Theory of Wind Turbine design and examination of Drawings and Documentation.

d. Mounting of Mechanical Components for complete Nacelle and Nacelle cover.

e. Erection and service management.

f. Erection of Wincon wind turbine in practice.

g. Training in Estimation of Annual Energy Output by means of Computer Program.

Ulstrup, November 25th, 1989.

Wincon Wind Energy ApS.

Tomas O Lyrner	Carsten H. Pedersen	Viggo Jørgensen
Project Manager	Chief-mech.engineer	Chief-electr.engineer

Jan Haahr
Man Director

TITLE PAGE.

December, 1989.

Manufacture of Wind-turbines for electricity Generation

DP/EGY/88/001 - Contract no. 89/57/GYL.

EGYPT

3rd Interim Progress Report for the period:

November 26th to December 31st, 1989.

Prepared for the Government of Egypt
by the United Nations Industrial Development Organization,
acting as axecuting agency for the United Nations Development Programme.

Based on work of Wincon Wind Energy ApS.

under UNIDO Contract No.89/57.

Report made by: Director Jan Haahr.

Executing Officer: D. Gardellin, Director General Services
Division, Department of Administration.
UNIDO
P.O.Box 300
A-1400 Vienna
Austria.

1. During the time from November 26th to December 22nd all Equipment, Tools, components, gearbox and 2 Control Panels was assambled in our factory and packed in a container rented by our Transportation Agent "Leman Transport A/S, on December 22nd 1989 the container, including all equipment to be shipped in accordance with our contract, left our factory for shipment from the harbour of Aarhus/DK. On December 30th, the container left Aarhus by the Ocean vessel: K.Tomson, with destination: Alexandria. In accordance with informations from the shipping company, the container will arrive at the harbour of Alexandria on January 15th, 1990.

   All original documents for the shipment was send by DHL on January 2nd, 1990 to EISCO, to make it possible for the Venture Partner to prepare the costum-clearence before the arrival to Alexandria.

   Copy of documents was send to the UNDP Representative in Cairo Mr. Tharwat Sabry, on Januar, 4th. with the request for his assistance to EISCO for the release of the container immediately after arrival.

   For your information, enclosed please find copies of:

   1. Letter to EISCO att. Mr. Dia Tantawi following the shipping documents, dated Januar 2nd, 1990.
   2. Bill of lading
   3. Proforma Invoice in accordance with Contract No.89/57/GYL.
   4. List of tools and equipment.
   5. List of components for the W 110 proto-type.

   CONCLUSIONS:

   The project is well running untill now, and we are ready to start-up the difficult part immediately after receipt of informations from Cairo, telling us that the container is out of costum clearance and available at the EISCO Factory in Helwan.

   We also expect to get informations telling us, that the new established and clean factory is ready as promised during the negotiations in Cairo. If it is possible for UNIDO to control, that this work is done, or under preparation, it will a great help for the project and us.

Ulstrup, December 31st, 1989.

Wincon Wind Energy ApS.

Jan Haahr - Director.

Wincon
DK-9240 Ulstrup Denmark
Phone 45 6 46 33 22
Telex dk 55 120
Telefax 45 6 46 46 24

Egyptian Iron and Steel Co.
Tebbin, Helwan,
CAIRO/ Egypt.

att. Mr. Dia Tantawi - Chairman

Ulstrup, January 2nd, 1990.

Re.:UNIDO Contract No.89/57/GYL
Transfer of Technology for the Manufacture in Egypt of Wind Turbines for Generation of Electricity.

Dear Mr. Dia Tantawi,

Enclosed please find all needed documents listed belowe for the custom-clearance of shipped container, which will arrive at the harbour in Alexandria in a few days from now.

Please arrange the custom clearance and inform us when the container will be ready for un-packing at your factory. The container may not be opened before Wincon's authorized manager is at your factory. If the container is opened before our arrival and participation, we are not responsible for the shipment.

The container must be empty and returned, at the latest 7 days af arrival. If not, the additional cost for container rent will not be for our account.

Documents following this letter is:

1. Bill of lading - 3 originals + 1 copy.
2. Proforma invoice - 1 original + 1 copy
3. List of tools and Equipment - 1 expl.
4. List of components for the W 110 proto-type - 10 pages.

Copy of this letter and documents is mailed to:

Resident Representative UNDP,
P.O.Box 982 Cairo
Taha Hessten - Zamalek
Egypt.

Best regards,

Jan Haahr

Director.

WINCON ENERGY SYSTEMS
HAGENSTRUPVEJ 38
8860 ULSTRUP
DENMARK

Consignee
TO ORDER

Notify
RESIDENT REPRESENTATIVE UNDP
P.O. BOX 982 CAIRO
TAHA HESSTEN - ZAMALK
EGYPT

BILL OF LADING

LATVIAN SHIPPING COMPANY

2, Boulevard Padomju, Riga, USSR - Cable: Morflot Riga

RINELA LINE = RICONA LINE

GENERAL AGENTS IN DENMARK
CHR. JENSEN
CHARTERING- & SHIPAGENCY LTD.
77, STORE KONGENSGADE
POSTBOX 9079
DK-1022 COPENHAGEN K

Local vessel	From (local port of loading)		
Ocean vessel: K. TOMSON	Port of loading: AARHUS		
Port of discharge: ALEXANDRIA	Final destination	Freight payable at: COPENHAGEN	Number of original B/L: 3/THREE

Marks + Numbers	Number of packages/description of goods	Gross weight Kos.	Measurement Cbm.
AS PER SPECIFICATION ATTACHED	1 X 40' CONTAINER(S) AS PER SPECIFICATION ATTACHED	4260	
		3454	(TARE)
	Particulars furnished by the Merchant	7714	

ORIGINAL

FREIGHT AND CHARGES

SHIPPED on board in apparent good order and condition, weight, measure, marks, numbers, quality, contents and value unknown, for carriage to the port of discharge or so near thereunto as the Vessel may safely get and be always afloat, to be delivered in the like good order and condition at the aforesaid Port unto Consignees or their Assigns, they paying freight as per note on the margin plus other charges incurred in accordance with the provisions contained in this Bill of Lading.

In accepting this Bill of Lading the Merchant expressly accepts and agrees to all its stipulations on both pages, whether written, printed, stamped or otherwise incorporated, as fully as if they were all signed by the Merchant.

One original Bill of Lading must be surrendered duly endorsed in exchange for the goods or delivery order.

IN WITNESS whereof the Master of the said Vessel has signed the number of original Bills of Lading stated above, all of this tenor and date, one of which being accomplished the others to stand void.

Place and date of issue:
COPENHAGEN 30.12.89

Signed (for the Master) by

CHR. JENSEN LTD.

WINCON

Resident Representative UNDP.
P.O. Box 982 Cairo.
Taha Hessien - Zamalk.
Egypt.

FAKTURA
INVOICE
RECHNUNG

PROFORMA

Dato · Date · Datum:

Deres ordre nr / Your order No / Ihr Auftrag Nr	Vor ordre / Our contract / Unsere Bestätigung	Bruttovægt / Gross weight / Bruttogewicht	Nettovægt / Net weight / Nettogewicht
		4260 kg	

Levering / Delivery / Lieferung	Betalingsbetingelser / Terms of payment / Zahlungsbedingungen
Cif Alexandria	Netto Cash

Emball. og mærke / Packing and marks / Verpackung und Markierung	Antal / Number / Anzahl	Vareart / Description / Warenbezeichnung	Enhedspris / Price / Einheitspreis	Beløb / Amount / Betrag	Currency
				US$	
Container MMRU 315021-0		Equipment, Tools		25.000,-	
		Equipment, Parts		50.000,-	
		Equipment, Gearbox		9.000,-	
		Equipment, Control System		15.000,-	
				99.000,-	
		Country of origin: Denmark			
		Shipped by:			
		CUSTOMS BROKERAGE THROUGH: Resident Representative UNDP. P.O. Box 982 Cairo. Taha Hessien - Zamalk. Egypt.			
		We hereby certify that the goods are in accordance with buyers purchase agreement contract DP/EGY/88/001			

Member of The Alliance Group Denmark, Roskildevej ... DK 2100 Copenhagen, Denmark

LIST OF TOOLS AND EQUIPMENT, SHIPPED TO CAIRO
THE 22TH OF DECEMBER 1989.

NOS.	DESCRIPTION
1. pcs.	Tack-welding fixture for the bottomframe.
1. pcs.	Welding fixture for optimal welding: 2 column - 2 consoles - and 2 bottomplates.
1. pcs.	Fixture for mounting of the bearings.
1. pcs.	Fixture for mounting of the transmission.
1. pcs.	Fixture for assembling of the cover.
2. pcs.	Wagons for mounting and transportation.
2. pcs.	Bench for tools and vice.
42 m2.	Welding curtains.
1. pcs.	Induction-heater for mounting of the bearings.
1. pcs.	Grease filling system complet for bearings.

Morten Andersen 20-12-89.

PACKING LIST FOR WINCON W110 XT.

BOTTOM FRAME WITH YAW SYSTEM.

Description	Unit.
Slewing ring	1
Yaw motor	2
Yaw gear	2
Yaw wheel	2
Screening for yaw wheel	2
Bottom frame	1
Bushing for slewing ring	30
Steel bolt m16x130 fzv	40
Lock nut m16 fzb	40
Disc HB200 m16	80
Insex Screw m12x40 12.9	20
Disc HB200 12mm fzv	20
Stel bolt m8x40 fzv	8
Lock nut m8 fzb	8
Facet disc m8 fzb	8

MAIN SHAFT KOMPLETE.

Main shaft	1
Main bearing 23136es	1
Main bearing 23036es	1
Bearing house fixet 300	1
Bearing house lose 280	1
Bushing long	1
Bushing short	1
Air ecape valve ps18	4
Grease nippel 1/4"	2
Insex Screw m6x8 916-45H	2

PACKING LIST FOR WINCON W110 XT.

MOUNTING GEARBOX.

Description	Unit.
Gearbox flender szak 1360	1
Scrink disc ø200	1
Blade hub	1
Taper lock	1
Lock disc for hub	1
Web plate	1
Caliber konsol for brake	1
Brake caliber W4	1
Brake disc ø700	1
Steel bolt m24x80 fzv	1
Disc HB200 m24 fzv	1
Disc HB200 m40 fzv	5
Insex screw m6x16 fzb	6
Steel bolt m20x80 fzv	4
Disc HB200 m20 fzv	8
Lock nut m20 fzb	4
Steel set screw m36x70 fzv	2
Steel set screw m36x90 fzv	2

MOUNTING GENERATOR.

Generator 108kw Elin	1
Coupling komplete	1
Plate 1 for momentstag	1
Plate 2 for momentstag	1
Plate for sensor generator	1
Fittings for sensor for Gearbox	1
Plate for demex sensor	1
Fittings for sensor generator	1
Fittings for topbox	1
Securit for main shaft	1
Bushing for momentstag	2
Eye plate thick	1
Eye plate thin	1

PACKING LIST FOR WINCON W110 XT.

MOUNTING GENERATOR.

Description	Unit.
Rubber for momentstag	1
Rubber for eye plate	1
Steel set screw m24x 70 fzv	4
Steel set screw m8x20 fzv	2
Steel set screw m20x50 fzv	2
Steel bolt m30x120 fzv	8
Steel bolt m27x220 fzv	2
Disc for momentstag	2
Disc HB200 m36 fzv	8
Disc HB200 m30 fzv	8
Disc HB200 m20 fzv	2
Disc HB200 m27 fzv	1
Disc HB200 m24 fzv	4
Disc HB200 m8 fzv	2

MOUNTING NACELLE COVER.

Helmet sheild l.r	2
Side sheild l.r.	2
End plate perforation l.r	2
End plate l.r.	2
Hinge	4
Lock fitting 1	1
Lock fitting 2	2
Hook	2
Gasspring fitting	2
Reinforcement	1
Torsion stregthening	2
Shock absorber komplete	4
Reinforcement front r.	1
Reinforcement bottom	1
Shield for air (nacelle cover)	2
Loock fitting AH 27	2

PACKING LIST FOR WINCON W110 XT.

MOUNTING NACELLE COVER.

Description	Unit.
Steel set screw m6x16 fzv	148
Steel set screw m8x20 fzv	76
Steel set screw m10x20 fzv	32
Insex screw m6 x 16 fzb	4
Lock nut m10 fzv	28
Kombi nut m6 fzb	152
Kombi nut m8 fzb	80
kombi nut m10 fzb	4
Disc A10 fzv	60
Disc HB200 8m fzv	62

MOUNTING NACELLE COVER KOMPLETE.

Description	Unit.
End part front	1
End part bottom	1
Gasspring fittings front	2
Reinforcement front r.	1
Reinforcement bottom	1
Helmet consol front l.	1
Gasspring fitting bottom	2
Helmet consol bottom l.	1
Sound lock	1
Fittings for nose cover	3
Nose cover	1
Plate for nose cover	3
Rubber for nose cover	6

PACKING LIST FOR WINCON W110 XT.

MOUNTING NACELLE COVER KOMPLETE.

Description	Unit.
Noise absorber for sound lock	1
Noise absorber for generator profil	1
Noise absorber bottom	1
Noise absorber front	1
Noise absorber for iron ankel	1
Noise absorber for frame l.	1
Noise absorber for frame r.	1
Rubber for nacelle cover	2,5 m
Shock absorber for helmet shield	50
Helmet consol front r.	1
Helmet consol bottom r.	1
Safety chain 1520	1
Safety chain 1207	1
Safety hook	4
Steel set screw m8 x20 fzv	30
Steel set screw m12 x 25 fzv	18
Steel set screw m16 x 35 fzv	4
Steel bolt m12 x45 fzv	2
Steel set screw m16 x45 fzv	20
Steel set screw m10 x 35 fzv	4
Steel bolt m6 x40 fzv	6
Eye bolt m8	4
Steel set screw m6 x 20 fzv	6
Kombi nut m8 fzb	34
kombi nut m10 fzb	40
Kombi nut m6	6
Lock nut m12 fzb	14
Lock nut m16 fzb	16
Lock nut m6 fzb	6
Lock nut m8 fzb	4
Disc A12 fzv	14
Disc A16 fzv	16
Disc A10 fzv	4
Center disc m12 fzv	6

PACKING LIST FOR WINCON W110 XT. Page 6.

MOUNTING NACELLE COVER KOMPLETE.

Description	Unit.
Disc 4 side ϕ16x65	4
Disc 1/4" fzb	6
Oil funnel	1
Taptite screw m6 x16 fzb	6
Center disc 6mm fzv	6

MOUNTING ELECTRICITY.

Cable 3x35	27m
Cable 4x35	27m
Cable 34x1	26m
Cable 4x1,5	52m
Cable 2x1	55,6 m
Cable 12 x 144	3,5m
Cable eye 35	7
Cable eye 2,5	8
Cable fitting	1
Cable wire m6	2
Cable wire m4	2
PG 42	1
PG 36	1
PG 16	1
PG 16 Brass	1
PG 13,5	6
Top box	1
Small top box	1
Microswitch unbalance	1
Wire terminal	1
Sensor	2
Microswitch twistet cable	1
Thrust pad	3
Fittings for unbalance switch	1
Wire 2mm	3.3m
Steel set screw m12x 30 fzv	4
Steel set screw m8x 16 fzv	2
Steel set screw m6x 20 fzv	2
Machine skrew m6 x 20 ch fzb	2

PACKING LIST FOR WINCON W110 XT.

MOUNTING ELECTRICITY.

Description	Unit.
Disc A12 fzv	8
Disc HB200 8m fzv	4
Disc A6 fzv	2
Lock nut m12 fzb	4
Lock nut m6 fzb	4
Wire lock 2m	2
Schrink flex 1/2"	0.35m
Vind vane	1
Anemometer	1

ASSEMBLING.

Bushing for tower	30
Screw flange	72
Fittings for weather station	1
Bottom flange for blade	36
Fittings for vind vane, anemometer	1
Fittings for control panel	3
Hook for cable	1
Frame for control panel	1
Safety line 22m	1
Safety belt	1
Safety Altochut	1
Steel bolt m20 x 160 fzv	72
Steel bolt m12 x 120 fzv	30
Steel bolt m20 x 130 fzv	72
Steel set screw m10x 30 fzv	8
Lock nut m10 fzb	8
Disc A10 fzv	8
Disc HB200 12m fzv	30
Disc HB200 20m fzv	144

CONTROL PANEL KOMPLETE.

Description	Unit.
Enclosure 800 x 1200	1
Rc unit	3
Cobberbar for thyristor	3
Typesign	1
Worning sign yellow/red	2
Thyristorprint	1
Bolts Aux for triggerprint	4
Voltagetransformers	3
Wiringcover 30x 80	3,6m
Wiringcover 60x80	1
Mainswitch strømberg	1
Aksel for mainswitch	1
Aux element for mainswitch	1
Bracket for yaw transformers	1
Termorelay 4-6,5 A	1
Termorelay 2.4 4 A	1
Yaw transformer	1
Yaw controller	1
Fuses 3x 80 A	3
Fuse holder 100A	1
Contactor for capasitors 3tk44	3
Capasitor 4700 uf 63V	1
Rectifier 30A	2
Aux relay 3TB	2
Current transformers 500/1 A	3
Thyristers	3
Tripbreaker 3A	2
Tripbreaker 6A	1
Tripbreaker 10A	1
Varistor 40KA type v20/3	1
Contactor ls 177/400V	1
Brake trafo dt 9084-1	1
Trafo 24V dt 1445-1	1
Cpu trafo dt 1055-1	1
Light trafo dt	1
Caoasitor 12,5	3
Bracket fot capasitors	1
Din bracket for terminals	1,2

PACKING LIST FOR WINCON W110 XT.

CONTROL PANEL KOMPLETE.

Description	Unit.
Cable 35mm	5
Cable 6mm	3
Cable 10mm	1
Cable eyes 35 x10	12
Cable eyes 6 x8	6
Emergency stop	1
Terminal 95mm	5
Terminalseparation	4
End stop	9
Terminal vk4e	20
Seperation piece AP4/E	1
Terminal vk4u	43
Seperationspiece AP4	2
Term.sign 1-40	1 set
Term.sign u1-u1.W1n u2-v2-v2	1 set
Varistor 24V	5
Varistor 380V	5
Resistor 18G K for capasitors	9
Resistor 15k	2
Diodes 5408	2
Ventilator 24 VAC	1
Fittings for ventilator	1
Schrink flex 1/2	0.2 m
Cable red ø75mm	100
Cable orange ø,75	100
Cable black 0,75	100
Cable lilac ø,75	100
Cable Yellow/green	100
Cable brown ø,75	100
Cable red 2,5mm	10
Cable black 2,5	10
Cable lilac 2,5	10
Scrink flex 5,5mm	0.5
Flex cower nylon	1
PG 48 HSK	1
PG 48 brass	1
PG 42 HSK	1

PACKING LIST FOR WINCON W110 XT. Page 10.

CONTROL PANEL KOMPLETE.

Description	Unit.
PG 42 brass	1
PG 36 HSK	4
PG 36 brass	4
PG 16 HSK	2
PG 16 brass	2
PG 13,5 HSK	2
PG 13,5 brass	2
PG 11 HSK	4
PG 11 brass	4
Copperbar 250 A	2,5m
Holder for diagram	1
Bolts m10 x35	4
Nuts m10	4
Disc m10	4
Bolts nuts	1 set
Computer cabinet 600 x 600	1
Front for cabinet	1
Fittings for CPU	1 set
Compuetr complete	1
Print for trafo	3
Temperature Scale	1
Din bracket S35	0,4
Cable 50 x 1 Reyflex	4

TITLE PAGE.

March 15th, 1989.

Manufacture of Wind-turbines for electricity Generation

DP/EGY/88/001 - Contract no. 89/57/GYL.

EGYPT

4th Interim Progress Report for the period:

January 1st to March 15th, ~~1989~~ 1990

Prepared for the Government of Egypt
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme.

Based on work of Wincon Wind Energy ApS.

under UNIDO Contract No.89/57.

Report made by: Director Jan Haahr.

Executing Officer: D. Gardellin, Director General Services
Division, Department of Administration.
UNIDO
P.O.Box 300
A-1400 Vienna
Austria.

1. On January 30th, we received a telefax from the Chairman for EISCO, Mr. Dia Tantawi, (Copy enclosed) that the container shipped from Denmark in December, finally was arrived at the Container Harbour in Alexandria. Mr. Tantawi asked us to send our Project Manager to be present while opening of the container in accordance with our requirements. We asked Mr. Dia Tantawi to arrange the release of the container and transportation to the factory in Helwan/Cairo, and promised to send Mr. Tomas Lyrner as soon as possible.

   On February 1st, 1990 we informed EISCO by telefax, that Mr. T.Lyrner would arrive at the airport in Cairo on February 5th 19,45 hour, (copy enclosed), and informed that he would be ready to start the unpacking and control of components on Febr.6th, and start-up the planned guidance and supervision on the prototype imediately after.

   At the arrival at the factory in Helwan on Febr.6th, the container was still at the harbour in Alexandria, nc tools was ready and available and the promised separated and cleene space for the assambly of the proto type and future machines was not prepared.

2. Copy of Mr. Tomas Lyrner's report for his stay and work in Cairo from Febr.5th to March 1st 1990 is following this report.

3. Copy of Price-list for components, to be uset for calculations of a Egypt produced Wincon W 110 including imported components from Wincon's normal sub-contractors.

4. Copy of a hand-written list of needed components to be imported for the production of the 100 UNITS.

5. Definition of other kind of materials for foundation-bolts was found, to make it possible to find suiteable steel in Egypt. (Copy of telexes enclosed.)

6. Hub for the prototype was not shipped in the container, but send by Air-freigt and arrived at the airport in Cairo on February 24th, 1990. Original shipping dokuments was handed over to the management at EISCO during my stay in week 9/90.

7. 2 Computers and yaw controller for the two shipped control-panels was not shipped together with the panels, but will be handed over by our Electrical-manager Viggo Jørgensen during his stay approx. week 17 - 18/90 for the final testing and erection of the prototype.

   We are afraid, the computers will be injured during the time of transportation and unpacking, and prefere to bring new controlled and tested units at the arrival for erection and first unit.

CONCLUSIONS:

The training programme and handling of problems in Egypt was more difficult than expected, it is very difficult for the involved engineers to get the needed authorisation to do even small details, as an example they could not get even simple hand tools for the assambling, before T. Lyrner was tired of waiting and went to Cairo and purchased some simple tools for our own account.

During my stay, I was promised again, that a new established and clean factory will be ready as promised before starting up of the manufacture of the next units.

Ulstrup, March 15th, 1990.

Wincon Wind Energy ApS.

Jan Haahr - Director.

REPORT FROM FEB-1990 VISIT IN EGYPT
WINCON/EISCO PROJECT, TOMAS LYRNER

MONDAY, FEB 5

Arrival date. Both Helge Petersen and Ahmed Abdul Hassan (from EISCO public & service department) received me at the airport.

TUESDAY, FEB 6

Left from the hotel at 6:00 am for Alexsandria where the container still was storaged. We were four people in the car. Me and Abdel Ghani, Ahmed Abdul Hassan and the driver Mr Kharliffa.

Concerning the transport of the goods in the container to Cairo--EISCO there were two alternatives. We could unload it at the harbour and put the things on a truck for the transport to EISCO, this would take about 10 days. Or we could have the hole container transported to EISCO. This would take about 5 days and would be more expensive. We agreed to chose the last alternative. We returned to Cairo 9 o'clock that night.

WEDNESDAY, FEB 7

First day at EISCO. I was showed around the enormous steel plant with all its workshops.

THURSDAY-FRIDAY, FEB 8-9

Since we had to wait for the container my EISCO-friends had a program for tourist attractions of Cairo. Pyramids, shopping district, resturants, Citadel mosk etc.

SATURDAY, FEB 10

More time was spent with tours around the factory. To see the facilities for manufactoring gives you some ideas of what can be manufactored later in the EISCO plant for this prodject.

Every day I made a short visit at the office of Eng. Aboraia (chief for spare part department) to get some news about the transport of the container. He was the man whom in practice was responseible of this.

SUNDAY, FEB 11

Stayed home at the hotel, writing letters.

MONDAY, FEB 12

The general way of informing about bad news is to say nothing. So a quick visit at the office of Eng. Ahmed Abouraia. He offered me a cup of coffee without mentioning the container....

Afternoon was spent with the chairman for the company EISCO, Mr Dia Tantawi. Helge Pedersen and Mr Sabri from UNIDO was also participating in the meeting. Mr Dia stated that a gearbox similar to Flender 1360 could be produced in the future, 1-2 years from now with new machines which will have the following capabilities:

1. Machining center - bearings of casing
2. Gear grinding - teeth
3. Lathe - shafts
4. Grinding - shafts

This means that the work which is being performed by Germanischer Lloyd (GML), to design a suitable gear design for existing machines of EISCO, is finished.

About ten minutes after Mr Sabri and Helge Petersen left for Cairo Mrs Laila arrived (maybe somewhat late ?). Mrs Laila is working for ENREA under Sharif El-Din.

If the container, with the original drawings, had arrived we could have discussed the foundation. We agreed to meet again when the container had arrived and that she at that time also should bring a man resposible for the casting of the foundation. Mrs Laila also mentioned about the problem of the wind turbines erected Ras Ghareb.

TUESDAY, FEB 13

I recieved (a fax from CHP 12.2.20) some requested information from Dk about preliminary power curve measurements on W99xt that will be erected in Hugharda. Since the fax was written in danish I translated into English and added some extra information. This information was given to both Helge Petersen and Mrs Laila.

WEDNESDAY, FEB 14

After 8 days of waiting the container finally arrived. The container was discharged within 4 hours so the truck could return to Alexandria. Only the main components of packing list was checked.

At 11:00 am an american group from US-aid arrived. I had a one hour information meeting with them concerning the project.

At 15:00 pm me and the driver together with Tarak went to see a national football game between Egypt and Denmark.

THURSDAY-FRIDAY, FEB 15-16

Two free days. Every second thursday the emploies of EISCO are free. Thursday, a second visit at the pyramids. Also went to a movie.

SATURDAY, FEB 17

Organized the components to be assembled. I desided to do the check the components according to the packing list meanwhile the assembly was performed.

SUNDAY, FEB 18

Start of the assembly. Hassan is doing alright with the cover. Since the tools still were missing I checked the components more carefully. We also had the main-gear washed out. The turning of gear-shaft (high speed shaft) was managed by means of a huge lathe machine.

MONDAY, FEB 19

Talked with Wincon. Had some questions about components etc.

-1. 3 capacitors, only 2 delivered. Answer: the 2 capacitors are of a larger size and replace the 3 smaller
-2. Grease filled in the bearing house at Wincon ? Answer: Yes
-3. Cabinet for testing sensors of nacelle is not supplied with the container, why ? Answer: that was not in the contract. Furthermore Wincon has delivered drawings of test cabinet. Mr Rabia shall be able to make his own test cabinet.
-4. Informed Viggo that Mr Rabia wants english info. of Generator, Capacitors and Cables.
-5. Hub sent when ? Answer: it will be shipped by air week ??.

Foundation bolts of quality 8.8 can not be manufactored at EISCO. The material was changed by me to C45. Heattreament of anchor bolts is also required (fully hardning also tempering to inprove fatigue strength). The yoeld point of the bolt material was required to 420 MPa after heat treament.

TUESDAY, FEB 20

Started the day with a visit at the Administration office of UNIDO I was told that I must be authorized by Jan Haahr to Cash more money.

At the EISCO company we still hadn't any tools. So the day was spent by run around the company searching for ordinary tools to be used for the assembly, attachments, torque wrenches etc.

WEDNESDAY, 21 FEB

Sent a fax to Wincon, requesting the enviromental conditions for - the Red Sea cost, from the hotel about the problem with the never ending problem about tower painting. Mr Dia Tentawi had suggeted that we should try to by the painting according to enviromental conditions instead of trying to find the special types of paiting.

To speed up the assembly process, I together with Tarak went to a district where a lot of tool-shops could be found in Cairo. I bought a set of Attachments 6-32 mm, one fixed-wrench 36/41 mm suitable for bolts M24/M27, one bacho 10 mm key and blade-measurements 0.05-1.0 mm. All together 160 Eg. pound payed by Wincon to get the assambly of the turbine started.

A meeting was appointed to be held at 10:00 am with ENREA concerning the foundation at the office of Mr Aboraia, EISCO.

Mrs Laila and Civil engineer Ibrahim from ENREA participated in the meeting. Their old drawings was replaced with updated versions for foundation. Mr Ibrahim pointed out that the quality of reinforcement required on the drawings from Dk was unknown in Egypt. I informed Mr Ibrahim that I had to retrieve some additional information (see Fax # 3 - 21.02.90) about the reinforcement from Dk to be able to replace it with some local produced reinforcement.

THURSDAY, FEB 22

We went downtown again this morning to buy some coating to cover the machined surfaces on the nacelle frame with.

Went up to the Unido Administration office and talked with Mrs Sarwat which luckilly had received the confirmation (from Jan Haahr) that allowed me to cash some more money.

According to earlier information the chairman of EISCO, Mr Dia Tantawi and some other important people would come at 12:00 for inspection of the assembly process. When the clock was 1:30 pm I went to the office to write some papers. Of cause they had to come while I was away.

EISCO did not have the facilities to determine the yield point of the anchor bolts at the factory so instead of the yield point 420 MPa the requirements was changed to a Brinelli hardness of 200 HB or more after heat treatment. The obtained bolt material will correspond to a bolt quality similar to 7.6.

FRIDAY, FEB 23

Free day. I called Wincon concerning the reinforcements of foundation.

SATURDAY, FEB 24

I recieved a fax with some information of reinforcement used the foundation. The yield point was as high as 550 MPa. The closest quality available on the Egypt market would be tentor Steel St-52. In order to use this steel the diameter of reinforcement had to be increased. A confirmation about the change of steel quality and dimensions was written and sent to Mrs Laila (see Fax # 4).

SUNDAY, FEB 25

The work in assembly shop was slow.

9:00 pm Kharliffa, Ahmed Abdul Hassan and I fetched Jan Haahr at the airport.

MONDAY, FEB 26

Meeting at 10:00 with Laila at ENREA. The troubles with the wind turbines erected at 1988 in Ras Ghareb was discussed. Mr Gilbert, Mrs Laila and some engineers joined the discussion. We were informed that an American investigation had tried to found out about the errors of the wind turbines. There main point for yaw system was that the yaw motors were to weak. This conclusion was wrong. They had not noticed the unconnected yaw brake on top of motor at all.

At about 12 o'clock noon we meat the chairman for ENREA Mr Sharif El-Din and some others (Mr Mohammed Aref ?). Posters for the exhibition which is to begin the 13:th of march was delivered. A Wincon video tape, which ENREA could take a copy of to show at the exhibition was also handled over.

TUESDAY, FEB 27

At 12 o'clock we meat Mr Dia Tentawi, Sharif El-Din and prof.Dr. ing. Amin Mobarak among others in an EISCO office located in the centre of town.

It was stated by Sharif El-Din:

Unit #1 The first wind turbine delivered by Wincon in pieces, except the tower which is produced by EISCO, will be erected in first week of may.

Unit #2-3 Will have original gear boxes, slewing rings and the same tower as unit #1.
Nacelle-frame and main shaft will probably being locally manufactured.

Unit #4-6 Will be supplied with gears manufactured partwise locally ?.

WEDNESDAY, FEB 28

Jan and I arrived to EISCO at 9:00 am. The preliminary assembly shop for unit #1 was showed to Jan Haahr.

We also had some 30 minutes to see Mr Aboraia before the meeting 10:00 with Mr Dia Tentawi.

Discussed items:

- Assembly shop
- Future plans
- Further informations. Information (Drawings, specifications etc.) which will be delivered by Wincon before the contract is finished.
- A list from EISCO was also handled over concerning these things

/W/

Januar 2nd, 1990.

Price-list for components, to be uset for calculation of windturbine, Type Wincon W 110/W 110 Xt. Prices in US $

Component:	Price:	Labor hours:	Freight in DK:	Total:
Rotorblades 9 m Type MAT	18.750		235	18.985
Spinner	252		4	256
Fixtures f.Spinner	12			12
Rotor Hub	1.725		39	1.764
Extenders-casted	1.955		50	2.005
Backflanges	241		12	253
Main ax	710		11	721
Main bearings	571		2	573
Housing f.bearings	1.163		2	1.165
Grease for "	41		2	43
Gearbox/Flender	11.209		90	11.299
Generator/ELIN/BBC	6.795			6.795
Centaflex-coupling	732		18	750
Momentstag	82	1,5 h.		82
Ringfeder scrink elm	270			270
Ringfeder scrinkplate	397		15	413
Distance-element	70		2	72
Brake-disk	475		10	485
Brake-calipers (two)	1219		30	1.249
Caliper-consol	201	5,5 h		201
Yawgears incl.brake	3.447		27	3.474
Yawbearing "R.Erde"	2.933		37	2.970
Toothwheel for yaw	273		5	278
Cover f.yaw wheel	11		1	12

Nacelle-frame compl.	2.374	25,5 h	86	2.460
Tower complete	16.312	3,5 h	344	16.656
Noise damper cnl.	90		2	92
Nacelle cover cpl.	1.618	2,2 h		1.618
Air-intake	60		2	62
Miscl.fixtures	110	6,1 h		110
Control panel excl. computers	5.860	52,6 h	66	5.926
Computers f.panel	4.883			4.883
Cables	1.797			1.797
Safety belt	288			288
Bolts and miscl.	808			808
Montage - el system		7,2 h		
" nacelle cover		6,3 h		
" yaw system		4,2 h		
" transmission		6,3 h		
" bearings		2,1 h		
" nacelle cover at nacelle		11.2		

Components to be imported to Egypt!
for the production of 100-[illegible]/EGY Type [illegible] 110

Component per unit	Price/unit US$	Total 100 units
Main bearings	571	57.100
Gearbox flanges	11.209	1120.900
[illegible]	6.795	679.500
Cardan-coupling	732	73.200
Ringfeder [illegible] element/[illegible]	270	27.000
Ringfeder " plate/disc	397.	39.700
Brake-disc	485.	48.500.
Brake-calipers	1249.	124.900.
Components f. control panel	5860	586.000
Computer f. control unit	4883	488.300.
Total/unit	$ 32.451	
Total 100 units		$ 3245.100.-

Cairo, 27th February 1990

[signature]

Telex

65120 Wincon DK

Dear Mr. Jan Haahr

Refering to your letter dated 2/1/1990.The Container arrived in Alexandria, please send your Authorized Manager to be present while opening the a.m. container according to your requirement. please notice that the container should be empty and returned at least 7 days of arrival, any delays concering the availability of your authorized manager, plus-additional cost for container rent will be for your account.

Best regards,

27.1.90

Chairman
Eng. Dia Tantawi
ESICO

9.111cv

WINCON, Wincon Wind Energy, Hagenstrupvej 38, DK 8860 Ulstrup

TELEFAX TRANSMITTAL FORM

Wincon No:

Date: 01.02.1990 Time: 15,15 Operator: JH

To : EISCO, Tebbin, Helwan,Cairo Attn: Mr. Dia Tantawi, Chairman

From: WINCON, Wincon Wind Energy, Denmark: Jan Haahr

Number of copies including this form: 1

Our machine is a CANON FAX 520 (GR. II and III capabilities) with autoreceive. Our fax no. is: 45-6-46-44-34. Please advise if any part of this transmission is illegible or if any pages are missing by using phone-no: (DK) 45-6-46-33-22.

---------- 0 ----------

To fax no. 009 202 791546

Dear Mr. Tantawi,

Tank you for your telefax dated 30.01.1990.

Our Project Manager - Mr. Tomas Lyrner, will depart from here on monday 5th and arrive at the Airport in Cairo, flying Swiss-Air- 19,45 Monday evening.

We have asked Mr. Helge Pedersen, to make Hotel reservation at the : Hotel President, 22 Taha Hussein St. Zamalek, Cairo from monday night.

Will you please send one of your engineers knowing T. Lyrner to pick him up in the Airport and arrange further local transportation.

Tomas Lyrner expect to start-up the planned guidance and supervision on the manufacture of the prototype imediately after the un-packing of the container.

I will try to come to Cairo later next week to see you, and have your opinion about the meetings with the Danish delegation from "Danida".

Best regards,

Jan Haahr

89-12-24 12:41

65120 WINCON DK
20176 solb un
cairo : 24 . 12. 1989 . tlex no . 108/ma
attn . mr . jan . naanr
---

thank you for the kind reception , hospitality and helpful training program of our engineers at your plants with refrence to unido project dp/ egy/ 88 / 001 for the design and manufacture of wind turbines in egypt , please confirm that :-

1- item 2- 2d includes the delivery of all required special equipment and special tool components not to be manufactured in egypt for example torque wrench , testing equipment , pneumatic wrench .... act .

2- all the above mentioned parts should be ready before starting assembly and errection of the pilot manufacture of prototype .b. regards.

nadisolb eng . dia tantawi chairman .

65120 WINCON DK
20176 solb un
mmmm
v

1:59 045

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90-01-03 10:47
091201764+
20176 solb un#
20176 solb un
65120 WINCON DK

DATE: 02.01.1990.

TO: EISCO
MR. DIA TANTAWI, CHAIRMAN
FROM: WINCON, DK
JAN MAAHR

RE: YOUR TELEX NO. 106/24.12.89/INT:EGY/88/001-
DELIVERY OF SPECIAL EQUIPMENT AND TOOLS.

IN ACCORDANCE WITH OUR OFFER AND CONTRACT WITH UNIDO NO. 89/ST/GVL.
OUR DELIVERY OF EQUIPMENT WILL BE AS LISTED UNDER ITEM (2.2.0.1).
ANNEXURE TO QUISTIONNAIRE AND BUDGET FORMS.
COPY OF THIS LIST WAS GIVEN TO YOUR MANAGERS AND ENGINEERS ~~AT~~
TRAINING DURING VISIT IN DK.

TORQUE WRENCH, PNEUMATIC WRENCH AND ELECTRICAL AND MECANICAL
TESTING EQUIPMENT IS NOT INCLUDED IN OUR DELIVERY.

THE TEST-STATION FOR CONTROL PANELS IS IN THE LIST FOR DELIVERY
[illegible] TOGETHER WITH COMPONENTS FOR THE 100 WTT'S.

BEST REGARDS

JAN MAAHR, WINCON.

20176 solb un
65120 WINCON DK

09120176+
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20176 eolb un
65120 WINCON DK

TO: DIA TANTAWI CHAIRMAN
FROM: CARSTEN H PEDERSEN, WINCON

THE FOLLOWING TELEX IS SENT TODAY TO DR. TADLAWI.

TO:DR. TADLAWI
FROM: CARSTEN H PEDERSEN
REF: PROJECT EGY/86/001/B/0137 MANUFACTURE OF WIND TURBINES FOR ELEC.
GENERATION.

THE SOIL CONDITIONS FOR THE FOUNDATION CAN BE SEEN ON DRAWING
0400220E, SEND TO EISCO FROM HERE 27.9.89.

THE SOIL CONDITIONS ARE:
SAND AND GRAVEL: FRICTION ANGLE =30 DEGR.

CLAY: FRICTION ANGLE APP. 0 DEGR
CU, BETTER THAN 50 KN M2

[illegible]

[illegible]

THE COMPLETE FOUNDATION DRAWINGS HAS BEEN SENT TO EISCO [illegible]
FROM HERE [illegible], 1989.

[illegible]
[illegible]
[illegible]

09121918+
90-01-03 09:50
09121918+
21918 sonra un+
21918 sonra un
65120 WINCON DK

TO: DR. TABLAWI
FROM: CARSTEN H PEDERSEN
REF: PROJECT EGY/88/001/B/0137 MANUFACTURE OF WIND TURBINES FOR ELEC.
GENERATION.

THE SOIL CONDITIONS FOR THE FOUNDATION CAN BE SEEN ON DRAWING
0-032206, SEND TO EISCO FROM HERE 27.9.89.

THE SOIL CONDITIONS ARE:

SAND AND GRAVEL: FRICTION ANGLE =30 DEGR.

CLAY: FRICTION ANGLE APP. 0 DEGR
CV, BETTER THAN 60 KN/M3

SOIL TO COVER FOUNDATION: WEIGHT AT LEAST 1600KG/M3

SOIL WATER LEVEL LOWER THAN BOTTOM OF FOUNDATION.

THE COMPLETE FOUNDATION DRAWINGS HAS BEEN SENT TO EISCO BY CONTAINER
FROM HERE IN DECEMBER, 1989.

BEST REGARDS
MANAGER, R AND D DEPARTMENT
M.SC. CARSTEN H PEDERSEN

[illegible]
21918 sonra un
65120 WINCON DK

TITLE PAGE.

July 27th, 1990.

Manufacture of Wind-turbines for electricity Generation

DP/EGY/88/001 - Contract no. 89/57/GYL.

EGYPT

5th Interim Progress Report for the period:

March 16th to July 25th, 1990.

Prepared for the Government of Egypt
by the United Nations Industrial Development Organization,
acting as axecuting agency for the United Nations Development Programme.

Based on work of Wincon Wind Energy ApS.

under UNIDO Contract No.89/57.

Report made by: Director Jan Haahr.

Executing Officer: D. Gardellin, Director General Services
Division, Department of Administration.
UNIDO
P.O.Box 300
A-1400 Vienna
Austria.

1. On June 10th, we received a telefax from the EISCO / Mr.Ahmed Abu Raya, that the foundations was allready finished since mid. of May and that the tower for the prototype WTG including painting would be ready for erection in the third week of June 1990.

   Our chief-engineer, and manager for activities in the factory in Denmark Mr. Carsten Høybye Pedersen, answered by telefax on June 13th, that our team would be ready for departure from DK and arrival in Cairo in week 26.(June 25th) for the final testing in the Helwan Factory and for supervising of erection and commissioning of the prototype at Hurgada.

   On June 14th, we received a telefax from EISCO, that our visit in the time from June 25th, Due to the Holly Feast vacations was inconvenient, and asked us to indicate a new date after the vacation period.

   On July 17th, we informed EISCO that our team was ready for arrival in Cairo in week 32.(5/6th of August) and asked for EISCO's approval of the new date.

   On July 24th, we asked one more time for the approval of our visit in the time from August 5/6th.

   On July 24th, we received a telex from UNIDO in Vienna with questioning us to send our team to EISCO at our earliest convenience.

   On July 24th, we informed UNDP, Cairo about the communication and planning for the our team's visit for final testing and commissioning of the prototipe.

   On July 31st, we informed EISCO, that our team will arrive at the Cairo Airport, Sunday 5th, Hour 20,55, and asked one more time for the EISCO confirmation for our visit, we need badly this confirmation to be sure, that all necessary tools and equipment will be available by our arrival.

2. On June 22nd, we received a request for delivery of components for the next 3 WTG's from UNIDO in Vienna, No EGY/88/001, Req. 90/3, 90/5 and 90/6.

   On June 27th, we offered our best prices for the delivery of requested components, to be delivered in best case in 16 weeks from day of order.

   CONCLUSIONS:

   The time from our team's last departure from Cairo till time for final testing and erection, have taken more time than expected, in February we was told that it was very important, that the prototype was commissioned before end of May. But we know, that the first WTG's will take more time than we are uset to.

During my stay in February, I was promised, that a new established and clean factory would be ready at our arrival for erection and commissioning, to make it possible to manufacture the next units in proper facilities, we look now forwald to see theese facilities for our approval.

Ulstrup, July 31st, 1990.

Wincon Wind Energy ApS.

Jan Haahr - Director.

Copies following:

1. Telefax from EISCO dated 10.06.1990.
2. Our telefax dated 13.06.1990.
3. EISCO telefax dated 14.06.1990.
4. Our telefax dated 17.07.1990.
5. " " dated 24.07.1990.
6. Telex from UNIDO dated 24.07.1990.
7. Our telefax dated 24.07.1990.
8. " " " 31.07.1990.
9. Request for delivery of components for WTG's.
10. Our offer for the delivery of WTG-components.

[illegible] DENMARK

Fax. No. 45 - 86 - 46 - 44 [illegible]

Atten. Mr. Jan Haahr
cc Mr. Carsten Hoybye Pedersen
cc Mr. Tomas Lyrner

Refering to your faxs No. 629,675 dated 23/3 and 9/[illegible]/1990 respectively we inform the following :

1- The foundations have already been finished since mid of May and the tower of the wind mill (painted) will be ready [illegible] the third week of June 1990.Please arrange for your group arrival to Cairo as early as possible.
Your comming group should include an electrical engineer and an erection expert.Please inform us in advance to recieve them at the airport.

2- Concerning the quality of polyamide ,please provide us with preliminary information about the types,dimensions and shapes that may be suitable for the modified design of the slewing ring, (yaw system) in order to look for in the Egyptian market.

3- EISCO.'S productions of galvanized light sheets are 1000 x 2000 mm but we can galvanize sheets with widths of 1000mm and lengths of up to 4000mm in other factories. Please deliver the modification of the cover design of wind mill according to our light sheets production.

Thanks for your cooperation ,best regards,

Eng. Ahmed Abu Ray[illegible]
9/6/90
Head of spare parts production sector

10.6.1990

TOTAL P.[illegible]

WINCON
Phone 45 86 46 33 22
Telex dk 65 120
Telefax 45 86 46 44 34

WINCON, Wincon Wind Energy, Hagenstrupvej 38, DK 8860 Ulstrup

TELEFAX TRANSMITTAL FORM

Wincon No: 709

Date: 13/6-90 Time: 8^{00} Operator: JN

To : EGYPTIAN IRON & STEEL Attn: Eng. Ahmed Abou Rayya

From: WINCON, Wincon Wind Energy, Denmark: Carsten Høybye Pedersen

Number of copies including this form: 1

Our machine is a CANON FAX 520 (GR. II and III capabilities) with autoreceive. Our fax no. is: 45-86-46-44-34. Please advise if any part of this transmission is illegible or if any pages are missing by using phone-no: (DK) 45-86-46-33-22.

---------- 0 ----------

Subject: Erection of WTG.

We are planning to send a team to arrive in Cairo early in week 26, that is about the 25th of june. But because of vacations and other projects, the time limits are very tight, and the team must be back in Denmark not later than friday the 6th july. To keep this schedule everything must be ready in Egypt.

All tools, lifting equipment, cranes etc. (according to the ERECTION MANUAL) must be at the site. The power must be connected to the WTG. The tower, controller, blade and nacelle must be ready and transported to the site.

To go on with our plans, we must have a quick confirmation that everything is ready.

Best Regards

Carsten Høybye Pedersen

C.R. 69394 Cairo
I.R. 634

شركة الحديد والصلب المصرية

سجل تجارى ٨٩٣٩٤ القاهرة
سجل صناعى ٦٢٤

EGYPTIAN IRON & STEEL Co. S.A.E.

Date :
Our Ref :
Your Ref :
Subject :

التاريخ :
رقم إحالتنا :
رقم إحالتكم :
الموضوع :

Fax No.: 4586464434 Denmark 14.6.90

Att : Mr Jan Haahr

Ref to your fax dated 13/6/90, please be informed that the period from 25th of June to 6th of July, Due to the vacations you have in Denamark, we are facing the same for our Holly Feast vacations.

Please indicate a new starting date after the 6th of July The mission task should cover commissioning, performance, test, operation ... etc. as agreed upon with (NREA).

Considering items 2 and 3 of our fax dated 10.6.90 , we are still waiting your reply.

Eng. Ahmed Abou Raya
Head of Spare parts
Production

Head Office & Tabbin Works : Helwan Cairo, (A.R.E.) Tel. : 39090-99
Aswan Mines : Tel. 235-237-272
Cairo Office : P.O. Box 746. Tel. 911980/911852/911500
Alexandria Office : 5 Salah Salem St. Tel. 24722
Teleg. Address : HADISOLB
Telex : 92007 U.N.

للمركز الرئيسى والمصانع بالتبين (مكتب بريد حلوان) تليفون ٣٩٠٩٠٩٩
مناجم أسوان : تليفون ٢٣٥ - ٢٣٧ - ٢٧٢
مكتب القاهرة : ١٤ شارع عبد الخالق ثروت - تليفون ٩١١٩٨٠ - ٩١١٨٥٢ - ٩١١٥٠٠
مكتب الإسكندرية : ٥ شارع صلاح سالم - تليفون ٢٤٧٢٢ - ٨٦٥١٥٠ - ٨٦٥١٦٠
العنوان التلغرافى : حديصلب - ص.ب ٧٤٦ - القاهرة
رقم التلكس : ٩٢٠٠٧ القاهرة

نموذج رقم ١١٨٩ (١١/٤١٠٠)

Wincon
DK-8860 Ulstrup · Denmark
Phone 45 86 46 33 22
Telex dk 85 120
Telefax 45 86 46 44 34

WINCON, Wincon Wind Energy, Hagenstrupvej 38, DK 8860 Ulstrup

TELEFAX TRANSMITTAL FORM

Wincon No: 737

Date: 17/7-90 Time: 12.30 Operator: CHP

To :EGYPTIAN IRON & STEEL Attn: Dia Tantavi and Ahmed Abou Rayya

From: WINCON, Wincon Wind Energy, Denmark: Carsten Høybye Pedersen

Number of copies including this form: 1

Our machine is a CANON FAX 520 (GR. II and III capabilities) with autoreceive. Our fax no. is: 45-86-46-44-34. Please advise if any part of this transmission is illegible or if any pages are missing by using phone-no: (DK) 45-86-46-33-22.

---------- 0 ----------

Subject: Erection of WTG.

We are planning to send a team to arrive in Cairo early in week 32, that is about the 6th of August.

The team will consist of Bent Pedersen, electrician and erection expert, and my self. During our visit I hope that we also can discuss the preliminary design of the new yaw system, I have made some sketches that show the way I think it can be done.

Please confirm that this arrival time is OK and all equipment is ready.

Furthermore I shall give the telephone number for Mr. Jan Haahr private : +45 86 63 86 42 and for Wincon office : 86 46 33 22

Best Regards

Carsten Høybye Pedersen

FROM 45 88381846 '90.07.24 14:05

PRI GTK-0191 9007241113 VAI-0070 9007241130 ..NO SOM
901ATB ATE6TO 6
ZCZC SDK296 TS6648 CCI333
DKCX HL UTNY 135
NEW YORK TELEX 135/129 24 0503

LT
WINCON WIND ENERGY APS
HAGENSTRUPVEJ 38
8860 ULSTRUP DENMARK

VIENNA (UNIDO) 20 JULY 1990 /10.10
34525 ATTN. HAAR RE DP/EGY/88/001 - UNIDO CONTRACT NO. 98/57
1) WE HAVE RECEIVED THE FOLLOWING TELEX FROM UNDP EGYPT:
QUOTE MISC 1132 - SEIDEL EGY/88/001 - MANUFACTURE OF WIND
TURBINES FOR ELECTRICITY GENERATION. EISCO REQUESTING WINCON
ELECTRICAL/ELECTRONIC ENGINEER TO CHECK PANEL BEFORE START UP
PILOT TURBINE. PLEASE EXPEDITE AND CABLE ETA. REGARDS.
MERCADER, RESREP UNDP UNQUOTE
2) MAY I ASK YOU (IN ACCORDANCE WITH CLAUSE 1.02 6 OF OUR
CONTRACT WITH YOU) TO TRAVEL TO EISCO AT YOUR EARLIEST
CONVENIENCE. KINDLY CABLE YOUR ETA TO UNDP CAIRO, EGYPT (TELEX
92034 DP UN, TELEFAX: 202 3402 638) WITH A COPY TO US.NA (UNIDO) 20 J
(C.WALKER, UNIDO VIENNA TLX 135612 UNO A)

NNNN

8646322
nr. 1158

8646434

WINCON, Wincon Wind Energy, Hagenstrupvej 38, DK 8860 Ulstrup

TELEFAX TRANSMITTAL FORM

Wincon No: _____

Date: 24.07.1990 Time: 16,30 Operator: JH

To : UNDP, Cairo Attn: Mr.Tharwat Sabry

From: WINCON, Wincon Wind Energy, Denmark: Jan.Haahr

Number of copies including this form: _____

Our machine is a CANON FAX 520 (GR. II and III capabilities) with autoreceive. Our fax no. is: 45-6-46-44-34. Please advise if any part of this transmission is illegible or if any pages are missing by using phone-no: (DK) 45-6-46-33-22.

---------- 0 ----------

Re.: Contract DP/ EGY/88/001 - Manufacture of Wind-turbines for Electricity Generation i Egypt.
Your Telex/Telefax and telefax from UNIDO i Vienna dated 90.07.24.

In accordance with agreements made during my last visit in Cairo, we have been ready to send our staff to Ca for the final testing of the control panel and for the er on of the prototype WTG since April 15th, and ready to a e immediately after the message from EISCO, that the foundation, tower and power line was ready for the erection and commissioning.

In june we was informed, that EISCO would bc ready in the second half of June, and we informed that we would arrive in Cairo in week 26 (approx.June 25th.)

At June 14th we received a telefax from EISCO, that the planned time from June 25th to July 6th was not acceptabel due to the Holly Feast vacations in Egypt.

Therefore we have planned to arrive in Cairo in week 32.(5th or 6th of August). We are still missing the confirmation from EISCO that our arrival time is OK, please help us to get this confirmation.

Best regards,

Jan Haahr

Copy of telefaxes: 3

WINCON, Wincon Wind Energy, Hagenstrupvej 38, DK 8860 Ulstrup

TELEFAX TRANSMITTAL FORM

Wincon No: _____

Date: 24.07.1990 Time: 13,00 Operator: jh

To : Egyptian Iron & Steel Co. Attn: Eng.Ahmed Abou Raya ~~pector Spare Parts Prod.~~

From: WINCON, Wincon Wind Energy, Denmark. ~~Jan Haahr~~

Number of copies including this form: 1

Our machine is a CANON FAX 520 (GR. II and III capabilities) with autoreceive. Our fax no. is: 45-6-46-44-34. Please advise if any part of this transmission is illegible or if any pages are missing by using phone-no: (DK) 45-6-46-33-22.

---------- 0 ----------

Your telefax dated 1990-07-22.

Re.: Delivery of one unit casted Hub and three extenders.

The hub shall be fitted in the prototype for erection here in the beginning of August.

The extenders is a part of the total agreed delivery to be stored in stock until further.

Please inform us immediately if you are ready to receive our Carsten H. Petersen and Bent Petersen for the final testing, erection and commissioning of the prototype here in the beginning of August as mentioned in telefax from Carsten H. Petersen dated: 1990-07-17.

Best regards,

Jan Haahr.

WINCON, Wincon Wind Energy, Hagenstrupvej 38, DK 8860 Ulstrup

TELEFAX TRANSMITTAL FORM

Wincon No: _____

Date: 31.07.1990 Time: 13,30 Operator: JH

To : Egyptian Iron & Steel Co. Attn: Eng.Ahmed Abou Raya

Sector Spare Parts Prod.

From: WINCON, Wincon Wind Energy, Denmark: Jan Haahr

Number of copies including this form: 1

Our machine is a CANON FAX 520 (GR. II and III capabilities) with autoreceive. Our fax no. is: 45-6-46-44-34. Please advise if any part of this transmission is illegible or if any pages are missing by using phone-no: (DK) 45-6-46-33-22.

---------- 0 ----------

Your telefax dated 1990-07-22/ our dated: 24.07.1990.

Re.: Final testing and erection of the prototype WTG.

In accordance with our telefax dated as above, Carsten H. Petersen and Bent Petersen will arrive at the Airport in Cairo with SAS fleight no.SK 783, on Sunday 5th - 20,55 Hour.

They will bring the two control computers for the allredy delivered panels, please send the necessary help to get theese components through your control-authorities and customs.

Please take care of Hotel reservation, and try to get 2 single rooms in: Hotel President, 22 Taha Hussein St. Zamalek. Phone 3400652, for as many days you may need for the final testing before departure to Hurgada.

I will try to find time for a short visit in week 33, to participate in the start-up og your first machine.

Please confirm that our visit is convenient and Hotel Reservations is made.

Best regards,

Jan Haahr.

UNIDO

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
P.O. Box 300
A-1400 Vienna, Austria

PLEASE DELIVER IMMEDIATELY TO ADDRESSEE

FACSIMILE TRANSMISSION

IN CASE OF INCOMPLETE TRANSMISSION, PLEASE CALL THE CONTACT PERSON BY PHONE OR BY FAX LISTED BELOW

To:

WINCON WIND ENERGY APS
ULSTRUP
DENMARK

86419875
86463509
0045 86 44 34

Facsimile No. ~~XXXXXXXXXX 476 46 14 34~~

Drafted by/Contact person	Authorized by
R. Schneider	R. Logan
Telephone/Extension: 211 31 / 4849	Facsimile No.: (222)2307640
Our reference: EGY/88/001	Your reference:
Date: 21 June 90	Account to be charged:
TRANSMISSION No.:	This page No. 1 of 2 pages

ATT. EXPORT DEPARTMENT

WE WOULD APPRECIATE RECEIVING BY RETURN YOUR BEST PRICE AND DELIVER TIME C+F ALEXANDRIA EGYPT (FREIGHT CHARGES QUOTED SEPARATELY) FOR THE EQUIPMENT SPECIFIED IN THE ATTACHED SHEET(S).

THKS, RGDS

LOGAN/SCHNEIDER
CHIEF
PURCHASE SECTION

Wincon
Hagenstrupvej 38
DK-8960 Ulstrup - Denmark
Phone 45 86 46 33 22
Telex dk 65 120
Telefax 45 86 46 44 34

United Nations Industrial Development
Organization
P.O.Box 300
A-1400 Vienna/Austria.

Ulstrup, June 27th, 1990.

att. Mr. Logan / Schneider
chief Purchase Section.

Re.: Your telefax dated June 21st, 1990
EGY/88/001 - Request 90/3, 90/5 and 90/6
Components for local production of windturbines in Egypt.

Hereby please find our best prices for the delivery of components in accordance with your request of June 21st, 1990.

Request 90/3

Item	Quantity	Description/Specification	Price each in DKK	Price Total in DKK
1	1	RS-232 print card/outport for wind turbine	500	500,-
2	1	PROCOMM Software	500	500,-
3	1	Analysis programme in Language Turbo Pascal	5000	5.000,-
4	1	Spinner for rotor	1830	1.830,-

Request 90/5

1	3	Main bearings	4097	12.291,-
2	3	Housing for bearings	8330	24.990,-
3	3	Gearbox, Flender	80788	242.364,-

Item	Quantity	Description/Specification	Price each in DKK	Price total in DKK
4	3	Generator, Elin/BBC	48585	145.755,-
5	3	Centaflex coupling	5363	16.089,-
6	1	Ringfeder, scrink element	1930	1.930,-
7	1	Ringfeder, Scrink plate	2953	2.953,-
8	3	Brake disk	3468	10.404,-
9	3	Brake caliper	8930	26.790,-
10	3	Yawmotor incl.yaw wheel	24839	74.517,-
11	3	Components for control panel	41899	125.697,-
12	3	Computer for control system	34913	104.739,-
Request 90/6				
1	1	Rotor hub, casted steel	12613	12.613,-
2	1	Extenders, casted, 1 set	14335	14.335,-
3	1	Steel for three main shafts	2500	7.500,-
		Price total for package.....DKK.		830.797,-

Time of delivery: Gears "Flender", can be delivered in 1st week og December if ordered before July 6th, 1990.

All other components can be delivered 16 weeks from day of order and accept of l/c for payment.

Transportation to Alexandria: All components shipped in a 20' container C+F Alexandria.

Price.....DKK 14.700,00

Terms of payment: 40 % by order
60 % against shipping documents.

/W/

Most components are delivered from Germany, where time of delivery are increasing from week to week. Please inform us, if possible next week, if the components need to be delivered this year.

Best regards,

Jan Haahr
Director.

Wincon Wind Energy ApS
Hagenstrupvej 38

TITLE PAGE. September 12th, 19

Manufacture of Wind-turbines for electricity Generation DP/EGY/88/001 - Contract no. 89/57/GYL. EGYPT 6th Interim Progress Report for the period: July 26th to Sep. 12th, 1990.

Prepared for the Government of Egypt
by the United Nations Industrial Development Organization, acting as axecuting agency for the United Nations Development Programme.

Based on work of Wincon Wind Energy ApS.

under UNIDO Contract No.89/57.

Report made by: Director Jan Haahr.

Executing Officer: D. Gardellin, Director General Services Division, Department of Administration.
UNIDO
P.O.Box 300
A-1400 Vienna
Austria.

1. On August 05th, our Engineers Mr. Carsten H. Pedersen and Mr. Bent Petersen arrived at the airport in Cairo for the final control, erection and commissioning of the first prototype WTG assembled in Egypt.

Mr. Carsten H. Pedersen's report for the visit is enclosed under annex.no.1.

To hold meetings with NREA and EISCO, and for participation in the erection and commissioning of the Egypt prototype WTG, the undersigned was in Egypt from August 11th to August 15th.

On Sunday 12th, I had a meeting in NREA with the chairman Mr. Hafez Sharaf El-Din for the planning of a visit at Hurgada during the time of erection and commissioning, and for preparation of the next stage of the project. Mr. Hafaz Sharaf El-Din was not able to leave Cairo during theese days, but arranged transportation for me to the site.

I visited the UNDP office in Cairo with aim to visit Mr. Tharwat Sabry and give a report for the stage of the project, but was unable to find Mr. Sabry as he was out of town.

CONCLUSIONS:

The mecanical work for the assembling of the prototype WTG, and the manufacture of the tower at the EISCO Factory in Cairo was well done, the manufacture of rotorblades at the Suez -canal ship yard was exelent but the installation of the electrical parts and cables in the nacelle and control panel can be better.

There is no doubt, that the two factories can produce/assemble WTG's of the type included in this project, but it will absolutely be necessary, also in the future to import the main components from Germany as we do to-day.

The new cleaned factory-space, as promised from the beginning of the project and mentioned in report no.5, was still not available. If a production of more WTG's in series will be established it is very important to get this space before the assembling will be started.

Ulstrup, September 12th, 1990.

Wincon Wind Energy ApS.

Jan Haahr - Director.

A N N E X N O. 1 .

Report on Mr Bent Petersen's and Mr Carsten H. Pedersen's visit at Cairo and Hurghada the 5/8-17/8 1990 with the purpose of erecting the first WTG.

DP/EGY/88/001, UNIDO contract No. 89/57.

Before our departure we sent a telefax to Mr Ahmed Abou Rayya, EISCO, with the schedule for the visit. We also tried to send the schedule to Mrs. Laila Saleh, NREA, but it was not possible to get a connection.

Schedule:

Monday and Tuesday the 6/8 and 7/8:
Inspection of the WTG at EISCO at the Helwan factory.

Wednesday and Thursday the 8/8 and 9/8:
Transportation of the WTG to the place of erection.

Saturday, Sunday and Monday, the 11/8, 12/8 and 13/8:
Erection of the WTG and connection to the grid.

Tuesday the 14/8:
Tests etc.

Wednesday the 15/8:
Commissioning.

Sunday, 5/8.

We arrived at the airport in Cairo late Sunday evening and were met by two representatives from Egyptian Iron & Steel Co. (EISCO) and were driven to the hotel.

Monday, 6/8.

We were picked up at 8.30 am by Mr Hamdi from EISCO and driven to the EISCO factory.
Here we were welcomed by Mr Ahmed Abu Rayya, Head of spare parts production sector, and informed of the state of the project.
Mr Abu Rayya had forwarded the schedule for the visit to Mrs. Laila Saleh. We were also informed that NREA was responsible for the transport and that the transport would take place at the time stated in the schedule.
After that we went to check the tower and the nacelle.
The tower is completely produced at EISCO. Main dimensions were checked and found ok. The only remark was that also the upper flange was painted. That is not permissible. An overall impression of the tower was that it was a good tower, although the finish of the painting was not so good.
The nacelle was assembled when Mr Tomas Lyrner was at the factory in the spring. All the mechanical mountings and connections were finished. The uplining of the generator had been done after Tomas Lyrner's visit. We checked it carefully, also after the erection and start of the turbine, and the uplining were very good.

The electrical connections in the nacelle were not finished, so it was not possible to check the connection. We were told that the electrical connections would be made for the next day, Tuesday.

At app. 4 pm. we left the factory, and went on a guided tour to some of Cairo's attractions. After that we went to the hotel.

Tuesday, 7/8.

We were picked up just before 9 am. and arrived at the EISCO factory at app. 10 am.
After a short visit to Mr Ahmed Abu Rayya, we again inspected the tower to see if the paint on the upper flange has been removed. That was ok, and the tower was ready for transportation and erection.

Then we inspected the nacelle again. The connections to the top-box were mounted. Mr Bent Petersen (BP) checked the connections and found only a few minor faults. The electrical connections to the little box behind in the nacelle had still not been mounted.
The relief for the cables has also not been mounted.

Wednesday, 8/8.

We were picked up at app. 8 am and we arrived at the EISCO factory at 9 am.
According to the schedule the transportation should start on Wednesday and the tower and the turbine should be ready for erection on Saturday at Hurghada. We were informed by Mr Ahmed Abu Rayya that NREA had telephoned and told that the truck for transportation would arrive Thursday instead of Wednesday. A meeting with NREA was planned for 11 am on Thursday, to check the tools and lifting equipment.

When we checked the nacelle, the remaining elictrical connections had been mounted. The relief for the cables had still not been mounted.

Thursday, 9/8.

We arrived at the factory at app. 10 am. We were told that the trucks for transportation would arrive at app. 12 am. and that the meeting with NREA was postponed until the trucks had arrived.
Then we decided to make the last check of the nacelle. The relief for the cables had still not been mounted, so BP decided to mount it himself.
After that we went back to Mr Ahmed Abu Rayya's office, to see if the trucks had arrived. After some time it became obvious that the trucks would not arrive that day. Therefore the meeting with NREA was also cancelled.

Friday, 10/8.

Day off in Egypt.

Saturday, 11/8.

Arrived at the EISCO factory at app. 10 am.
At last the trucks have arrived. The loading of the nacelle and tower started immediately, and at 11 am the nacelle had been loaded. The loading of the tower posed some problems, but at 4 pm the trucks were ready to go.

Then we went to NREA's office together with Mr Ahmed Abu Rayya to check the tools and lifting equipment. When we arrived at 6 pm, the tools and equipment had already been loaded and sent, but we were told that all the tools and lifting equipment specified in the "Erection Manual" would be at our disposal. We were also informed that the foundation and the connection to the grid for the turbine were ready. Furthermore, we were told that NRFA had made reservations for the hotel at Hurghada.

Sunday, 12/8.

We were picked up by the people from EISCO at 9.30 am in order to leave for Hurghada. It was decided that Mr Rabya Abdel Wahab, Mr Samir Mohamed Salem and Mr Hassan Abdel Fattah from EISCO should accompany us to Hurghada to help us if any problems should arise.
At app. 6 pm. we arrived at Hurghada after a very hot trip. We contacted the people from NREA, and they led us to a hotel. For some reason there was only one room, but after some discussion BP and I had single rooms. Then it turned up that there were no hotel reservations for the people from EISCO.
The people from NREA told us that they would come back after an hour so that we could discuss the next days work. But they never turned up.
Instead we aggreed with the people from EISCO that they should pick us up the next day at 8.30 am. and then take us to the site.

Monday, 13/8.

The nacelle, tower and crane were already at the site. The connections for the grid were not finished, the cables had not been put into the foundation, and they had not been connected to the transformer. But NREA promised that it would be done on Tuesday at 8 am.
At 11 am. the tower was erected without any problems.
The nacelle was erected. The chains for lifting the nacelle were not of the correct type (stated in the Erection Manual) so it was not possible the adjust to length of the chains.
Normally the chains must be adjusted in order to have the nacelle to tilt 4 degr. when it is mounted on the tower. But due to a competent

crane driver we succeeded in getting the nacelle mounted.
The windspeed was all the day rather high, 8 - 10 m/s, but between 5 and 6 pm. the windspeed became low. Therefore we decided to continue and to have the blades mounted, when the windspeed was low.
In the Erection Manual the lifting equipment for the lifting of the blades is stated (At least 2 nylon straps, 8m). But there was only one strap, and only app. 3 m. The only possibility to get the blades lifted was to use the security line in the tower.
At app. 8 pm. all the blades were mounted.
We needed a torgue wrench in the correct size for the mounting the blades. The sizes of torque wrenches is stated in the Erection Manual. Instead we had to use a smaller torque wrench and a torque multiplier. This torque multiplier resulted in scratches at the root section of the (very nice) blades.
As a conclusion it must be said that the crane driver was very competent, but the lifting equipment must be of the correct type next time and secondly that the correct tools must be available.

Tuesday, 14/8.

On Monday we were told that the people would start connecting the grid at 8 am. When we arrived at the site at 8.15. together with the people from EISCO, no one was there. Unfortunately, the door in the tower was locked, and we had no key. At 9.15 the first people from NREA appeared, and the door was opened. Together with the people from EISCO we started at once to mount the cables from the nacelle to the controller.
At app. 12 am. the people from the utility started to connect the grid, and the cabling was finished at 14.30. Then BP and Rabya finished the connections to the controller.
Then we had to wait for 1 1/2 hour until the power was switched on.
When the power had been switched on, BP started to check the functions of the turbine. There were some connections that were wrong, and they were corrected.
At 8 pm. the turbine had been running for app. 15 minutes, but we still had some problems with the phase assymetrical and the anemometer.
We aggreed with NREA to start at 8 am. sharp on Wednesday.

Wednesday, 15/8.

When we arrived at the site, no one was there. This time we had a key so BP started at once to find the last errors. It appeared that the problems with the phase assymetrical were due to a faulty connection in the controller, because the computer is the newest version, and the controller was made in Denmark last year.
At 9.15 - 9.30 am. the first people showed up.
During the work we had been helped by the people from EISCO. There were also a lot of peop.e from NREA and other authorities so it was very difficult to find roam for doing anything. All the people were very interested, and they were continously standing in the way.

Then I had a meeting with Mrs Laila Saleh, NREA. She told me that NREA was responsible for the erection and the service and that we should teach 3 engineers from NREA, how to operate the turbine.
Of course, we agreed upon that, if then Mrs Laila Saleh would se to if all the other people get out of our way.
The engineers from NREA were: Mr. Salah Abdel Hafeez, Mr. Yehia Salem and Mr. Hesham Saad Zaghloul.
The turbine was started and it was running very well. But still we could not get any signals from the anemometer. At last we found out that there were some problems between the settings in the computer and the signals from the anemometer. It was not possible to correct that error at the site. We would have to check an anemometer together with a computer of the same version when we got back to Denmark, and then send the necessary spare parts. (When we got back to Denmark, it turmed out that the anemometer was malfunctioning, and a new anemometer was sent by air.)
As the turbine can be running without anemometer we decided to have it running.
We started teaching the engnieers from NREA to operate the turbine.
We aggreed with Mrs. Laila Saleh to have a meeting the next morning at 8.30 am. to discuss the material that NREA wanted us to send. And then we would leave for Cairo in the afternoon on Thursday to get our plane back to Denmark

Thursday, 16/8.

Mrs. Laila Saleh was 3 quartes late, and so was our meeting started.

After some time we went to the turbine to test the data collecting system. The computer in the turbine was connected to an IBM XT and data collecting of the time, the windspeed, the power and the no. of revolutions was started. It functioned at once. After an hour the IBM XT stopped functioning because of the heat. It is necessary to have a room with aircondition.
At 2 pm. we left Hurghada together with the people from EISCO and arrived in Cairo at 10 pm.

Friday, 17/8.

We were picked up early by Mr Hamdi from EISCO, and were driven to the airport.

Wincon, 7/9-1990

Carsten Høybye Pedersen