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KORDIN GRAIN TERMINAL MALTA

(Contract no. 84/05/HR)

AMENDMENT NO. 3 - FINAL REPORT

Report prepared for:

United Nations Industrial

Development Organization (UNIDO)

Vienna, Austria.

8523

January, 1986.

G.E.M. Consultants B.V. - Rotterdam - The Netherlands

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ABBREVIATIONS

G.R.M.	Government of Republic of Malta
M.E.D.	Ministry of Economic Development
D.O.W.	Department of Works / Marine Section
B.M.B.	Bühler Miag Braunschweig
B.B.U.	Bühler Brothers Uzwill
M.S.C.L.	Malta Shipbuilding Co. Ltd.
P.L.	Panta Lesco Malta
B.B.C.	Brown Boveri Cie, Germany
M.D.D.	Malta Dry Docks
M.G.G.	MediGrain
K.P.H.	Milk Producers Co-operative Soc. Ltd.
	K.P.H. Feedmill
P.W.	Public Works
M.S.	Molenschot Breda Holland
H.C.	Hydrau Care Boxtel Holland
M.D.O.	Malta Development Organization

1. INTRODUCTION

In accordance with contract no. 84/05/HR and Amendment No. 3 concerning mechanical and electrical assistance for the Kordin Grain Terminal, Malta, between UNIDO, Vienna and G.E.M. Consultants B.V., Rotterdam, a representative of G.E.M. Consultants B.V. (Mr. J.G. Herrebout) visited Malta during the period September 1st up to and including December 18th, 1985.

This report, reflecting the findings and recommendations, concludes the services required in the contract's Amendment 3.

2. PROJECT ORGANIZATION

G.R.M./M.E.D.	Client
D.O.W.	Government implementing Agency, responsible for the execution of the works on the Grain Terminal Project on behalf of G.R.M.
B.M.B.	Member of consortium and Contractor for design, supply, delivery, installation and commissioning of the facilities and equipment.
M.S.C.L.	Member of Consortium and Contractor who will, in accordance with B.M.B. drawings, manufacture, supply, deliver to site parts of mechanical equipment.
P.L.	Member of Consortium and Contractor who will in accordance with B.B.C. design drawings, supply, deliver and install electrical equipment.
B.B.C.	Subcontractor of P.L. who will, in co-operation with P.L. design and deliver electrical equipment.
M.S.	Subcontractor of B.M.B. for design, delivery and installation of weighing equipment.
H.C.	Subcontractor of B.M.B. for installation of hydraulic equipment.

Persons involved

- Mr. M. Sant	Economic Division Ministry of Economic Development Ass. Principal Secretary, who will act on behalf of G.R.M. as contact person and co-ordinator for the project.

- Mr. C. Cassar Engineer in Charge	Department of Works, Marine Section. Chief Engineer, Marine Works.
- Mr. F. Chachia	Department of Works.
- Mr. J. Mizzi	Department of Public Works Assistant Director
- Mr. M. Camillery	Department of Public Works Electrical Engineer
- Mr. M. Calea	Malta Development Organization Senior Engineer
- Mr. J.P. Abela	Malta Shipbuilding Co. Ltd. Director & Production Manager.
- Mr. M.G. Ellul	Malta Shipbuilding Co. Ltd. Senior Eng. Shipbuilding Div.
- Mr J. Caruana Project Manager	Malta Shipbuilding Co. Ltd. Senior Mechanical Engineer.
- Mr. J. Slerri Ass. Project Manager	Malta Shipbuilding Co. Ltd. Mechanical Engineer.
- Mr. H. Attard	Panta Lesco Ltd. Director
- Mr. O.M. James Project Manager	Panta Lesco Ltd. Projects Electrical Engineer
- Mr. B. Azzopardi Ass. Project Manager	Panta Lesco Ltd. Electrical Engineer

- Mr. Borg	Panta Lesco Ltd.
- Mr. U. Bühler	Bühler Miag Braunschweig Managing Director
- Mr. B. Häni	Bühler Brothers Uzwil Director, Division Manager
- Mr. W. Herzmann Division Manager	Bühler Miag Braunschweig Bulk Material Handling & Storage System
- Mr. H. Krökel	Bühler Miag Braunschweig Engineer Bulk Handling & Storage System
- Mr. E. Janke Project Leader	Bühler Miag Braunschweig Engineer Bulk Handling & Storage System
- Mr. H. Tiedemann	Bühler Miag Braunschweig Engineer Bulk Handling & Storage facilities
- Mr. H. Hartmann	Bühler Miag Braunschweig Erection supervisor
- Mr. O. Karl	Bühler Miag Braunschweig Erection supervisor
- Mr. F. Krumpkamp	Bühler Miag Braunschweig Erection supervisor
- Mr. G. Mueller	Brown Boveri Cie Braunschweig Chief Engineer Industrial Division
- Mr. Seffer	Brown Boveri Cie Braunsweig
- Mr. Greiser	Brown Boveri Cie Hannover
- Mr. Lege	Brown Boveri Cie Hannover

- Mr. W. Eichenberg	Brown Boveri Cie Hannover Commissioning Engineer
- Mr. A. Briffa	MediGrain Board Secretary
- Mr. Ch. Farrugia	MediGrain
- Mr. G. Buttigieg	K.P.H. Feedmill General Manager
- Mr. A. de Boer	Brown Boveri Cie Hannover Commissioning engineer
- Mr. P. Lorenci	Brown Boveri Cie Hannover Commissioning engineer
- Mr. F. v.d. Krabbe	Hydraucare B.V. Holland Service Engineer
- Mr. H. van Tongeren	Hydraucare B.V. Holland Service Engineer
- Mr. J. Struys	Molenschot Breda Holland

3.1. VISIT REPORT

Wednesday, September 4th, 1985

Arrival Malta Airport

Thursday September 5th, 1985

hrs.

10.00 Meeting at Ministry of Economic Development / Economic Division

Present:	Mr. M. Sant	Economic Division
	Mr. A. Briffa	Medi Grain
	Mr. G. Buttigieg	K.P.H. Feedmill
	Mr. J.G. Herrebout	G.E.M. Consultants

- G.E.M. Consultants briefed the meeting concerning the visit made to B.M.B. office on August 15th and 16th, 1985. During this meeting the items to be remedied (see Appendix 1 - Final Report - Progress Report No. 12) have been discussed extensively. The proposals made by B.M.B. concerning the rectifications and modifications were acceptable.
  - . G.E.M. Consultants requested B.M.B. to establish an indicative time schedule as soon as the necessary information from sub-contractors is received,
  - . B.M.B. presented G.E.M. Consultants a preliminary list with delivery dates of the various parts needed for the rectification (see Appendix 1). In view of this information it is estimated that further test runs can be held during second half of October,
  - . G.E.M. Consultants presented B.M.B. a copy of the checklist with all outstanding items.

- Mr. M. Sant received a letter from B.M.B. dated August 12th, 1985, in which B.M.B. mentioned "that successful testrun and commissioning of the installation took place" (see Appendix 2, page 3).

- G.E.M. Consultants disagree with B.M.B.'s statement about successful testrun. The execution of testrun during the period July 15th upto and including July 28th, 1985, were regarded as technically not acceptable.
(See interim commissioning Report, Appendix 1 - Final Report - Progress Report No. 12).

- Mr. M. Sant informed the meeting that sofar B.M.B. has left M.E.D. in the dark with regard to the requested time schedule and appropriate action. (See Appendix 3, page 3).

- Mr. M. Sant asked attention for the technical staff required for the operation of the terminal.
To identify the staff a draft proposal in Progress Report No. 9 (Appendix 5.1., page 2) has been used as an example.

The minimum staff requirements are:
(a) electrical engineer (1),
(b) electronic technician (1),
(c) electrician (1),
(d) mechanical engineer (1) preferable with some experience with hydraulic equipment,
(e) mechanical fitters (2),
(f) unloader operator (1),
(g) loader operator (1),
(h) control room operator (1),
(i) scale operator (1),
(j) handyman (4) - for general maintenance, cleaning etc..

Mr. A. Briffa is requested to provide names of personnel who are capable to fit into these functions.
The necessary action will be taken to engage personnel as early as possible.

- In order to improve the efficiency, consideration may be given to the additional implementation of the following facilities:
  . clean-up of shipholds is a rather complicated and time consuming operation; an additional pneumatic clean-up system of about 200 tons per hour, will greatly improve the clean up operations, but it would be very costly.
  However, considerable improvement can be achieved by having 3 bobcats and a small pneumatic pipe of about 20 tons per hour. A less costly alternative would be lowering a residual hopper for about 3 tons of grain,
  . warehouses for bag storage in order to create a buffer, thus not being dependant on the hourly capacity of the bagloading facility (80 tons per hour), additional equipment needs then also to be purchased e.g. pellets, forklifts, conveyors, trucks, etc..
  Bagloading with a loader is too expensive although loading can be carried out uncomplicated but with a low capacity due to the 80 tons per hour bagloading facility.
  * an other alternative which reduces too much handling of bags and which is not labour intensive could include bag beltconveyors from bagging plant to warehouse, overhead craneage and bundling equipment say into 1 ton each,
  * all alternatives have advantages and disadvantages.
  It is advised to conduct a market study in the Mediterranean and based on this study the best solution has to be worked out.

- Security fencing around the terminal has been discussed in the past but so far no action has been taken.

- Moisture content inside the silobins could be too high and therefore it will be not possible to store grain products for long period. Consideration may be given to install forced ventilation in the reclaim tunnels which will lower the existing humidity but how far it will lower the humidity inside the bins can not be predicted.
  Although very costly it can be considered to install a grain drier to reduce moisture content, but weight losses might occur.

- Silo walls and hopper slopes are not smooth enough. Slope connection to the steel outlet hoppers are mostly less then 45 degrees. Therefore, problems can be encountered when bins are being emptied.
  These problems already mentioned last year but since then no improvements have been carried out.

Friday September 6th, 1985

- The past few days problems with silo compressor. The filter unit is completely blocked with an emulsion of oil and water. It might be possible that water separation is not operating as it should be.
  Phoned Mr. Hartmann of B.M.B. and explained the problems and requested information from compressor supplier because in maintenance instructions no relevant information is given.
  It seems that the installed filter cartridges are wrong (fiber material). In spare parts only a ceramic type is available.

Monday September 9th, 1985

- Telephone call with B.M.B.;
  . according to the compressor supplier the installed filter type filters are wrong for the circumstances in Malta (high humidity). Ceramic filters have to be installed,

. compressor completely cleaned and new filters installed. Testrunned the compressor but stopped immediately because a lot of noise was heard. The impression exists that the vanes might be damaged due to low greasing with the oil/-water emulsion. Decided to dismantle the compressor in order to check eventual damages.
Meanwhile informed the supplier with regard to the noise. Supplier will investigate with the manufacturer and will phone back.

- Received from Mr. M. Sant the letter and telex communication between G.R.M./M.E.D. and B.M.B. (see Appendix 3, page 1 to 6).

Tuesday September 10th, 1985

- Telephone call with compressor supplier.
According to the manufacturer, the noise can not come from rotor and vanes. As long as rotation is normal no damage can occur. If damage occurs, the rotor and vanes will be blocked in the housing and rotation by hand will not be possible.
Supplier suggests to clean compressor and assemble with new ceramic filter cartridges.
Pressure release valve to be checked and in case of doubts to be re-newed, because this valve will due to malfunctioning cause the noise during starting up of the compressor.

- The new ordered B.K.T. chain to replace the damaged one, arrived at the site today. About one month later than planned.

Wednesday September 11th, 1985

- Assembled silo compressor and testrunned for some hours with a renewed relief valve. No further problems noticed and decided to put compressor in operation.

- Checked bagging conveying line. Observed that bag steering plate at the end of the beltconveyor has to be modified.

- Requested Mr. A. Briffa/MediGrain to arrange for a few trailers and some casual labour so that bagloading tests can be carried out.

- Mr. O. Karl/B.M.B. modified drive motor support of jib beltconveyor in loader to enable adjustments of drive pulley.

- B.M.B. has to fabricate a steering plate in transfer point between portal belt and loading jib belt, in order to improve the alignment of the belt.

Thursday September 12th, 1985

- The bagloading exercise can be regarded as unacceptable. Bagloading belts did not stay aligned with continuous load of the 50 kg bags. Installed an additional steering plate next to the bag overturn roller.
  Arranged for re-weighing of the trucks and found on a total of 17,500 kg, a weight difference of 355 kg, which is not acceptable.

Friday September 13th, 1985

- Requested Mr. A. Briffa/MediGrain to arrange for bulktrucks for loading tests and trials.

Loaded the trucks with barley but the movements of the analog control panel are so fast that it is not possible to observe correct weighing.

- Due to temperature rising in the yellow corn recirculation has to be carried out.
  Observed that emptying of silobin will be a problem. A great amount of grain remains on the bin slopes due to rough finishing of civil works and high humidity inside silo bins.

- Received correspondence from Mr. M. Sant to B.M.B. (see Appendix 5).

- Received by mail from B.M.B. some information which is supposed to provide an answer on the off-tracking of the beltconveyors (see Appendix 6).

Monday September 16th, 1985

- Telephone call with B.M.B./Mr. E. Janke,
  . received the latest information with regard to supply and arrival of the parts to be used for the necessary modifications. The delivery dates mentioned today differ from the dates received mid August, 1985. The new dates show another two weeks delay (see Appendix 4, page 3),
  . requested B.M.B. to take the necessary action by contacting the belt supplier and insisted on an investigation on the spot.

Tuesday September 17th, 1985

- Upon request of Mr. A. Briffa/MediGrain, bagloading exercise continued because MediGrain is in need of the grain which is already sold to feed millers. Bagloading exercise still gives the same problems with off-tracking of the beltconveyors.

- Molenschot service engineer is finished with his installation work and planned to depart from Malta.
  G.E.M. Consultants discussed with Molenschot and B.M.B. that the following points have to be remedied:
  * function of bag clamp,
  * off-tracking of bag beltconveyor,
  * analog control panel of bulk truck scale,
  * stabilizers to be installed,
  * paint work on A.B. scales.

Wednesday September 18th, 1985

- Received message from Mr. E. Janke/B.M.B. that he will travel to Malta in the company of a representative of Scholtz (belt supplier).

Thursday September 19th, 1985

- Mr. E. Janke/B.M.B. arrived on site and introduced Mr. Smith from the company Scholtz, Hamburg.
  Inspected all the belts in the company of Mr. Smith.
  He agreed that damages have to be rectified but he disagreed that the wearing faults are not correct, because what is shown on the rubber topcover are fabrication mistakes during vulcanization of the beltcovers. As the fabrication was executed under great delivery pressure, this kind of fabrication mistakes have passed the control department.
  Mr. Smith will arrange for the necessary repair and will provide in writing the full quarantee regarding the life time of the belts.

- Mr. E. Janke checked with Mr. O. Karl the remaining works to be carried out on loader and unloader.

B.M.B. planned to sent Mr. O. Karl home for a certain period and will arrange for return of Mr. O. Karl in due time.

Friday September 20th, 1985

- Informed by Mr. A. Briffa/MediGrain that it might be possible that MediGrain arranges a vessel to be loaded with 3000 tons of yellow corn and 2000 tons of wheat.
  Mentioned above to Mr. E. Janke in view of the planned departure of Mr. O. Karl.
  Mr. Janke said that B.M.B. is not obliged to keep their personnel for operational exercise.
  According to Mr. E. Janke it is the task of the Client to provide for sufficient operational staff and it is not the responsibility of B.M.B.

Monday September 23rd, 1985

hrs.

09.30 Meeting at Ministry of Economic Development/Economic Division.

Present:	Mr. M. Sant	Economic Division
	Mr. A. Briffa	MediGrain
	Mr. E. Janke	B.M.B.
	Mr. A. Camillery	M.S.C.L.
	Mr. J.G. Herrebout	G.E.M. Consultants

- Mr. E. Janke presented a time schedule.
  During the visit by G.E.M. Consultants to B.M.B. office it was announced that finalization of the modification was estimated during second half of October, 1985.

The presented time schedule shows now that this estimate has to be extended with a few weeks (see Appendix 7).
According to Mr. E. Janke the additional time is due to late delivery of subcontractors.

- In view of the extensive repairs on some beltconveyors, the supplier "Scholtz", Hamburg should guarantee in writing that in spite of the repairs, no negative effects on the lifetime of the belts are expected.
  Mr. M. Sant urged B.M.B. to present such a letter of guarantee.

- The problem with regard to re-circulation of the yellow corn was discussed and Mr. M. Sant repeated his disapproval concerning the telexes sent by B.M.B. (see Appendix 2, page 5, 6 and 7),
  . at present re-circulation of the yellow corn has to be carried out when temperature increase exceed the allowable,
  . in the stored hard wheat there are no changes in temperature sofar but due to the humidity problem inside and outside the silobins it might be necessary in a later stage to carry out recirculation in the wheat also.

- Mr. M. Sant informs Mr. E. Janke about the additional commissioning tests to be made which is for the sole responsibility of B.M.B.. Mr. M. Sant suggested Mr. E. Janke to liaise with Mr. A. Briffa and to look for a possibility to execute tests in connection with vessel movements of MediGrain.

- Discussed the malfunctioning of the truckloading scale.
  According to supplier leaflet, the type of scale EME-80/200-E(AB) will be fitted with AB basic control unit.
  However, the scale installed at Kordin is fitted with an analog control system.

After tests it appeared that with the analog system, the scale can not be used for truckloading. Weight difference is far above international standards.
Mr. E. Janke explained that B.M.B. has contacted the supplier but sofar no response received for solving this matter.

- Malfunctioning of bag clamp is discussed and with a proposed minor alteration on the opening side of the clamp the problem will be remedied. B.M.B. agreed on this.

- Analysis of snaglist drawn-up by G.E.M. Consultants (see Progress Report No. 12, Appendix 1, page 21 to 30), results in the following:

Unloader

1. According to Mr. E. Janke the system installed at Kordin is similar to the system supplied in Liverpool.
   No explanation could be given why the BKT chain during trials at Kordin is broken and in Liverpool, it gives no problems.
   B.M.B. will investigate what the possibilities are to provide a more reliable protection.
2. Completed.
3. The level indicator changed into the type "MAIHAK" but with this type the cabling and interlocking is not suitable. B.M.B. will provide a suitable level indicator. B.B.C. is investigating the matter.
4. Parts are with customs.
5. Ready end of next week.
6. Completed, but it will be more preferable to make it adjustable.
7. Completed.
8. Completed.
9. Completed.
10. In execution.

11. Completed. Functioning to be proved at test run.
12. Completed.
13. According to B.M.B., an additional item to the contract.
    G.E.M. Consultants disagreed and stated that indication light is absolutely necessary for operational purpose.
    Therefore, this is not regarded as an addition to the contract.
14. In hand.
15. Completed. Functioning to be proved at testrun.
16. Completed.
17. Oiltemperature sensor changed.
    For repeated start procedure, B.M.B. will supply a 6 minute timer as addition to the contract.
    G.E.M. Consultants disagreed and stated that 6 minute timer is necessary for protection of the compressor and to guarantee no breakdown.
18. P.L. will exchange broken compressor.
19. In hand with M.S.C.L., but sofar workmanship below acceptable standard.
20. In hand.
21. Completed.
22. According to Mr. A. Camillery, this is in hand, but G.E.M. Consultants, disagreed with that statement.
    In the past few weeks the painters allocated by M.S.C.L. have shown such a low standard that paintwork carried out is hardly of an acceptable standard.
    Requested M.S.C.L. to carry out the work in accordance with the supplied written and verbal information and when M.S.C.L. is sure that work is completed satisfactory, they will request for final inspection.
23. Completed. Final adjustment to be made in grain.
24. In hand.
25. Will be executed by P.L. according B.B.C. information.
26. B.B.C. will be requested to take the necessary action.

27. In hand, material ordered.
28. Still to be investigated by B.M.B..
29. B.M.B. will explain this problem to the Client by letter.

Loader

1. Parts will be in Malta week 39. Installation will start second week of October. Estimated at one week work.
2. Completed. Function to be proved at testrun.
3. Completed. New membranes are installed. Function to be proved at testrun.
4. Completed.
5. Completed. Function to be proved at testrun.
6. High level indicator replaced and B.M.B. will investigate the possibility to install other type of beltscraper.
7. Completed.
8. Switches are installed for connection to panel. P.L. waits for B.B.C. instructions.
9. Will be executed by P.L. according to B.B.C. information.
10. In hand, material ordered.

Transfer tower and wharf gantry

1. In hand.
2. In hand.
3. Aspiration in hand
   Capacity flap: completed
   Bufferplates : completed
4. Aspiration in hand
   Stiffeners: completed
   Additional backplate: completed.
5. Shoe support: completed
   Grain spillage: function to be proved at testrun.

6. Completed.
7. In hand; most properly additional keep down rollers to be installed.

Headhouse and silo

1. In hand.
2. In hand (see delivery list).
3. Will be completed end of next week.
4. Will be completed end of next week.
5. Completed.
6. Will be completed end of next week.
7. Completed.
8. In hand; see delivery list.
9. In hand; all flapboxes to be dismantled and slightly modified inside.
10. Will be completed end of next week.
11. Completed.
12. See delivery list arrival November; installation will start mid November.
13. In hand.
14. Paint supply Molenschot was not enough and colour was not matching the original paint.
    M.S.C.L. will repair the complete scales.
15. Completed.
16. In hand.
17. Malfunction of truckloading scale:
    See discussion before.

Remaining points (see telex 27/03/85)

3. As per item 22 of Unloader.
11. In hand.
12. In hand; started with removal on 20.09.1985.
16. In hand.

17. On request P.L. will get hold of painter to improve execution.
    The additional equipment such as aspiration will be painted on mimic panel also. Items for further extension will be marked accordingly.
18. In hand.
19. P.L. will carry out when all additional cabling is ready.
20. In hand, see item 19.

Remaining electrical points (see telex 02.04.1985)

1. B.M.B. will contact B.B.C. to find out the possibilities to remedy this item.
2. Material on site; P.L. to carry out connections in accordance with B.B.C. information.
3. In hand, see item 2.

Progress Reports (Remaining points)

- B.M.B. stated that items 1 to 10 are not part of B.M.B. supply, therefore Mr. E. Janke prefers not to discuss these items.

Remaining mechanical items

- B.M.B. stated that items 1 to 14 are not part of B.M.B. supply. Therefore it is preferred not to discuss these items.

Remaining electrical items

1. Additional high level indicators installed. The connections concerning the interlocking to be done by P.L. in accordance with B.B.C. information.
2. Additional low level indicators installed. Connections concerning the interlocking with scales to be given by Molenschot. P.L. will carry out the installation.

3. Installation completed, wiring to be connected by P.L. in accordance with B.B.C information.
4. Completed.
5. In hand.
6. In hand.
7. In hand with P.L.; indication plates are ordered.
8. As item 7.
9. In hand.
10. See item 13 unloader.
11. See item 23 unloader.
12. See item 27 unloader and item 10 loader.
13. B.M.B. requested P.L. to simulate power supply fluctiations to check if it is necessary to install voltage stabilizers.
    G.E.M. Consultants stated that investigation is a loss of time because great voltage fluctuations do exist. Therefore voltage stabilizers are highly advisable. At present two P.L.C.'s of scale are already damaged due to fluctuations.
14. Only 10% installed, the remaining 90% will be carried out by B.B.C.
15. According to B.M.B. the supplied flash lights are an addition as they are not mentioned in contract.
    Client is not specifically interested in flash lights, but for operational purposes a telephone call should be heard above the noise of the machinery.
    B.M.B. will request P.L. to investigate wether flashing of lights can be improved.
16. See item 12 headhouse and silo.
17. In hand.
18. Cabling already completed.
19. See item 18.
20. In hand.
21. Completed.
22. Parts will be sent by B.B.C. and P.L. will take care of the connections.

23. B.M.B. stated that this request is in addition to the contract.
    G.E.M. Consultants disagreed, because an operating switch on level 55.50 meter, while maintenance/repair will be carried out on level 15.50 meter, is not practical and can be dangerous for maintenance personnel.
    Suggested to install on level 15.50 m on/off switches for elevators inspection drives.
24. According to B.M.B. not advisable in view of inspection of equipment prior to start-up.
    G.E.M. Consultants did not agree with this statement because maintenance and operation of particular equipment is a separate organization.
    The inspection prior to start-up is not only for a compressor, all other equipment in silo is also started from the control room.
25. In hand.
26. In hand.
27. B.M.B. will contact B.B.C. to find out the possibilities to remedy this item.
28. Is part of additional items and will be followed up by P.L..
29. Completed.
30. Completed.
31. Completed.
32. B.M.B. awaiting quotation of B.B.C. and P.L..
    G.E.M. Consultants disagreed with waiting for quotation because this request is not an addition, but necessary for normal operational functioning and for safe guarding the installed equipment.
33. See item 32.

hrs.

14.00 Returned to site.

- Informed by Mr. A. Briffa/MediGrain that the vessel expected coming wednesday is cancelled.
  Mr. A. Briffa is in the process of arranging an other vessel.

- Proposed to Mr. A. Briffa to make a start with cleaning of the empty silobins.
  Mr. A. Briffa will arrange via the stevedore of MediGrain a crew to carry out the cleaning.

Tuesday September 24th, 1985

- Discussed with Mr. A. Briffa the safety measures to be taken for cleaning of silo bins which are contaminated due to moisture problems.
  Sufficient ventilation to be provided, this can only be assured with forced ventilation.
  Thereto renting or purchasing of ventilators is advised.
  Before a bin is ready for cleaning the oxygen and gas contents have to be measured and in case of low concentration of oxygen, forged ventilation has to be carried out with monitoring the oxygen and gas concentrations.
  Mr. A. Briffa will bring a measuring instrument from MediGrain.

- During heavy rainfall a lot of rainwater penetrated gallery roof, doors and windows and also waterproofing of siloroof.
  Informed Mr. F. Chadia/D.O.W. and M.S.C.L. because both parties have to take the necessary steps to remedy the problem.

- Ordered re-circulation of yellow corn due to rise in temperature.

Wednesday September 25th, 1985

- The whole day bulk truck loading exercise.
  All trucks re-weighed due to weigh discrepancies of installed analog control panel.

Thursday September 26th, 1985

- The whole day bulk truck loading exercise.
  All trucks re-weighed, again weigh difference observed.

- Tele Malta arrived to carry out the requested connections to the PBX system but staff was not able to connect such systems. Requested P.L. to arrange tnat the local representative of the installed telephone exchange will be requested to make the necessary preparations soonest.

- Mr. H. Hartmann started with the modifications on the motor controlled flapboxes.
  The modifications consist of complete dismantling of the flapboxes, removal of welded impact strips and replacing rubber seals.

- Upon request of B.M.B., P.L. connected a measuring instrument, to measure voltage dips. B.M.B. is still not convinced that voltage stabilizers for scales' electronic circuits have to be installed.
  Instrument is fitted for continuous measuring and the figures will be printed out.

Friday September 27th, 1985

- Re-circulated yellow corn again due to rise in temperature.

- Checked voltage measuring instrument and it showed voltage differences of 30 Volt.
  P.L. will execute more tests. Also planned to carry out measurements on the unloader.

- Informed by Mr. A. Briffa/MediGrain that he can arrange a vessel for next monday for about 2200 tons of yellow corn.
  Discussed above with Mr. H. Hartmann/B.M.B. to find out if this is possible due to the modification works.
  Mr. H. Hartmann agreed and G.E.M. Consultants arranged for filling of scale bins A and B.
  Informed Mr. A. Briffa that it is possible to load the vessel next Monday.

Monday September 30th, 1985

- Started loading the vessel Dwerja II at 08.10 hrs with one conveying line (625 tons per hour).
  It appeared that the additional installed steering plate in the transfer point did not function as expected.
  Off-tracking of loading jib belt still the same, also for the tripper a more reliable solution has to be provided, because off-tracking of belt appeared often. Loaded vessel with 2200 tons of yellow corn.

Tuesday October 1st, 1985

- In corporation with Mr. A. Briffa purchased a ventilator complete with cable and plug for the use of silo bin cleaning. Tested the ventilator and concluded that this ventilator will provide sufficient airflow to clean bins from gasses and will create safe working condition.

- Bulk truck loading carried out, all trucks re-weighed.

- Emptying of load-out bin for bulkscale will always be a problem, as long as future bulkscale is not installed (see Appendix 8).

Wednesday October 2nd, 1985

- Loading of bulktrucks.
  All trucks re-weighed and noted again weight differences.

- Emptied silo bin number 22 into load-out bin bulkscale.
  Showed Mr. A. Briffa the great amount of barley remaining in the bin.
  All of the remains have to be taken out normally which is time consuming.
  At present no problem but when silo is put into full operation then this problem will have great influence on the operational aspects.

- Informed by Mr. A. Briffa/MediGrain that tomorrow a coaster will come alongside to load yellow corn and wheat.
  Requested Mr. H. Hartmann to organise the modification work in such a way that loading can be carried out without disturbance.

- Mr. H. Hartmann re-modelled the additional steering plate in the transfer point between portal belt and loading jib beltconveyor due to the fact that this plate has not given the required results during the loading out on September 30th, 1985.

Thursday October 3rd, 1985

- Started loading the vessel Dwerja II of 09.45 hours.
  Again problems with dedusting filters. Still problems with transferpoint between portal belt and loading jib beltconveyor. Due to problems occuring with the loader, not able to finish the vessel today loaded 1800 tons of grain, although loader is designed for 1250 tons per hour.

The problems with de-dusting filters might be that capacity of compressor is too low to provide sufficient pressure when all three filters are operating simultaneously.

Friday October 4th, 1985

- Started at 08.30 hours to load remaining quantity.
  Same problem occured as yesterday.

- Noticed that when changing the grainroutes, the motor controlled flapboxes are not closing properly.
  Informed Mr. M. Hartmann that this is not acceptable and need repair.

- Arrival of B.M.B. 1st shipment in Malta.
  Requested Public Works to clear the parts from customs.

- Observed high humidity at the far end of reclaim tunnels (96 percent). Checked the rockformation around the silo and noticed that on various locations water is seeping down from rock cracks.

Tuesday October 8th, 1985

- Telephone call with B.M.B./Mr. H. Tiedemann.
  Requested Mr. H. Tiedemann to investigate if loader compressor has sufficient capacity to supply all three dedusting filters simultaneously.
  The loader beltconveyors still give problems. Off-track running with a load of 600 M/T.

  We would like to be informed soonest when B.B.C. will send its commissioning engineer again.

- First shipment of B.M.B. arrived at the site.

Wednesday October 9th, 1985

- Telephone call from B.M.B./Mr. Winter. Being informed that next week a shipment with small items will arrive in Malta and that the lastest shipment will arrive in week 43 (Wednesday October 23rd, 1985).

- Discussed with Mr. H. Hartmann/B.M.B. the additional de-dusting connection to be installed on tripper beltconveyor B2. Proposed to make connection on top of casing and underneath belt near beltscraper, because these are the areas where dust accumulate.

Thursday October 10th, 1985

- Telephone call with B.M.B..
  Requested Mr. E. Janke to check the points of view of Scholtz on the damaged beltconveyor.
  Asked Mr. E. Janke if B.M.B. discussed the off-track running of the unloader/loader beltconveyors. No decision made yet.

  There are a few options to improve the present situation, viz.:
  . checking and re-alignment,
  . more tapered return pulley's,
  . re-design of transfer points.

  Requested B.M.B. to repeat the discussion with B.B.C. concerning the electrical design modification for the manual/-automatic mode and the alarmfunction on mimic panel.

Informed Mr. E. Janke that the problems with Molenschot equipments are still not solved. It is expected that following topics shall be settled to the satisfaction of the Client:

* function of bag clamp,
* bag beltconveyor,
* installation of voltage stabilizers,
* analog control panel bulk truckscale,
* low level indicators.

Above items have been discussed with the Molenschot engineers who agreed that the remarks are correct but they were not in the position to rectify these items.

Molenschot engineers where in Malta for installation and commissioning of the seales during June and July.

Before the return to Malta of Mr. O. Karl, the design office of B.M.B. is investigating the problems occuring in the loader. When a solution is worked-out, we will be informed.

Monday October 14th, 1985

- B.M.B. started the erection of the additional de-dusting filter in the transfertower in accordance with the installation sketch from B.M.B. design office.
  During the initial stage of erection, observed that there is a much more favourable location at one level higher.
  It will make installation simple and access of mainfold and piping (storter) easier and for maintenance the inspection door will be on floor level.
  Discussed above with B.M.B./Mr. H. Hartmann and he agreed with the proposed change in location.

Tuesday October 15th, 1985

- During the manual cleaning of silobin 6, a large crack was observed in the pre-stressed slabs of the bin slope.
  Informed D.O.W..

Wednesday October 16th, 1985

- During the manual cleaning of silobin 7, a great amount of wet and damaged grain (yellow corn) was observed.
  Informed MediGrain / Mr. A. Briffa. He will arrange removal of the damaged grain.
  G.E.M. Consultants have warned constantly about this problem due to the high humidity inside the silobins (see Appendix 9)

- Carried out loading of bulktrucks. Problems with chainconveyor C4 occurred.
  Interlocking with bulkscale to be made. Dosage valve to be installed between scale and fillopening of chainconveyor.

- Received from Mr. M. Sant copies of correspondence from B.M.B. to G.R.M./M.E.D. concerning payment schedules (see Appendix 10).

Thursday October 17th, 1985

- During manual cleaning of silobin 8 simular problems as in silobin 7 observed, (wet and damaged grain).
  Informed Mr. M. Sant and MediGrain / Mr. A. Briffa, that D.O.W. has to take action.

Friday October 18th, 1985

- Telephone call with B.M.B.:
  Informed by Mr. E. Janke that B.B.C. is going to send an electrical engineer to finalise the existing installation and to start with the additionals.

Asked B.M.B. about the modification of the electrical diagrams. According to the information B.M.B. received from B.B.C. they are ready and will be brought by B.B.C. eng. Requested B.M.B. to provide Client with lists of installed electrical materials.
Informed by B.M.B. that electrical equipment for additionals is ordered and will arrive in Malta in due time.
Mr. E. Janke has investigated the possibilities to modify the alarm function of the mimic panel. To change the system an other panel with interlocking relais and cabling will be required. Estimated costs DM 40,000 excluding transport.
B.M.B. has not checked yet if compressor installed in loader has sufficient capacity.
Bulk loading scale; Molenschot refuse to cooperate concerning exchange of control panel. B.M.B. reached no agreement with Molenschot. Mr. E. Janke will sent a copy of correspondence with Molenschot (see Appendix 12). However, G.E.M. Consultants will advise the Client not to accept the installed scale control panel.
Informed by Mr. E. Janke that Mr. O. Karl will travel to Malta on October 20th, 1985. B.M.B. design office only gave some ideas in solving the problems in the loader and Mr. O. Karl is aware of these ideas and is instructed to carry out the modifications.

- Discussed with Mr. A. Briffa / MediGrain the truckloading station. Strongly advised Mr. A. Briffa to apply to M.E.D. to furnish an operator cabin.

- Informed by Mr. A. Briffa / MediGrain that it is planned to load a vessel with about 2200 tons.
Informed Mr. H. Hartmann / B.M.B. to prepare and make arrangements to avoid as much as possible delays in the rectification work.

- Detected the first insects in the grain. Showed Mr. A. Briffa the insects and requested to arrange for the necessary tools and equipment to combat the insects.
  Later in the day Mr. A. Briffa informed G.E.M. Consultants that at MediGrain silo only two boxes, 5 years old, Phostoxin tables are available. No other tools and equipment and no labour with experience.

  Advised Mr. A. Briffa to organize very soon a sufficient amount of Phostoxin and liquid to be sprayed outside the bins.
  When fumigation and spraying is not carried out within a few days, the problem will rapidly increase.
  Mr. A. Briffa will try his utmost to collect some, but it is not possible to buy on the open market.
  Mr. A. Briffa has connections with the flour and feedmills and most probably they have some insecticides.

Monday October 21st, 1985

- The information given by B.M.B. design office concerns mainly the installation of additional grain steering plates in the loader transferpoints.
  Mr. O. Karl will carry out the above recommendations.

- Mr. M. Hartmann has to re-arrange the existing return dust piping in order to continue some rectification work during loading of the vessel tomorrow.

Tuesday October 22nd, 1985

- Start loading the vessel with one (625 tons per hour) reclaiming route.
  The yesterday placed temporarily additional steering plate in transferpoint from loading jib belt to portal belt the off-tracking of the belts slightly improved but did not give the required results.

. After a period of time testing with 625 tons decided to test with two reclaiming lines at 1250 tons per hour. The behaviour of the belts was slightly better than with 625 tons but also did not give the results as expected.

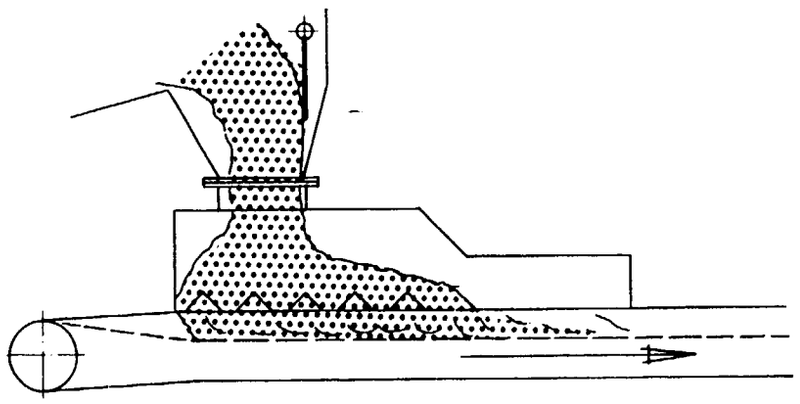
. Major changes to be carried out because off-track running of loading jib belt in most positions still exist,

. Finished loading of the vessel with all the problems of the belt including occasionally malfunctioning of the de-dusting filters. Both problems have to be solved.

- Mr. A. Briffa still not able to acquire the necessary insecticides.

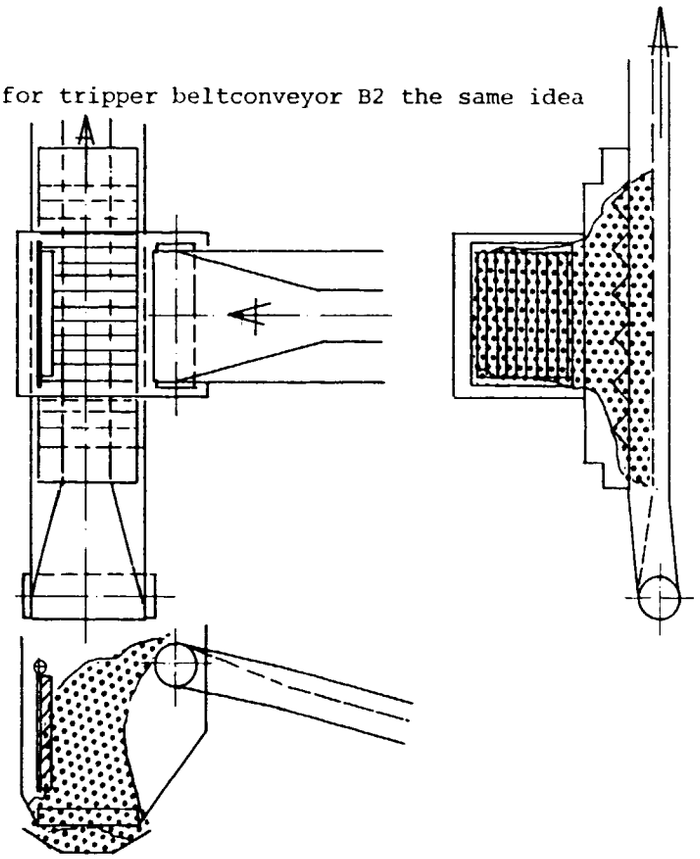
- Proposed and discussed with Mr. O. Karl the following possible solutions to keep the grain under control in the loader transferpoints.

  (a) adjustable triangle shaped plates to be placed under the grain flow as follows.



The triangle shaped plates accross the rotating loading shoe underneath the flow from portal beltconveyor transferpoint.

(b) for tripper beltconveyor B2 the same idea



Mr. O. Kara agreed with the above proposals

- Telephone call with B.M.B..
  Informed by Mr. E. Janke that Mr. van Leysen/Molenschot will visit B.M.B. office to discuss the inaccurancy of the truck loading scale.
  G.E.M. Consultants will make a list with weight figures, with K.G.T. weight and custom weight (see Appendix 1.3.),
  Requested Mr. E. Janke to check with B.B.C. Braunschweig office if they have worked out the necessary cabling and instruments necessary for additional installations, because P.L. is at present not aware of drawings and extent of additional work,
  The delivery of parts planned for week 41 is still not on site. Reminded Mr. Janke that this is two weeks delay.

Wednesday October 23rd, 1985

- Telephone call with B.M.B..
  Informed by Mr. E. Janke that delivery of cables and instruments for the additional de-dusting filter and screwconveyor will be next week (44),
  Requested B.M.B. to study the problems with the de-dusting filters on the loader. Inspite of all trials and small changes carried out no results have been noticed,
  When Molenschot will visit B.M.B. next week, Mr. E. Janke will inform Molenschot that beltconveyor of bagging stations need to be modified.
  Mr. E. Janke is informed by B.B.C. that the B.B.C. service engineer will be in Malta next week Thursday.

Thursday October 24th, 1985

- Telephone call with B.M.B..
  The by B.B.C. modified electrical diagram for the unloader compressor to integrate an additional timer in the existing circuit, cannot be accepted. B.B.C. has to make another diagram.
  The instrument for measuring hydraulic pressure and temperature is missing an adapter for connection to the measuring points. Mr. E. Janke will check.
  Informed B.M.B. that G.E.M. Consultants has advised the Client not to accept the bulkloading scale as installed.

- During manually cleaning of silobin 15, again observed a great amount of damaged grain due to moisture.
  Another problem in this bin is the about one meter wide flat part on top of binslope (see Appendix 14).
  Deformation noticed in the pre-stressed slabs on bin slope (see Appendix 14).

Mr. E. Janke requested G.E.M. Consultants the weighing data showing the descrepancies in weight.
A visit of a Molenschot representative to B.M.B. office is arranged monday next. G.E.M. Consultants will sent a telex with the relevant information (see Appendix 13).

Friday October 25th, 1985

- Telephone call with B.M.B.
  Informed by Mr. E. Janke that B.B.C. will send by truck, departing October 30th, all the necessary items needed for the modification.
  It is planned by B.B.C. that on November 6th, 1985, Mr. W. Eichenberg and another electrical engineer will arrive in Malta. Mr. Eichenberg will stay about one week, the other electrician will stay in Malta till all remaining work is completed.
  Informed by Mr. E. Janke that the latest B.M.B. supply is packed on October 29th and on the road to Malta.
  Due to the problems with off-tracking of the belt conveyors in unloader, and loader Mr. E. Janke will send various and substantial information about belt conveyors (see Appendix 15).

Monday October 28th, 1985

- Upon request of Mr. M. Sant a meeting on the site with Mr. M. Galea / Malta Development Organization was organized to check together the remaining payment list due.

- On advice of B.M.B. design office Mr. O. Karl installed an airknocking hammer on the dedusting filtercone in the loader.
  After a certain period of operation, filter malfunctioned again.
  Advised B.M.B. to turn the whole membrane casing 90 degrees to arrange membranes horizontally to avoid drooping of membranes. Mr. O. Karl will discuss this proposal with B.M.B. and require approval to carry out the filter modification.

Tuesday October 29th, 1985

- Telephone call with B.M.B.
  Mr. H. Tiedermann announced that yesterday it has been agreed between B.M.B. and Molenschot that the installed analog control panel will be exchanged for a digital control panel AB-basic.
  It will be ready before the end of November, 1985.

- Mailed the by Unido requested evaluation report concerning the present situation and views on the overall finalization.
  Presented Mr. M. Sant a copy. This list to be read in comparising to Appendix 1 page 21 to 36
  (see Appendix 16).

- Immediate action will be required on insect control in the silo.
  Informed Mr. A. Briffa / MediGrain and requested to arrange Phostoxin for silo bin fumigation and non poisoneous liquid complete with pressurized knapsack sprayer.

- Noticed that from the already cleaned silo bins 5 and 9 outlet slidegates water was dripping on the belt conveyors, opened the slidegates and some grain came out of the bins.

Wednesday October 30th. 1985

- Requested B.M.B. to replace the filter blower on the trippers of belt conveyors B5 and B6.
  With this replacement, a more dustfree and easier maintenance location is created.

Thursday October 31st, 1985

- B.M.B. approved the proposal for the modification of the membrane casing of the dedusting filters on the loader.
  Mr. O. Karl arranged immediately for the modification work.

- Mr. A. Briffa arranged 5 cases of Phostoxin tablets and started immediately with recirculation of the grain and simultaneously dosing the tablets by hand.
  For Phostoxin dosing the silo is equipped with pellet dispencers but these dispencers can not be used with tablets, it was not possible to acquire pellets on short notice. Pellets have to be imported on licence.
  Advised Mr. A. Briffa to place on order as soon as possible.

- Received by post some information on belt conveyor installation, alignment etc.,
  This information was sent by B.M.B. in view of remarks made in the past concerning off-tracking of belts in unloader and loader.
  About possible solutions to avoid off-tracking there was not the expected information. The possiblities explained are already tried out.
  (see Appendix 15).

- Telephone call with G.E.M. Consultants for electrical back-up service.
  Requested to investigate the possibilities in interlocking the B.K.T. in such a way that chain breakages are not occuring any more.

Friday November 1st, 1985

- Telephone call with G.E.M. Consultants about the questions asked yesterday.
  The B.K.T. chain break protection is only possible hydraulically. Electrical interlocking is too slow.
  Multiple alarm is not possible with some simple additional parts, it will be a major operation.
  Proposal is to do it in sections which makes it less complicated.

- The recirculation of wheat with contineous dosing (by hand) of Phostoxin tablets carried out.

- Repeated earlier made request to D.O.W. / Mr. F. Chachia to install breather piping on top of silo bins 5, 6, 7 and 8, fitted with open/close valve.
  Outlet of breather piping to be placed outside of gallery.

- Observed that the wipe-off plates in chain conveyors C1 and C2 are creating a strong knocking noise.
  Informed Mr. H. Hartmann and requested investigation considering the removal of these wipe-off plates.

- Noticed that high level indicator stops reclaim conveyors first followed, through interlocking, by the following conveyors. When high level indicator is released before the interlocking sequence of the other conveyors is finished, the reclaim conveyor starts automatically without giving a signal to protect operating personnel.
  Complained to B.B.C. and requested to rectify this dangerous situation.

Tuesday November 5th, 1985

- Telephone call with B.M.B.,
  Informed Mr. E. Janke that it is prefered to have the wipe-off plates in chainconveyors C1 and C2 to be removed due to hard knocking noises when chain conveyors are empty or half empty.
  P.L. likes to be informed about coming shipment.
  Requested Mr. E. Janke to investigate in cooperation with their hydraulic expert if it is possible to add some type of hydraulic valve for very fast pressure release from the B.K.T. drive motors, release valve or valves interlocked with an electrical pressure monitor.
  An additional installed speed monitor will not suit the purpose because it is too slow, the mass of hydraulic pump electric motor is too much to release pressure in a fraction of a second.

  Mr. E. Janke is not able to give exact date of Molenschot engineer arrival to exchange the bulk loading scale control panel.
  The required information about the connections for the measuring of hydraulic pressure with censor control is still not received.

- Due to the modification on the dedusting filter on belt loader it will be necessary to have an additional platform for maintenance.
  Requested Mr. O. Karl to fabricate such a platform.

Wednesday November 6th, 1985

- The latest shipment of B.M.B. arrived on the site. After unpacking noticed that some support parts for dedusting filter were not included. Missing parts to be fabricated locally.

- Telephone call with B.M.B.,
  Informed by Mr. E. Janke that Molenschot service engineer will travel to Malta on November 14th or 15th, 1985,
  Molenschot office requested location change of bulk loading control panel. The present control panel is placed near bulk scale on level +23 meter in headhouse.
  For the new AB basic control panel location on level + 23m is not advisable.
  Molenschot's proposal to install above panel in control room near the other AB basic panel accepted, however this location requires much more cable to be installed by P.L..
  Updated electrical diagrams for unloader compressor still not received from supplier.
  Mr. E. Janke informed all parties concerned that he will arrive in Malta next week Monday, November 11th, 1985.

Thursday November 7th, 1985

- Arrival of the B.B.C. service engineers, Mr. W. Eichenberg and Mr. Lorenci,
  Mr. W. Eichenberg will stay in Malta for about one week.
  Mr. Lorenci will stay in Malta as long as necessary.

- Due to the observed problems with humidity in and around the silo, G.R.M./M.E.D./D.O.W. had requested P.L. to prepare a proposal and quotation for forced ventilation in silo reclaim tunnels.
  Mr. M. Sant requested G.E.M. Consultants to attend the meeting at P.L. office discussing P.L.'s proposal.

Present:	Mr. H.	Attard	P.L.
	Mr. A.	Azzopardi	P.L.
	Mr.	Galea	P.L.
	Mr. Ch.	Cassar	D.O.W.
	Mr. J.G.	Herrebout	G.E.M. Consultants.

Mr. H. Attard presented a specification/quotation with drawing concerning the forced ventilation in the reclaim tunnels.

- Mr. Ch. Cassar requested G.E.M. Consultants to give advice if proposal is acceptable.
  It would advisable for D.O.W. that P.L. provides more information on the supplied equipment, i.e.
  * documentation of the ventilators,
  * protection degree of the exhaust air fans and power feeders,
  * lay out drawing of main and sub. power feeder boards.

  . Requested P.L. to provide on feeders indication lights that fans are running.
  (see Appendix 17).

Friday November 8th, 1985

hrs.

10.00 Site Meeting

Present: Mr. M. Galea P.L.
Mr. J.G. Herrebout G.E.M. Consultants B.V.

- On request of Mr. M. Sant a visit of Mr. M. Galea was arranged concerning finalization of the rectifications and time schedule related with payment schedule.
  . Unloader
  will be ready mid of November.
  . Loader
  As loader needs to be tested again it is advisable to check the performance first in a small vessel (± 2.000 tons) to avoid high costs in demurrage.
  When it appears that test is successful then final tests in larger vessel to be arranged.
  . Transfer tower
  It is estimated that the installation of the additionals will be completed first week of December.
  . Headhouse and silo
  Works to be carried out will be ready by the end of November. Thereafter test can be made to assure readiness for loading out into a large vessel.

- The electrical works will be completed together with the mechanical works.

- Completion of remaining civil works cannot be estimated as there is no action by P.W. and D.O.W. and it seems that the civil works will not be ready before the end of the year.

- Electrical parts for the additional works arrived at the site.

- Repeated request to B.B.C. about the control voltage lay out. Control voltage needs to be changed into separate feeders to:
  * mimic panel
  * temperature control unit
  * weighing scales control panels
  * telephone exchange,

  B.B.C. agreed with request and will carry out the necessary work.

Monday November 11th, 1985

- Mr. E. Janke arrived in Malta with the intention to speed up installation, to establish dates for new tests and trials and discussions with M.E.D./D.O.W. about the delayed payments.

- The requested higher safety protection for breakage of B.K.T. chain has been investigated by B.M.B. hydraulic expert.
  Mr. E. Janke presented a letter dated November 7th, 1985, stating that the electrical operated safety device is sufficient and that it is technical not possible to carry out other proposals.
  Informed Mr. E. Janke that G.E.M. Consultants is not satisfied with the answer and would like to receive a detailed explanation.
  (see Appendix 18 page 1-2).

- Being informed by Mr. A. Briffa / MediGrain that the planned loading of a vessel will be carried out tomorrow.

Tuesday November 12th, 1985

- Arranged loading of the vessel with 2.200 tons of wheat. The transferpoints in belt conveyor B2 tripper and loader show great improvement with the installed plates as proposed on October 22nd, 1985 (see sketches).
  * minor changes have to be carried out.

- During the loading silo scale panel 30 malfunctioned. Checked and detected that most probably the P.L.C. is the reason.

- P.L. started with the installation of cabling for the additional equipment.

- Mr. A. Briffa requested to arrange outloading of the remaining barley.

- Received some copies of correspondance between M.E.D. and B.M.B. concerning next commissioning.
  (see Appendix 18 page 3 to 7).

Wednesday November 13th, 1985

- B.M.B. arranged that local subcontractor started with the additional required aspiration piping in the transfer tower.

- Started bagging of the remaining barley, but unfortunately both bagging lines could not be put in operation due to malfunctioning of the scale analog control panels.

- Requested B.M.B. to inform Molenschot about the malfunctioning of the loading out scale 30 and both bagging line scales.

- Requested Mr. E. Janke to speed up an investigation into the poor functioning of the belt scrapers.

Thursday November 14th, 1985

- The travel limit supports for loader on the wharf have been destroyed by container trucks. Requested Mr. F. Chachia to arrange some large concrete blocks (available on site) in front of these limit supports.

Friday November 15th, 1985

- Mr. E. Janke informed that the supplier "Horsch" replied to the complaints on the poor functioning of the belt scrapers.
  The supplier "Horsch" agreed to sent an expert to Malta on Wednesday November 20th, 1985, to investigate the possibilities to improve the functioning of the scrapers.

- Requested Mr. E. Janke to advance the visit of Molenschot service engineer.

November 16th - November 20th, 1985

- Daily site supervision.

Thursday November 21st, 1985

- Arrival of service engineer from the belt scraper supplier "Horsch".
  The service engineer checks all the installed belt scrapers.
  The service engineer had the following remarks:
  * more adjustments to be carried out,
  * belt B1, B5 and B6 need to be fitted with additional spring loaded supports,
  * after adjustments, test runs with grain have to be organized.
  The spring loaded supports for belt B1 are available and will be installed but for belts B5 and B6 supports have to be ordered from supplier.

- Mr. E. Janke received telex from Molenschot explaining why they did not sent their service engineer to Malta because the new parts for bulk scale are only ready on November 21st, 1985 instead of November 15th, 1985.

- During the inspection of all the belts with service engineer, detected that belt of belt conveyor B3 showed detoriation on the vulcanized strips.
  Informed and showed Mr. E. Janke and insisted on immediate action from B.M.B. to supplier "Scholtz" Hamburg.
  (see earlier mentioned problems with other belts amendment No. 2 - Final Report, Progress Report No. 12, Appendix 1, page 27).

  (see also B.M.B. letter dated October 24th, Appendix 18 page 3).

Friday November 22nd, 1985

- The belt scraper supplier service engineer adjusted and testrunned all the belts (empty).
  Installed the spring loaded supports on belt B1 and testrunned.
  Requested and received approval from Mr. A. Briffa / MediGrain to recirculate grain for a certain period to check if there is any improvement after the adjustments of belt scrapers.

  Recirculated grain (wheat) for a few hours and observed improvement but an optimum effect cannot be established because the running-in of scrapers needs time. The service engineer assured that after a longer period the scrapers are runned-in and get the shape of the belt.
  The service engineer will upon return in factory arrange for spring loaded supports for belts B5 and B6. B.M.B. will arrange transport to Malta.

Monday November 25th, 1985

- Requested Mr. Lorenci / B.B.C. to carry out the necessary changes and additions for the sequential start of filter units.
  Before departure to Malta Mr. Lorenci was informed by B.B.C. office which work has to be carried out. Above item was not on that list. Showed Mr. Lorenci the remaining electrical point list on which above item was mentioned since April, 1985.

- To avo[illegible]e electrical discrepancies requested Mr. E. J[illegible] inform Mr. Lorenci that all the remaining electrical items have to be remedied.

Tuesday November 26th, 1985

- Received telephone call from Molenschot requesting more information about the malfunctioning of the bagging scales and outloading scale 30.
  Molenschot service engineer will arrive in Malta November 25th, 1985.

Wednesday November 27th, 1985

- Informed by Mr. A. Briffa / MediGrain that they foresee problems the coming weeks with the arrival of vessels to discharge at MediGrain silo.

  It was suggested to discharge one vessel at Kordin and store temporarily.

- Tested the modified dust filter on loader portal belt conveyor, at present connected with the tripper.
  Observed that suction on the two tripper connections is far below requirements. Suggested to enlarge the filter suction opening to create more airdraft.

Thursday November 28th, 1985

- Molenschot service engineer Mr. J. Struys arrived in Malta, He checked the malfunctioning of the outloading scale 30.
  It became clear that the P.L.C. was damaged, most probably due to unstabilized voltage.
  During the previous scale installation tests and trials, four P.L.C.'s were exchanged,
  Voltage stabilizers are on the site but not installed by B.M.B.

Friday November 29th, 1985

- G.E.M. Consultants wrote a memorandum to Mr. M. Sant concerning the latest developments at Kordin Silo,
  . special attention to be drawn to:
    * seepage of rainwater,
    * civil Works,
    * mechanical Works,
    * electrical Works,
    * expiry of Agreement 84/05,
    * summary of items which have been completed upto November 29th, 1985,
      (see Appendix 19).

- Molenschot service engineer checked the problem with the bagloading scales,
  Exchanged potentiometers and adjusted some parts in the electronic prints.
  Tested the scales with a few bags and observed that scale function is correct.
  Stopped the testing of the scales because of problems with the bag sewing machines.
  The service engineer checked the mechanical side of the sewing machines. The proximity switch might receive magnetic influence of a mechanical part.
  To release the magnetic field the sewing machine has to be switched on several hours before operation can be carried out. This is not acceptable and should be rectified by the supplier. Informed Mr. E. Janke and requested action.

- A few weeks modified electrical diagrams were received from compressor supplier, but proposed modification was not correct.
  Suggested to B.B.C. engineer to use another timer instead of the one proposed and draw-up the necessary connections.
  The B.B.C. engineer presented his proposal and agreed to work it out.
  With this modification and the use of another timer the unloader compressor switch board can be finalized and safeguard the required idle time of 6 minutes, and not allow repeated starts with full air pressure.

- Informed by Mr. A. Briffa / MediGrain that the vessel planned to unload grain at Kordin Terminal will arrive tomorrow and will be ready Monday morning December 2nd, 1985 to discharge.
  Informed also B.M.B. and requested cooperation.

Monday December 2nd, 1985

- On arrival at the site noticed that vessel was moored alongside the wharf wrongly.
  Requested Captain and Chief Officer to shift the vessel backwards about 100 meter.
  Informed Mr. A. Briffa / MediGrain that due to shifting discharging will start later than planned.

- Started the necessary Unloader equipment and noticed oil leakage on connection coupling of feed pump for hydraulic apparatuses.
  This leakage on the same coupling occured already twice before.
  Requested Mr. O. Karl / B.M.B. to remedy but unsuccessful because a new o-ring was not available.
  To enable the discharge of the vessel, decided to collect the oil for today and in the meanwhile to buy a new o-ring locally.

Mr. E. Janke will arrange for procurement.
Suggested Mr. E. Janke that a hydraulic expert can solve the problem, Mr. E. Janke will call "Rexroth" supplier of the hydraulic cabin. B.M.B. can claim guarantee.

- During discharging observed that interlocking function between scale and lowlevel in upper bin is not carried out as required.
  The proper working condition is that scale can only start with weighing after low level indicate that sufficient quantity of grain is available.
  Requested Molen and B.B.C. service engineer's to carry out the necessary connections to reach the requirements.

- Another interlocking failure observed in the start conditions between chainconveyors and upperbin of scale.
  Requested B.B.C. service engineer to investigate and modify.

- Requested MediGrain stevedore to arrange today for adequate bulldozers in good working condition, to carry out the clean-up exercise in ship hatches.

- Checked the modifications in unloader and silo equipment.
  It seems that equipment performs adequately.

Tuesday December 3rd, 1985

- Before starting with discharge of the vessel, tried to repair the oilleakage on feedpomp.
  B.M.B. procured o-rings.
  Replacement was not successful as leakage still exists.
  Convinced Mr. E. Janke / B.M.B. that Rexroth service engineer has to be called to remedy this leakage and meanwhile also other very small oil-drips which can give greater problems lateron.

- Measured several times the capacity of the Unloader under full load and it showed that Unloader easily reached the required 1100 tons per hour in heavy grain with a specific weight of 0.75 metric tons per cubic meter.

Wednesday December 4th, 1985

hrs.

09.00 Site Visit

Present:

Mr. M.	Sant	M.E.D.
Mr. Ch.	Cassar	D.O.W.
Mr. F.	Cachia	P.W.
Mr. W.	Herzmann	B.M.B.
Mr. E.	Janke	B.M.B.
Mr. H.	Hartmann	B.M.B.
Mr.	Barbara	M.S.C.L.
Mr. J.	Abela	M.S.C.L.
Mr. A.	Cammillery	M.S.C.L.
Mr. H.	Attard	P.L.
Mr. O.	James	P.L.
Mr. B.	Azzopardi	P.L.
Mr. A.	Briffa	MediGrain
Mr. J.G.	Herrebout	G.E.M. Consultants B.V.

- This meeting was requested by Mr. M. Sant with the intention to carry out a visual inspection on the rectifications and eventual remaining works.

- After the inspection tour around the whole plant Mr. M. Sant proposed to continue the meeting at M.S.C.L. office.

hrs.

11.00 Visit M.S.C.L. Office

Present:

Mr. M.	Sant	M.E.D.
Mr. W.	Herzmann	B.M.B.
Mr. E.	Janke	B.M.B.
Mr. H.	Attard	P.L.
Mr. O.	James	P.L.
Mr. B.	Azzopardi	P.L.
Mr. A.	Briffa	MediGrain
Mr. J.G.	Herrebout	G.E.M. Consultants B.V.

- Mr. M. Sant opened the meeting by requesting B.M.B. to present a statement of facts about the delay's occured. It is for M.E.D. important to have these statement of facts in order to enable M.E.D./D.O.W. to settle the payments due.

- Mr. W. Herzmann sees no immediate reason to prepare first a statement of facts concerning the delay's because the payments due concern only the erection and commissioning. Delay's in connection with the penalty clause in the contract are separate contractual obligations.
Mr. W. Herzmann reminded the meeting that in the past the presentation of silo logbook to be counter signed was always refused by Mr. Ch. Chassar without presenting a reason.
If silo logbook had been kept and counter signed for approval, the logbook would present the statement of facts about delays.

- Mr. M. Sant explained that payment with regard to finalization of erection has been withhold due to M.E.D. feeling that the equipment installed was not in accordance with the agreement. Simular feelings exist for commissioning.

- Mr. W. Herzmann and Mr. E. Janke disagreed with Mr. M. Sant's statement because the equipment installed is in accordance with the agreement and erection was completed. Consequently payment of erection could be made.

- In view of the successful testing of the mechanical and the electrical equipment on 2nd and 3rd December 1985, G.E.M. Consultants could advise G.R.M. and M.E.D. that commissioning can be regarded as finalised and it is no reason to withhold the signing of the certificates of final acceptance.

- Conclusion of B.M.B. is that after the certificates are signed the warranty period will come into effect which is more favourable for M.E.D. than laid down in the contract.

- Mr. M. Sant assumes that most probably next week the signing of the certificates will be made.

- According to Mr. W. Herzmann the existing L.C. has to be prolongated upto the end of 1985 by the Central Bank on instruction from D.O.W.
  The remaining payment balance is DM 1.9 million, except the value denominated in Maltese liri.

- Training of personnel is being discussed again and B.M.B. assured that when personnel is made available B.M.B. is prepared to carry out training.

- It was observed that no representative of M.S.C.L. was attending this meeting.

- Mr. M. Sant brought forward the problems with the belts, and the reply letter of B.M.B.
  It is difficult to understand paragraph 2
  quote
  we herewith declare that the visual deficiencies are without influence over mode of running and lifetime of the belts
  unquote
  Mr. M. Sant asked G.E.M. consultants about the lifetime of a belt.
  G.E.M. Consultants explained that it is difficult to say because it depends greatly on:
  . type of material conveyed
  . environmental conditions
  . mode of maintenance
  . running hours per year
  However, from experience it can be calculated 6 to 8 years (see Appendix 18 Page 3).

hrs.

13.00 Returned to Site

- Finished with discharging the vessel at 13.30 hours. The only problem during the discharging are the hydraulic leakages to be remedied by B.M.B.

Thursday December 5th, 1985

hrs.

10.00 Meeting at Ministry of Economic Development/Economic Division.

Present:

Mr. M.	Sant	Economic Division
Mr. M.	Galea	M.D.O.
Mr. A.	Briffa	M.G.
Mr. J.G.	Herrebout	G.E.M. Consultants B.V.

- Mr. M. Sant arranged for this meeting for the sake of information and possible involvement of the Malta Development Organization Mr. M. Galea.

- Mr. M. Sant presented a draft for Handling and Storage Agreement between The Canadian Wheatboard (CWB) and Kordin Grain Transhipment Silo.
  The presentation of the draft proposal gave G.R.M./M.E.D. the impression that it is the intention of C.W.B. to operate Kordin Grain Terminal.
  It was advised to G.R.M./M.E.D. to obtain from other sources also draft agreements (see Appendix 20).

- Conformation of Commissioning
  The unloading of the vessel on 2nd and 3rd December can be regarded as successful and modifications plus additionals have been tested.
  G.E.M. Consultants can advise G.R.M./M.E.D. that the commissioning is finalized and performance tests have been executed.
  Mr. M. Sant requested G.E.M. Consultants to put the confirmation in writing. G.E.M. Consultants agreed to write a letter with an enclosure list of remaining small items which have to be performed by B.M.B. in a short period (see Appendix 21).

- Paintwork

This item on the list of remaining items is the main concern.

G.E.M. Consultants advised G.R.M./M.E.D. to insist with M.S.C.L. to supply sufficient paint for rectification work and subcontract the execution and charge M.S.C.L. for the total costs.

Mr. M. Sant asked G.E.M. Consultants the time necessary for the rectifications.

It is estimated that it will take three months with three painters.

- Penalty for delay

According to Mr. M. Sant it might be possible that G.R.M./M.E.D.will insist on penalty for delay as described in Contract Volume I schedule 3.8.

It will become extremely difficult to determine the extent of the delay because the progress of erection to be recorded in a logbook has never been counter signed by the buyers authorized representative (D.O.W. Mr. Ch. Cassar).

Remaining contractual payments will be retained by G.R.M./M.E.D. i.e. - erection being 5% of contract sum
- commissioning being 5% of contract sum.

It is assumed by M.E.D. that additional contracts can be paid in accordance with their value.

Demurrage of unloading commissioning vessel due to B.K.T. chain breakage will be claimed, in addition vessel stayed 3 days and 8½ hours longer than the contract with ships owner.

It will be questionable if B.M.B. can claim additional cost for the installation of a start/stop near elevator maintenance opening.

- Spareparts

The mechanical as well as electrical spare parts have to be checked in accordance with the contract.

B.M.B. has to prove that the delivered spares are valued the same as described in the contract, i.e. compressors and scales are not the same make as described.
In volume II Annex II Page 11.9 of the contract is mentioned.
quote

A definite list will be drawn up jointly between the buyer and the Contractor in due time

unquote.

- Civil Works

No progress has been noticed in finalizing the remaining points and rectifications on workmanship.
The most critical points are the workmanship on inside and hopper slopes of silobins and the humidity in and around the silo.
(see Appendix 14, situation on June 3rd 1984).

- Remaining items on snaglist

Scrutinized the list attached to memorandum sent to Mr. M. Sant on November 29th, 1985.
Meanwhile various items could be crossed out.

Have sent the following information to G.E.M. Consultants Rotterdam enabling them to inform Unido.
Tests for commissioning purposes have been carried out.

Loader

On 12/11/85 loaded a vessel with 2200 tons of Wheat.

- Problems with Off-tracking of conveyor belts have been successfully solved.

- Problems with de-dusting filters are solved.

- Meanwhile the other items on snag list are carried out.

Unloader

On 2nd and 3rd December 1985, discharged vessel with 5500 tons of Yellow Corn.

- The Major operational problems are solved.

- Meanwhile small remaining items will be carried out in the coming week.

Transfer Tower

- The additional installed de-dusting has proved during the testing period, that problems on that part have been completely remedied.

Headhouse and Silo

- The main item remaining is a new bulk loading control panel, dry test carried out, with grain will take place beginning of next week.

- The major modifications on transfer points, inlets to elevator boot, have been successfully tested.

- Small remaining items will be carried out in due time.

- One major problem has to be solved by B.M.B. and Scholtz, suppliers of belt for belt conveyor B 3.

Other remaining points

The other remaining points on the snag list are mostly civil construction problems which are already mentioned a year ago, but sofar no action has been taken by P.W. and D.O.W.

Meeting on December 4th, 1985

- In view of the successful testing of the mechanical and the electrical equipments G.E.M. Consultants could advise G.R.M. and M.E.D. that commissioning can be regarded as finalised and there is no evidence that can withhold the signing of the certificate of final acceptance after successful completion of performance test.

- The small remaining items will be carried out by the consortium the coming two weeks.

- During the meeting, M.E.D. shows the willingness of arranging the payments due, according to the contract:
  i.e. . completion of erection
  . successful commissioning.

- The penalty in regards of delay, has to be discussed after B.M.B. presented a statement of facts describing what has hampered the erection and completion.

Friday December 6th, 1985

- Wrote a statement about the successful testing, with a snag list of the remaining small items to the rectified in a limited period of time.

- The newly installed AB basic control panel for the truck loading scale is damaged by P.L.
  A mistake in wiring by P.L. causes burning of P.L.C. and feeding print.
  Molen service engineer immediately contacted Molen Holland to order new parts.

- Checked bag closing sewing machines again and observed the same problem as described on November 29th, 1985.
  also about this problem Molen service engineer informed Molen Holland.

- Mr. O. Karl / B.M.B. supervisor departed from Malta.

Monday December 9th, 1985

- Daily site supervision.

Tuesday December 10th, 1985

- Requested Mr. A. Briffa/MediGrain to arrange trailers for bag loading because we would like to test the bag sewing machines and the bag belt conveyor.

- The replacement parts for truck loading scale mentioned December 6th, 1985 arrived at site.
  Molen service engineer installed the parts and dry tested the whole truck loading scale.

- Requested Mr. A. Briffa/MediGrain to arrange bulk trucks to test the bulk truck loading scale.

Wednesday December 11th, 1985

- Arranged to continue with bag loading but again simular problems as before with the bag closing sewing machines.

- During the bag loading exercise observed that bag counters built-in the analog control panel by certain simultaneous scale movements counting two bags while only one bag was weighed.
  Made Molen service engineer aware of it and requested rectification work in the internal panel wiring.

Thursday December 12th, 1985

- Ordered bulk trucks for wheat loading exercise with the new installed AB basic digital control panel. According to Molen service engineer the installation is ready for operation.
  Started with loading of the bulk trucks and observed no discrepancies.
  Arranged that each loaded truck is re-weighed by custom's truck weighing scale.
  After loading twelve trucks the weight difference was only 40 kilogrammes which is a great improvement compared to the earlier exercise with the analog control panel.
  Weight difference was better than scale supplier indicated in their design parameters.

- The required springloaded supports for the belt scrapers on belt conveyors B5 and B6 arrived on site.
  B.M.B. immediately organized installation.

- MediGrain faces problems with their supply of wheat to the flour millers and in a few days the stock of wheat in MediGrain silo will be finished.

Mr. A. Briffa/MediGrain requested cooperation of B.M.B. in loading a vessel next week, to provide MediGrain with sufficient stock upto the end of January 1986.
Mr. E. Janke / B.M.B. explained Mr. A. Briffa that this request to B.M.B. might not be granted, due to the fact that they estimate that their remaining work will be ready this week and their supervisor is planned to depart Malta not later than December 11th/15th, 1985.
It is also arranged by the consortium that they will remove their workers.

Friday December 13th, 1985

- Observed again rain water in the silo bins. Checked the empty bins and detected leakages into bins 2, 3, 9, 11, 15, 16, 17 and 26.
  Informed Mr. F. Chachia / D.O.W., Mr. M. Sant / M.E.D. and Mr. A. Briffa / MediGrain on above.

- Mr. M. Sant / M.E.D. and Mr. A. Briffa / MediGrain have put both great effort to convince B.M.B. with regards to the emergency of the flour millers wheat supply but sofar without results.

- Informed by Mr. E. Janke / B.M.B. that today it will be Mr. H. Hartmann's last day at the Kordin Grain Terminal. Tried to convince B.M.B. about the importance of having back-up from B.M.B. next week but without result. According to Mr. E. Janke / B.M.B., they have no obligations in carrying out transhipment and loading of vessels.

Monday December 16th, 1985

Site meeting

Present: Mr. E. Janke B.M.B.
Mr. J.G. Herrebout G.E.M. Consultants B.V.

- This morning Mr. E. Janke attended a meeting with Mr. M. Sant and others about possible signing of certificates connected with payment schedules.

- Mr. E. Janke requested G.E.M. Consultants to check and confirm the items finalized on the snag list attached to G.E.M. Consultants letter dated December 6th, 1985. Because this morning G.R.M. and M.E.D. informed Mr. E. Janke that signing of certificates will only take place when all items on snag list are completed (see Appendix 22).

- Presented Mr. E. Janke with a list for rectification to be made in the maintenance instruction files (see Appendix 23).

- Strongly requested B.M.B. to present an original mechanical sparepart list because the one used to check the spareparts is a packing list.

- Stressed the urgency of receiving the as-built electrical diagrams from B.B.C. according to contract (5 sets).

- Requested Mr. E. Janke to exchange soonest the damaged proximity switches for the unloader tripper.

- As several small leakages in hydraulic equipment was observed , Mr. E. Janke had requested the supplier "Rexroth" to send a service engineer.
  Service engineer started today to carry out the necessary work.
  Oilleakage on feedpump still remain because the necessary part is not available in the spareparts and locally not available. The service engineer will order this part and arrange transport to Malta.

- As already stipulated by Mr. E. Janke / B.M.B. on December 13th, 1985, B.M.B. cannot fullfill the request for assistance in loading a vessel.

- Informed Mr. M. Sant / M.E.D. and Mr. A. Briffa / MediGrain about the latest developments of assistance in loading a vessel tomorrow.
  When vessel arrives tomorrow at least a few people from M.S.C.L. are needed to give some assistance.
  G.E.M. Consultants stressed their concern and refrain from any responsibility with regards to possible damages during loading of the vessel.
  Mr. M. Sant / M.E.D. will request M.S.C.L. management for possible assistances.

Tuesday December 17th, 1985

- Arrived on site 07.00 hours and noticed that five people of M.S.C.L. are present for assistance.

- Vessel was moored in the wrong position. Requested Chief Officer to shift the vessel.

- Also present labourers of the stevedoring company used very often by MediGrain, and one weigher operator from MediGrain.

- Started conveying system in Control Room but one route fails to react.
  Checked the routing and noticed that one flap on transfer point between silo and belt conveyor B 2 was not in the right position. Adjusted flap in the right position.

- Started loading and immediate problems with high level indicators in the loader.
  Adjust sensitiveness of the level indicators.
  Adjust triangle grain break plates in tripper and loader transfer point to create more spacing in between plates.

- Loaded the vessel with about 6,000 tons of hard wheat.

Wednesday December 18th, 1985

hrs.

09.00 Departure Malta.

Last minute information

- The as built electrical drawings and diagrams from B.B.C. still have to be presented by P.L. (5 sets).

- Original sparepart list still to be provided by B.M.B.

- Mr. E. Janke agreed to exchange the damaged proximity switches for unloader tripper.

- Tools belonging to the "Union Special" bag closing machines to be completed.

- Bag closing machines need immediate attention by supplier "Union Special" and B.M.B. because magnetic induction by the sewing start lever influences the magnetic field of a proximity switch.

- Confirmation letter to be presented by the supplier of the installed belt scraper (the company "Horsh"), to confirm that after the run in period the belt scrapers will perform as required.

- Oilleakage on feedpump unloader to be remedied by B.M.B.

Progress Reports

(remaining points)

		ACTION
1.	Backfill of steelhoppers in silo bins to be corrected.	D.O.W.
2.	Signing of silo logbook.	D.O.W.
3.	Minutes of meetings to be verified for correctness.	D.O.W.
6.	Sign boards of headway on unloader and loader.	D.O.W.
7.	Safety precautions.	D.O.W.
8.	Residual hopper to be fabricated.	D.O.W.
10.	Humidity of silo bins to be remedied.	D.O.W.
11.	Manhole covers to be installed in lower outloading scale hoppers.	D.O.W.

Remaining mechanical items

		ACTION
1.	Walkways and workfloor on level +15.50 meter headhouse.	D.O.W.
3.	Headhouse wall openings to be fitted with covers.	D.O.W.
4.	Remaining work on floor openings in headhouse.	D.O.W.
5.	Fire extinguishers to be placed in headhouse and silo.	D.O.W.
9.	Finishing doors and windows in auxiliary building.	D.O.W.
10.	Some closure (door) to be made in cable tunnel from silo to auxiliary building.	D.O.W.
11.	Decision on emergency generator for fire lighting pumps.	D.O.W.
12.	General cleaning of headhouse and silo inside and outside.	D.O.W.
13.	General cleaning of magazine and laboratory wharf.	D.O.W.
14.	Fencing of terminal perimeter.	D.O.W.
15.	Truck loading operator cabin to be considered.	D.O.W.
16.	De-airing ducting from bins 5, 6, 7 and 8 to be installed.	D.O.W.

APPENDICES

1. List with delivery dates for additional equipment.

2. Correspondence between M.E.D. and B.M.B.

3. Correspondence between M.E.D. and B.M.B.

4. List with changed delivery dates for additional equipment.

5. Correspondence between M.E.D. and B.M.B.

6. Information about off-tracking of conveyor belts.

7. Timeschedule concerning rectification work.

8. Remaining grain in out-loading bin.

9. Photographs showing damaged grains.

10. Correspondence from B.M.B. to G.R.M./M.E.D.

11. Proposal for truckloading operation cabin.

12. Correspondence (in German) from Molen to B.M.B.

13. Telex of weight difference and copies proving wrong installed panel from G.E.M Consultants to B.M.B.

14. Photographs showing poor civil work in silobins.

15. Information about off-tracking of conveyor belts and possible remedies.

16. General information on progress and justified views on the overall feasibility of the finalisation.

17. Proposal and quotation of P.L. installation of forced ventilation in reclaimtunnels.

18. Correspondence between M.E.D. and B.M.B.

19. Memorandum to Mr. M. Sant attached with list of present progress.

20. Draft for Handling and Storage agreement.

21. Declaration of successfull testing with list of remaining works.

22. List with remaining worksituation Dec. 16th. 1985.

23. List of maintenance instructions manuals remedies.

APPENDIX 1

MITTEILUNG H. G. Winter Braunschweig, 15.08.85
FS-7.1/wi-up

Geht an: PP-2/H. Weber
PP-4/H. Grabenhorst
EK-3/H. Kleinfeld
SP-2.1/H. Ude

z. Kts.: FS-1/H. Herzmann
FS-4.2/H. Janke

Betr.: Nachlieferungen Malta
526 800 - 527 320
- Katastrophenfall -

In Hinblick auf die fortgeschrittene Montage und Inbetriebnahme müssen die folgenden Teile bevorzugt gefertigt bzw. beschafft werden:

526 851/03 TA-Blatt Termin: 13.09.85
- 1 Satz Zubehör zur Aspiration

526 851/04 TA-Blatt Termin: 23.08.85
- div. Montagematerial

526 852/01 256 Aerzen Termin: 13.09.85
- 1 Gebläseaggregat

526 852/02 256 Piller Termin: 13.09.85
- 1 Radialventilator

527 003 TA-Blatt Termin: 13.09.85
- 1 Satz Zubehör zum PGFB-30

527 094 TA-Blatt Termin: 20.09.85
- 3 Silo-Auslaufschieber

527 227 TA-Blatt Termin: 27.09.85
- 2 Schleusenstationen kpl.

527 235 TA-Blatt Termin: 20.09.85
- 1 Düsenfilter MVRS-26/24 NT

527 240 TA-Blatt über FV Termin: 30.08.85
- 1 Schneckenförderer NFAS Ø 200 mit Nachtrag 01

Bremsmotore 06.09.85

...

Die o.a. Termine sind so abzukürzen, daß alle Teile spätestens am 06.09.85 fertiggestellt bzw. mit den Wareneingängen zur Spedition gebracht werden können.

Die Teile (auch einzelne Auftr.-Nr.) sind umgehend auf die Baustelle zu senden.

Vielen Dank für Ihre Kooperation.

FS - 7.1

H. G. Winter

APPENDIX 2

MICHAEL SANT PAS ECONOMIC DIVISION 20352

MR W HERZMANN

BUHLER MIAG GmbH BRAUNSCHWEIG, F.R.G.

952700 - 40 bm d

[redacted] MICHAEL SANT PAS

FOLLOWING RECENT COMMISSIONING TESTRUNS ON KORDIN EQUIPMENT AND THE VARIOUS DIFFICULTIES ENCOUNTERED, WE WOULD HEREBY LIKE TO FORMALLY REQUEST BUHLER MIAG TO PREPARE A DETAILED REPORT OUTLINING WHAT WENT WRONG DURING THE TESTS AND GIVING US THE REASONS WHY VARIOUS INSTALLATIONS FAILED TO FUNCTION PROPERLY. INFORMATION CONCERNING REMEDIAL ACTION WHICH BMB PLAN TO TAKE AS WELL AS AN INDICATIVE TIME SCHEDULE FOR THESE MODIFICATIONS ALSO REQUIRED.

YOU WILL NO DOUBT ALSO AGREE THAT ON COMPLETION OF MODIFICATION WORKS REFERRED TO ABOVE, FURTHER COMMISSIONING TESTS ON LOADING OUT EQUIPMENT ARE REQUIRED IN VIEW OF REPEATED FAILURE BY PLANT LAST WEEK TO REACH PLANNED CAPACITY. WOULD APPRECIATE BEING KEPT INFORMED OF YOUR PLANS FOR THESE TESTS INCLUDING ARRANGEMENTS BY BMB FOR AN EMPTY SHIP OF AT LEAST 10,000 DWT TO BE LOADED WITH GRAIN AND TENTATIVE TIME SCHEDULE FOR THESE TESTS. YOU MAY IN THIS CONNECTION WISH TO LIAISE WITH MEDIGRAIN, THE LOCAL GRAIN IMPORT ORGANISATION.

/ .....

2.

FINALLY, IN THE LIGHT OF LAST WEEK'S HAPPENINGS, THE GOVERNMENT RESERVES THE RIGHT TO TAKE ANY ACTION WHICH IT CONSIDERS APPROPRIATE.

REGARDS,

MICHAEL SANT
AUBERGE DE CASTILLE
MALTA.

BÜHLER-MIAG GMBH

BÜHLER-MIAG GmbH, Postfach 3369, D-3300 Braunschweig / BRD

By express - airmail

Malta Government
Economic Division
Attn.: Mr. Michael Sant
Principal Assistant Secretary
Auberge de Castille

Valletta / MALTA

Please contact : Mr. Janke
Direct dial/phone: (0531)594-2998
Direct dial/telex: 952700-40 bm d
Our ref. : FS-4.2/Jn/Ra

Your ref:
Your letter of:

Braunschweig, August 12, 1985

Re.: Kordin Grain Terminal

Dear Sirs,

Regarding your telex dated 31.07.85 we would like to mention that successful test run and commissioning of the installation took place. Unfortunately, a foreign body in one of the conveyors caused a breakage of the conveying chain at the ship unloader.

The chain has been repaired so far, to continue unloading the vessel at that time. To guarantee the working condition, a complete new chain has been supplied in the meantime.

Minor alterations within the spouting and aspiration systems, listed at the snag-list of your technical advisor, are partly already in hand.

For some required alterations, without influence to the function of the installation (additional aspiration), supply from Germany is necessary, and the delivery time will be advised.

We agree to demonstrate the conveying capacity of the shiploader once more, as test run period was not as requested.

For the outstanding parts of commissioning, we kindly ask you for assistance to provide the required operating staff, as at

...

BÜHLER-MIAG GMBH

BÜHLER-MIAG GmbH, Postfach 3369, D-3300 Braunschweig, BRD

the main commissioning period the installati n had to be operated by our own crew.

Yours faithfully,

BÜHLER - MIAG GmbH

ppa. i.V.

W. Herzmann E. Janke

ZCZC 40A544 26.08.85 14.15 8188E 906022
TT 40 12
.ZZ45F-444-RA AN:FS-4.2/JN, PANTA LESCO/MALTA, GEM/ROTTERDAM,
Dep.of Works, MSCL,ZM MR.HARTMANN/C/O MSCL, FS-1, FS-2.1, ARTEN

HANDVERMITTLUNG 04061100 MODMLT MT
ACHTUNG

MALTA GOVERNMENT - ECONOMIC DIVISION
ATTN.: MR. MICHAEL SANT
PRINCIPAL ASSISTANT SECRETARY

RE.: KORDIN GRAIN TERMINAL

IS HAS BEEN REPORTED BY OUR CHIEF-ERECTOR THAT AT VARIOUS STORAGE BINS FILLED WITH MAIZE THE TEMPERATURE WITHIN THE PRODUCT IS RISING UP TO 50 DEGREE CELSIUS, WHICH MAKES IT NECESSARY TO TURN OVER THE PRODUCTION COOLING PURPOSE.

AT PRESENT OUR CHIEF-ERECTOR TAKES CARE OF THE TURN OVER PROCEDURE.

AS OUR CHIEF-ERECTOR IS SUPPOSED TO HANDLE THE RECTIFICATION WORK, PLEASE MAKE THE SILO OPERATION STAFF AVAILABLE FOR HANDLING THIS MATTER.

BEST REGARDS,
BUEHLER-MIAG GMBH BRAUNSCHWEIG FS-4.2/E. JANKE

TELEX TO MALTA GOVERNMENT, MALTA

DONN

	27-8-85
Project no.	
Verz. directie	
Voor aktie	
Ter info	

ZCZC 40A566 27.08.85 10.34 81003 [illegible]
FT 40 10
[illegible]-444-RA AN:FS-4.2/JN, PANTA [illegible] MALTA, GEM ROTTERDAM, MSCL,
DEP.OF WORKS, IM MR.HARTMANN [illegible] MSCL, FS-1, FS-C.1, AKTEN

HANDVERMITTLUNG 04061[illegible] MOOMLT MT
ACHTUNG

MALTA GOVERNMENT - ECONOMIC DIVISION
ATTN.: MR. MICHAEL BAJADA
PRINCIPAL ASSISTANT SECRETARY

RE.: MARSA[illegible] GRAIN TERMINAL
OUR TELEX NO. [illegible] DATED [illegible].85

MUCH TO OUR REGRET THERE IS AN ERROR IN WRITING IN OUR ABOVE MENTIONED TELEX. PLEASE READ THE FIRST PARAGRAPH AS FOLLOWS:

"IT HAS BEEN REPORTED BY OUR CHIEF-ERECTOR THAT AT VARIOUS STORAGE BINS FILLED WITH MAIZE THE TEMPERATURE WITHIN THE PRODUCT IS RISING UP TO [illegible] DEGREE CELSIUS, WHICH MAKES IT NECESSARY TO TURN OVER THE PRODUCT FOR COOLING PURPOSE."

BEST REGARDS,
[illegible] BRAUNSCHWEIG [illegible]

TELEX TO MALTA GOVERNMENT

NNNN

Project no.
29.8.85

BÜHLER-MIAG GMBH

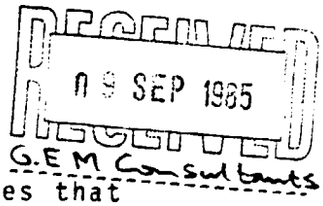
BÜHLER-MIAG GmbH, Postfach 3369, D-3300 Braunschweig / BRD

Malta Government
Economic Division
Attn. Mr. Michael Sant
Principal Assistant Secretary
Auberge de Castille

Valletta / Malta

Your ref:
Your letter of:

Please contact : Mr. Janke
Direct dial/phone: (0531)594-2998
Direct dial/telex: 952700-40 bm d
Our ref. : FS-4.2/Jn/Zi
Braunschweig, September 4, 1985



Re: Kordin Grain Terminal

Dear Sirs,

With our telex dated 26.08.85 we informed your offices that recycling of already stored maize is necessary for cooling purpose of the product.

We further asked you to make silo operation staff available to handle this matter. Up to date only one scale operator is on site who still requires the guidance of Messrs. Molenschot's commissioning engineer.

It has been reported that the terminal is now in use at the outloading line to such an extent, that it can not be longer classified as test run and commissioning.

For this work as well our people on site have to take care at present, as no operating staff is available.

Under these conditions we are not able to work at the requested rectifications. We have to inform you that at present three BMB-supervisors and one scale specialist are hampered by the commercial use of the terminal.

We presume your understanding in this matter that we have to invoice you for our work involved of operating the terminal due to unavailability of operating staff.

Yours faithfully,

BÜHLER-MIAG GmbH

ppa. i.V.

[illegible]mann E. Janke

APPENDIX 3

FLORIANA

MALTA

Your Ref

5 September, 1985.

BY EXPRESS - AIR MAIL

RECEIVED
09 SEP 1985
G.E.M Consultants

Mr W Bergmann
Mr E Janke
Buhler Miag GMBH
Postfach 33 69
D - 3300 Braunschweig
Federal Republic of Germany.

KORDIN GRAIN TERMINAL

Dear Sirs,

Please refer to the telex dated 31 July, 1985, by Mr Michael Sant from the Economic Division, Auberge de Castille and to your letter to Mr Sant dated August 12, 1985.

You write in the first paragraph of your letter that "successful test run and commissioning of the installation took place" and in the fifth paragraph that "we agree to demonstrate the conveying capacity of the shiploader once more". Both statements are not correct. The Government of Malta strongly rejects that successful test run and commissioning of the outloader have taken place and that the stipulated conveying capacity of the shiploader has been successfully demonstrated. Moreover neither do we agree that the alterations required for additional aspiration do not influence the proper functioning of the installation.

Due mainly to faulty design the capacity of the shiploader has so far failed to meet the contractual rate while the defects in the dedusting system seriously hamper the operational efficiency of the plant. Other shortcomings which have already been brought to your attention by Mr J G Herrebout have yet to be remedied.

As a result the taking over of the Kordin grain terminal by the Maltese Government is well behind schedule. The delay is not due to remedies which were found necessary for ordinary defects and for which provision was made in the contract signed on 21 October 1983. It is evidently due to the failure on your part to supply equipment of the contractual standard, design and capacity.

Severe prejudice is being caused to operational start up which has been planned by the Maltese authorities for the Kordin grain terminal and damages have been and are being incurred.

In the circumstances the Government of Malta is holding Buhler Miag

/.....

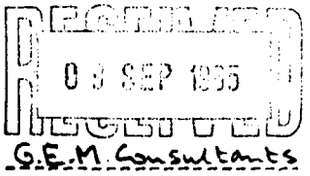
responsible not only for the penalties which were stipulated for mere delay but also for all damages caused by your default.

L. C. SPITERI
F/ACCOUNTANT GENERAL

LCS/jd

CPM/EP/11/78/P.16

6 September 1985.



Mr W Herzmann
Mr E Janke
Buhler Miag GMBH
Postfach 33 69
D-3300 Braunschweig
Federal Republic of Germany.

KORDIN GRAIN TERMINAL

Dear Sirs,

1. With reference to my telex dated 31 July 1985 and your letter dated 12 August 1985 I would like to draw your attention to the letter which was sent to you by express air mail on 5 September 1985 (ref. TR 2208/83) by the Accountant General.

2. In spite of the fact that Mr J G Herrebout visited your offices in Braunschweig in mid-August for discussions on various aspects of the remedial action which Buhler Miag has to take in order to honour the contractual obligations of the contract signed on 21 October 1983, it is a matter of strong concern to us that so far we have been left completely in the dark as to the programme which Buhler Miag intends to adopt for the execution of the necessary remedial/ modification works.

/.....

3. We understand from Mr Herrebout that during his visit to your offices he passed on to you various papers which describe the outstanding items as on 15 August 1985 which require remedial action both from Buhler Miag and from the other sub-contractors. Without prejudice to any other items which may require rectification, we consider this list as the check-list for remedial works which have to be undertaken before the performance tests at the Kordin grain terminal can get under way.

4. We also understand from Mr Herrebout that he drew your attention to the weaving faults which have been observed in most of the belt conveyors. Not only are there various faults in belt fabrication but in general the workmanship of the belt fabrication can be regarded as low-quality work. In the circumstances you are hereby being requested to undertake all necessary remedial action so that the belt conveyors will be brought up to internationally acceptable standards.

5. In my telex dated 31 July 1985 I had requested you to provide us with an indicative time schedule of the modification works which are necessary on various installations at the Kordin grain terminal. To date this information has not been made available to us. I do of course appreciate that this schedule has to be integrated with the requirements of Medigrain and the company's programme to draw upon its grains currently stored in the Kordin silo: but the fact remains that so far we have not been given the slightest indication by your side as to when the Kordin grain terminal can be expected to be operational. In the circumstances I would suggest that Buhler Miag will as a matter of urgency present us with a time schedule for the modification works. On its part Medigrain will also draw up a tentative programme to indicate the likely dates when it will need to draw upon its Kordin stocks. These two programmes could then be made to fit into each other by your representatives in Malta and Medigrain officials so that we will at least be in a position to know when the Kordin terminal modification works and commissioning tests are likely to be completed.

/ .....

6. We have also not been given any indication so far of the arrangements which Buhler Miag will be making for the commissioning tests on the ship outloader in spite of my request for this information in my telex to you dated 31 July 1985. Here again the programme and timing of these tests could possibly be worked out in cooperation with Medigrain in the sense that Medigrain stocks currently held in the Kordin silo can be used for the purpose as long as the commissioning tests are held at a time which will be convenient for Medigrain. I would therefore like to draw your attention to the fact that unless this programme is worked out as early as possible, Medigrain might then not be in a position to ccoperate in the execution of these tests.

7. You will no doubt agree that the Kordin contract has now been delayed for an inordinately long time. I would therefore suggest that all outstanding items be cleared forthwith and that every effort be made to bring the contract to a conclusion as early as possible.

Yours faithfully,

Michael Sant

Michael Sant
Principal Assistant Secretary

1100 MODHLT MT
1100 MODHLT MT
952700Z BN D BRAUNSCHWEIG SO 09.09.85 15.30 H

ATTN. MR. MICHAEL SAINT - PRINCIPAL ASSISTANT SECRETARY -.
ECONOMIC DIVISION

RE: YOUR LETTER REF OPM/EP/11/78/F.16 DATED SEPT. 6, 1985

WE ARE VERY MUCH SURPRISED REGARDING YOUR LETTER AND YOUR REMARK THAT WE HAVE LEFT YOU COMPLETELY IN THE DARK.

WE WOULD LIKE TO MENTION THAT IMMEDIATELY AFTER RECEIPT OF YOUR TELEX DATED JULY 31 WE INFORMED YOU BY LETTER DATED AUGUST 12 THAT WE ALREADY STARTET WITH RECTIFICATION WORK.

YOUR OFFICIAL SNAG LIST HANDED OVER BY YOUR TECHNICAL ADVISOR WE RECEIVED ON AUGUST 16 ONLY.

ACCORDING TO THIS SNAG LIST WE INFORMED ALL PARTIES CONCERNED IMMEDIATELY.

FURTHERMORE OUR MR. JANKE HAS INFORMED YOU BY TELEPHONE ABOUT OUR ACTUAL SITUATION WITH REGARD TO RECTIFICATION WORK AND CONFIRMED IT BY TELEX.

WITH REGARD TO THE OUTSTANDING WORK WE HAVE INFORMED YOU ON SEPT 4 BY LETTER ABOUT THE DIFFICULTIES OUR CHIEF-ERECTOR HAVE ON SITE UNDER THE CONDITION THAT PART OF THE SILO IS ALREADY IN COMMERCIAL USE.

THE NECESSARY TIME SCHEDULE WILL BE READY MIDDLE OF SEPTEMBER AND WILL BE PRESENTED PERSONALLY BY OUR MR. JANKE TO COORDINATE ACTIVITIES FROM YOUR SIDE.

WE ASSURE YOU THAT WE DO EVERY EFFORT FOR CONCLUSION OF THIS CONTRACT IN THE SHORTEST TIME POSSIBLE.

REGARDS,

BUEHLER-MIAG BRAUNSCHWEIG
F3-1 / W. HERRMANN

1100 MODHLT MT
[illegible]
1100 MODHLT MT

Memorandum

To : Mr. M. Sant M.E.D. Economic Division
From : J.G. Herrebout G.E.M. Consultants B.V.
Subject : Kordin Grain Terminal
Date : November 29th, 1985.

We wish to inform you on the latest developments at the silo :

1. See page of rain water
2. Civil works
3. Mechanical works
4. Electrical works
5. Expiry of Agreement 84/05

---

1. Seepage of rain water

We observed on November 25th, 1985, water on reclaim belt conveyor B8, water dripping from bin outlets, bin number 9, 11, 24 and 26.

- Most probably rain has penetrated the waterproofing on the silo roof.
- No evidence could be obtained if rain has seeped into other bins, but one can be assured that some other bins have maybe less but similar problems.
- Above proofs that previous remarks made in regards to the workmanship in civil construction in general, have been made correctly.
- Superfluous to mention that in regards of professional handling and storage of food grains at present the si is not ready to store grains

2. Civil works

- In respect of the remaining works up to date no proper action has been taken to remedy the major and small items in the civil construction work, mentioned in previous summary.

- Great concern should be given and prompt action to be taken to remedy the following :

  - Wetness in silo bins
  - Humidity in and around silo
  - Smoothness in silo bins
  - Adequate slopes at bin outlet hoppers
  - Adequate cement washing of the inside bin walls.

- Ventilation for reclaim tunnels

  Have attended a meeting in P.L. head office requested by Mr. Ch. Cassar.

  Presented with P.L. proposal for the ventilation in reclaim tunnels.

  Requested P.L. to install running lights of ventilators on starting panels.

  Due to lack of experience in this particular topic of ventilation for silo humidity problems, it is difficult for G.E.M. Consultants to judge if P.L. proposal will remedy the existing humidity in reclaim tunnels completely.

  The proposed ventilation will certainly improve the humidity balance if also operating personnel being instructed not to ventilate when ambient humidity is too high.

3. Mechanical works

In respect of the remaining works and modifications to be carried out by the suppliers, one can judge from lists presented that up to date only a few items will remain in regards of the mechanical works, see attached summary.

In contrary with the mechanical items to be carried out by D.O.W. and M.S.C.L., up to date the items on previous list are still remaining and it seems that no action can be expected soonest.

4. Electrical Works

Similar as for the mechanical works, the remaining works on the previous electrical list can be regarded as almost finalised, only a few items still to be carried out, see attached summary.

5. Expiry of Agreement 84/05

In reference to our memo "Justified views in the overall feasability of the finalisation",

I feel obliged to draw your attention for the expiry of Agreement 84/05 – second amendment which is due on the 13th of December, 1985.

In connection with said date, the urgency arises to make arrangements for the continuation of all pending matters.

Summary of items whichhave been completed up to November 29th, 1985.

Unloader

Item 1, In an earlier stage B.M.B. had intended to look into a more reliable solution, but according to B.M.B. letter dated November 7th, 1985, they regard the installed safety device as sufficient for the purpose.

Item 2, Completed, test with full load of grain

Item 3, Completed, is now made adjustable.

Item 4, Completed.

Item 5, Completed.

Item 6, Completed, test with full load of grain

Item 7, Completed, test with full load of grain

Item 8, Completed.

Item 9, Completed.

Item 10, Completed, test with full load of grain

Item 11, Completed, test with full load of grain

Item 12, Completed, but has to be tested when unloader is loaded with grain.

Item 13, Completed.

Item 14, In hand by B.B.C.

Item 15, Completed, test with full load of grain

Item 16, Completed.

Item 17, Replaced temp. indicator, but can only be checked if ambient temperature is as high as in summer.

. Time delay for starting procedure will be installed.

Item 18, Completed in regards airconditioning, but if cooling is sufficient can only be checked if ambient temp. is as high as in summer.

Item 19, Doorlocks and handles ordered and partly installed. Due to the poor construction of the doors and frames, work executed cannot be regarded as adequate.

Item 20, Completed.

Item 21, Completed.

Item 22, Still not completed, and in regards of adequate action by M.S.C.L., the proper action never taken.

Item 23, Completed.

Item 24, Completed.

Item 25, Exchange of signal carried out but one alarm for wind velocity to be changed.

Item 26, If pulley of belt conveyor sufficient tapered can only be proved with full load of grain,

Item 27, Still outstanding because the ones delivered were incorrect.

Item 28, One more dry test been carried out but test under working condition will proof that the switches are acceptable or not.

Item 29, No adequate answer obtained from B.M.B.

Item 30, Completed, test with full load of grain

Loader

Item 1, Filter on backside of portal belt conveyor modified. Dry tests been carried out, if de-dusting of tripper is sufficient can only be checked with full load of grain.

Item 2, Modification completed and short test with grain carried out, but if belts stay aligned under longer and more severe operations, cannot be judged.

Item 3, B.M.B. have turned the whole membrane casing go degrees, with many hours dry testing, filters not malfunctioned anymore, tests with full load of grain to be carried out.

Item 4, Oil leakage appears again, to be checked/repaired.

Item 5, Modification executed and short test with grain carried out, but if belt stay aligned under longer and more severe operations, cannot be judged.

Item 6, Enlargement of transfer point is not possible due to the design of the swivel point between loading jib and loading pipe.

. High level indicator is replaced and made adjustable.

Item 7, Completed.

Item 8, Completed.

Item 9, Completed.

Item 10, Still outstanding, because the ones delivered were incorrect.

Item 11, See point 3.

Transfer tower and wharf gantry

Item 1,) Additional de-dusting filter and accessories installed,
Item 2,) to check if de-dusting adequate, tests with full load of grain to be carried out.

Item 3, Completed.

Item 4, – See item 1 and 2.
– Completed
– Completed.

Item 5, – Completed
– Additional backplate installed, the function can only be checked with full load of grain.

Item 6, Completed.

Item 7, Some modifications carried out, but has to be checked with full load of grain.

Head house and Silo

Item 1, Completed.

Item 2, Completed.

Item 3, Completed.

Item 4, Completed.

Item 5, Completed.

Item 6, Completed, tests with full load of grain carried out

Item 7, Completed.

Item 8, Completed.

Item 9, Completed.

Item 10, Completed.

Item 11, Completed.

Item 12, Completed.

Item 13, Completed, tests with full load of grain carried out

Item 14, Completed.

Item 15, Completed.

Item 16, Completed.

Item 17, Materials to change control panel of truck bulk loading scale will arrive Dec. 1st, 1985, according to the agreement between B.M.B. and M.S. The materials should arrive Nov. 15th, 1985.

New

Item 18, Malfunction of outloading scale pos. 30.

Item 19, Malfunction of bagging scales (both lines).

- To remedy item 18 and 19, B.M.B. informed M.S. and requested immediate repair (guarantee).
- Service engineer of M.S. arrived in Malta Nov. 28th, 1985, which can be regarded as poor service concerning guarantee.

Item 20, Malfunction of motor control silo scale compressor, time dalay for star / delta to be renewed.

Item 21, Observed for the second time, water in the oil of silo compressor.
B.M.B. exchange oil, but it cannot be judged if this not happen again.

Item 22, For operation purpose a layout of the piping and flap boxes in the de-dusting head house to be drawn up by B.M.B.

Item 23, Belt conveyor B 3 shows cracks and loosening of the vulcanised ribs on the belt.

Item 24, Missing test weights (12 kg) to be replaced.

Progress Reports

(remaining points)

Item 1,
- Even after much pressure from the Prime Minister's Office to D.O.W., no action has been taken so far.
- At present already great problems in emptying the silo bins, a large remainder of grains have to be removed manually

Item 2, This obligation still not fulfilled by D.O.W.

Item 3, Same as item 2, both items 2 and 3 are contractual obligations.

Item 4, Proposal list supplied but ignored by D.O.W.

Item 5, Various equipment numbering completed with the co-operation of M.S.C.L., but also ignored by D.O.W.

Item 6, Still no action taken

Item 7, Partly executed, but on existing dangerous rock formations no action has been taken.

Item 8, Proposal supplied, but again no action taken.

Item 9, Telephones and accessories arrived week 42. Installation by P.L. started week 43.

New
Item 10, Observed 25/11/85 that after the rainfall on 24/11/85, a portion of rain has penetrated the waterproofing on silo roof, water in bins 9, 11, 24 and 26.

General Remark : For future operational purpose, items 1 and 10 have to be remedied otherwise use of this silo cannot be expected and will be a great limitation for an operating company.

Item 11, Manholes to be installed in lower outloading scale hoppers.

Remaining Points

(Telex dated 27/03/85)

Item 3, The action on paintwork by M.S.C.L. can be regarded as nil, because some work which has been carried out the past weeks is even more discontended as before.

Item 11, For the remaining improvements, no action has been taken.

Item 12, Still 60 percent of plastic film not removed.

Item 16, In hand.

Item 17, Still the same, the additional installed de-dusting filter and screw conveyor have been carried out very professional.

Item 19, Still not completely acceptable,

Item 20, It has been announced that after all the additional cabling is ready P.L. will check all the cable ladders and renew the Ty-raps were necessary.

Remaining Electrical Points

(Telex dated 02/04/85).

Item 1, Is overruled by P.L. showing early correspondence between P.L. and D.O.W.

. No further action can be taken by G.E.M. Consultants.

Item 2, Completed.

Item 3, Completed.

Remaining mechanical items

Item 1, About 20 percent installed and since weeks no further work has been carried out.

Item 2, Completed.

Item 3, No action taken so far.

Item 4, No action taken so far.

Item 5, Only placed in Aux. building due to wrong delivered brackets.

Item 6, Installation completed but testing not been carried out.

Item 7, Installation started week 41, but still not completed.

Item 8, See item 7.

Item 9, No action taken

Item 10, No action taken.

Item 11, No action taken.

Item 12, No action taken.

Item 13, Only partly carried out.

Item 14, Action is taken by M.E.D. and Medigrain, but so far no co-operation from D.O.W. and P.W.

Item 15, Maintenance covers silo roof to be made dust tight. M.S.C.L.

Remaining Electrical items

Item 1, Completed.

Item 2, Level indicators placed, but electrical connections not carried out. P.L. to be instructed by B.B.C. and M.S.

Item 3, Completed.

Item 4, Completed, padlocks with masterkey to be provided.

Item 5, Completed, buzzer alarm on unloader to be renewed.

Item 6, Not ready yet, is in hand.

Item 7, Completed.

Item 8, In hand by B.B.C.

Item 9, Completed.

Item 10, Completed.

Item 11, Completed, ~~remaining~~ test in grain.

Item 12, The ones delivered were incorrect, will be replaced.

Item 13, ~~In hand~~.

Item 14, Completed.

Item 15, No action taken.

Item 16, Completed.

Item 17, Completed.

Item 18, Completed.

Item 19, Completed.

Item 20, Completed.

Item 21, Completed.

Remaining Electrical Items (continued)

Item 22, Some remaining connections.

Item 23, Installation completed.

Item 24, Completed.

Item 25, Completed.

Item 26, In hand.

Item 27, B.M.B., P.L. as well as B.B.C. are not prepared to co-operate in carrying out the requested modification.

Item 28, Some connections remaining.

Item 29, Completed.

Item 30, Completed.

Item 31, Completed.

Item 32, In hand, will be carried out when new control panel is placed.

Item 33, Completed.

Item 34, Completed.

Item 35, Completed.

Item 36, Completed.

APPENDIX 20

DRAFT

HANDLING AND STORAGE AGREEMENT

between

THE CANADIAN WHEAT BOARD, WINNIPEG

(the "CWB")

and

KORDIN GRAIN TRANSHIPMENT SILO, MALTA

("Kordin")

It is agreed between above mentioned parties that Kordin Grain Transhipment Silo (Kordin) will undertake to discharge, store and load a quantity of Canadian Wheat and/or Canadian Barley, supplied and owned by the Canadian Wheat Board (the CWB), Winnipeg, on terms and conditions as specified below at their grain terminal and transhipment facilities (the terminal) in Malta.

1) Quantity/Quality: Up to m/t to be stored in separate compartments, apart from any other grain in storage in the terminal.

2) Weight: Any shortage between weight of grain unloaded into the terminal ex Ocean Vessel(s) and weights

loaded out by Kordin to transhipment vessels, to be for account Kordin. Any such overage to be for the account of the CWB.

3) Discharging/Loading Guarantee:

Discharging m/t per w.w. day of 24 hours sshex, usual notice and despatch/demurrage according to governing Charter Party. Loading m/t per w.w. day of 24 hours sshex, usual notice despatch/demurrage (not less than 50 per cent of demurrage) according to governing Charter Party. Grain to be delivered on board vessel stowed and trimmed for terminal's account.

4) Rates:

a) Unloading and loading operations basis 3 (three) U.S. dollars per metric ton, includes discharge into Kordin Terminal and outward loading from Kordin Terminal at rates mentioned above, per weather working day (24 hours basis), Saturdays, Sundays and public holidays excluded (sshex), even if used.

b) The above unloading and loading rate covers all stevedoring costs, but excludes costs such as pilotage dues, mooring and unmooring

charges and towage. Any other unloading or loading costs not specifically mentioned are to be paid, as mutually agreed upon between "Kordin" and the "CWB".

c. No other local charges and/or taxes for unloading, storage, loading and re-shipment except those specified in this agreement are payable by the "CWB" except for usual port call expenses referred to in sub-paragraph (b) above.

d) The above quoted rate, also includes weighing of grain, inward and outward, as well as issuing of following certificates by "Kordin".

i) (Quality) and quantity certificates on unloading and loading, at the terminal.

ii) Certificate guaranteeing separate storage and identity of grain.

iii) Phytosanitary certificate issued by Maltese Ministry of Agriculture for period of storage.

Any other certificates, which may be

required, but which must tally with information on other certificates, will be issued by "Kordin", will be for account of party ordering same.

The "CWB" shall have the right to engage Canadian Grain Commission and/or Société Generale de Surveillance (SGS) to monitor/inspect quality of grain during unloading and loading operations.

5) Storage: (Payable by owner of the grain)

a) Following completion of discharge of vessel, first week will be free. Starting with eighth day, after completion of discharge of vessel, storage rate will be $ .033 U.S. per metric ton, for each day or part thereof, until date of delivery of grain to vessel for outloading.

b) Grain which, though sound when received, goes out of condition, or is found to be infested, with injurious noxious or troublesome insect or animal pest, or with other quality defects, shall be the responsibility of the

Kordin Silo Authority who shall reimburse the owner, the value of the grain, including C.I.F. costs in moving grain from Canada to Malta.

6) Vessel: Regular selftrimming bulkcarrier(s) for discharging. Regular singledeck/selftrimming vessel, suitable for carrying grain in bulk without stowage bags, for loading. No cargo in wingtanks both inward and outward vessels. Vessels for transhipment not to exceed dwt tonnes and could include coasters and/or barges.

7) Notice for Loading: 14 days preliminary notice together with approximate loading quantity and days definite notice together with exact quantity to be loaded.

8) Insurance: "Kordin" shall, at all times, keep all grain in the terminal, fully insured by approved Insurance Company, satisfactory to CWB, against loss or damage by fire and inherent explosion and all other risks, during such time as the grain is stored in the terminal or in the course of delivery into or out of the terminal. Insurance policy shall provide that the proceeds of the policy be payable to owner of the grain stored in

the terminal, in priority to any claim by the terminal operator. Premium attributable to such coverage not to exceed for the account of the CWB.

9) Ownership: The commodity stored shall remain the property of the CWB and no delivery shall take place except with the authorization of the CWB. If storage capacity is rented to or used by other persons, the commodities belonging to such persons to be kept strictly separated.

10) Responsibilty: "Kordin" is responsible for any damage that may occur during discharge, loading and storing period. "Kordin" is responsible for any loss caused by larceny and/or defalcation and for deterioration or loss in quality of the grain.

11) Storage: "Kordin" will store the commodities in a safe way and shall exercise due care and diligence to prevent any grain in the terminal from suffering damage or deterioration in quality or from going out of condition.

During the first week after discharge daily

temperature readings must be taken. Thereafter temperatures must be taken once a week if the temperature is stabilized on an acceptable level.

Temperatures to be kept on record for each compartment during the term of storage.

Irregular temperature should be reported to the CWB immediately, and an agreement should be made for turning or delivery of the grain. (Understanding repayment of cost).

During storage, Kordin must ensure that contamination from other shipments of similar or any other commodity due to leakage in pipelines, chain transporter, or errors made by employees, does not occur.

12) Cleaning and Prevention of Infestation:

Both from an environmental point of view and considering the quantity of grain for human consumption stored, the plant must be kept thoroughly clean. This will also prevent infestation and reduce the possibility of dust explosion.

Except from the usual cleaning routine an annual thorough cleaning of the transportation system together with the top and bottom of the elevator must take place. This cleaning must be combined with an efficient prevention of infestation by using relevant pesticides. The type of pesticide must be approved by owner of the grain.

If grain is fumigated, certificates evidencing such fumigation must include data, such as type of fumigant, and percentage of residue.

13) Accounting and Control of Quantities Stored:

Separate account must be kept on commodities of various kinds. Separate account must also be kept for each large overseas cargo. Before final delivery of the remainder of each large cargo the balance must be weighed separately.

Signed this day of , 1985.

"Kordin" The "CWB"

APPENDIX 21

Office of the Prime Minister
Economic Division
Auberge de Castille
Valletta.

Attn : Mr. M. Sant.

Malta, December 6th, 1985.

Dear Sirs,

We herewith declare that in view of the successful testing, G.E.M. Consultants can advise G.R.M. and M.E.D. that commissioning can be regarded as finalised and the performance tests have been successfully executed.

No further discrepancies are present, henceforth the consortium's request to sign the certificates of final acceptance ought to be granted.

See attached snag lists with remaining items to be performed by the consortium within a limited period of time.

Yours sincerely,

G.E.M. Consultants B.V.

J.G. Herrebout.

Unloader	Action
- Speed monitor i.e. chain break protection of B.K.T. to be installed additionally to provide a more reliable protection.	B.M.B.
- Doorlocks and handles to be finalised and installation to be acceptable.	M.S.C.L.
- Painting still not completed.	M.S.C.L.
- Alarm buzzer for wind velocity indecator to be renewed.	P.L.
- No adequeate answer obtained to proof that counter weight can be turned above a vessel of 80.000 M/T during discharging of the remainder grain into residual hopper on portal belt conveyor.	B.M.B.

Loader	Action
- De-dusting filter located on portal belt conveyor serving the tripper, to be checked under more severe conditions i.e. dirty grains.	B.M.B.
- Painting still not completed.	M.S.C.L.
Head house and Silo	Action
- Finalising and testing of modified bulk loading scale	B.M.B./ M.S.
- Testing bag loading scales, attention to be given on the bag belt conveyors.	B.M.B./ M.S.
- For operational purposes a layout of the piping and flap boxes in the modified de-dusting system to be drawn up.	B.M.B.
- Belt conveyor B3 shows cracks and loosening of the vulcanised ribs on the belt.	B.M.B.
- Missing test weights (12 kg) to be replaced.	B.M.B.
- Paintwork still not completed	M.S.C.L.

Remaining Points	Action
(See telex 27/03/1985 - Report No. 11 - Appendix 5.1)	
3. Paintwork on building to be completed.	M.S.C.L.
11. Cladding on loader and unloader to be improved.	M.S.C.L.
12. Removal of plastic film on cladding wharf gantry.	M.S.C.L.
17. Modified-work on Mimic Panel executed in poor manner.	P.L.
19. Conduit pipe stoppers to be filled always, to be checked.	P.L.
20. Ty-rap strapping on all cable trays to be checked if it is acceptable carried out.	P.L.

Remaining electrical items	Action
- Flexible cables to hydraulic valves on Unloader boom cylinder to be supported.	P.L.
- Low level indicators in load-out bins A,B,C and D to be connected into scale panel and junction box.	P.L./ M.S.
- Indication plates on control desk Unloader to be changed.	P.L.
- Emergency stops in pushbutton pendants loader and unloader to be replaced by New locked ones.	P.L.
- The red flash lights on telephone not suit the purpose.	P.L.
- Emergency stops in headhouse to be fitted with protection covers.	P.L.

General	Action
- Revised and as built drawings to be provided for : . Mechanical drawings . Electrical drawings . Scale drawings and operating manuals	B.M.B./ P.L./ M.S.
- Revised operating and maintenance manuals.	B.M.B.

APPENDIX 22

ACTION

Situation Dec. 16, '85

Unloader

- Speed monitor i.e. chain break protection of B.K.T. to be installed additionally to provide a more reliable protection. B.M.B.

- Painting still not completed. M.S.C.L.

- No adequate answer obtained to proof that counter weight can be turned above a vessel of 80.000 M/T during discharging of the remainder grain into residual hopper on portal belt conveyor. B.M.B.

Loader

- De-dusting filter located on portal belt conveyor serving the tripper, to be checked under more severe conditions i.e. dirty grains. B.M.B.

- Painting still not completed. M.S.C.L.

Head house and Silo

- For operational purposes a layout of the piping and flap boxes in the modified de-dusting system to be drawn up. B.M.B.

- Belt conveyor B3 shows cracks and loosening of the vulcanised ribs on the belt. B.M.B.

- Missing test weights (12 kg) to be replaced. B.M.B.

- Paintwork still not completed. M.S.C.L.

ACTION

Remaining Points

(see telex 27/03/1985 - Report No. 11 - Appendix 5.1)

- Cladding on loader and unloader to be improved. — M.S.C.L.

- Removal of plastic film on cladding wharf gantry. — M.S.C.L.

Remaining electrical items

- Low level indicators in load-out bins A,B,C and D to be connected into scale panel and junction box. — P.L./ M.S.

- emergency stops in pushbutton pendants loader and unloader to be replaced by key locked ones. — P.L.

- Emergency stops in headhouse to be fitted with protection covers. — P.L.

General

- Revised and as built drawings to be provided for: — B.M.B./ P.L./ M.S.
  - . Mechanical drawings
  - . Electrical drawings
  - . Scale drawings and operating manuals

- Revised operating and maintenance manuals. — B.M.B.

APPENDIX 23

The following rectifications to be made in
Maintenance Instructions files
for
Unloader HL - SKT (1)

	Remarks
1. Motor and instrument list, to be completed.	in German
2. Technical data of nivotester 52.750.Z/ST	in German
3. Operating instructions for Lohmann and Stolterfoht, spare parts drawing 2/3831/1100/0	in German
4. Some Molenschot drawings to be rectified due to modifications carried out during installation and in the operating manual some paragraphs to be re-written due to mistakes.	
5. Speed monitor unit, type to be provided because copy description not clear.	
6. Inductive proximity sensors, type installed to be described.	
7. Operating instructions for belt drive to be provided.	
8. SEW bogie drives partly.	in German
9. Endress and Hauser sensor 52.750 Z/ST.	in German

for

Unloader HL-SKT (2)

1. Drawing REHM - 34007.00 arrangement cable guide.	to be modifi
2. Stemman drawing 4KMSch 249 a	in German

	Remarks
3. Stemman drawing 4 KMSch 120	in German
4. Demag spare parts lists, cable reel motors.	in German
5. Electrical diagram for switch board compressor to be provided.	

for

Unloader hydraulic

1. Drawings 250 ET 22RZ1/V 3110/10	in German
250 ET 22XZ1/V 3110/10	in German
2. Documentation of spindel limit Switch TY V3110 from Bruening-hans Hydraulik GMBH	in German
3. Drawing of Kickin/out cylinder	
4. Drawing of lift cylinder	
5. Documentation of "Beringer" leak free brake valve	
6. See point 5, sparepart list	
7. "Senso Control" documentation	

for

Loader

1. Motor and instrument list to be completed up to the latest developments.	in German

Remarks

2. Drawing; Arrangement of electric, to be completed up to the latest developments.

3. Tower swivel joint, drawing 0/383/1051/1 — in German

4. More details to be supplied for Rothe-Erde bearing

5. Vertical telescopic loading pipe, general remarks page, is not a clear copy, other copy of instructions to be supplied.

6. Belt conveyor bridge drawing REMP - 00593 to be updated in view of the modified transfer point and aspiration filter.

7. Information and applicable documentation to be supplied for drives of both belt conveyors.

8. Aspiration filters have been modified, principle of the valve location to be changed.

9. Arrange cable guide drawing REHM - 34008 - 00 to be updated
   * Stemman drawing 4 KM Sch 249 a — in German
   * Stemman drawing 4 KM Sch 120 — in German

10. No information provided for air drier and air cooler.
    * electrical diagram for compressor equipment to be provided.

Landside Installations Part A

1. Bucket elevator type RGEU:
   * no marks been make on elevator sizes installed.
   * elevator boot casing, drawing 1004 fig. 5 to be modified, because inlet completely re-build.

Remarks

2. Horizontal chain conveyors:
   * no marks been made indicating sizes of chainconveyors installed

3. Copies of the operating instructions of the Airlock type ADSB to be replaced for clear copies.

4. Information on electromotors not enclosed.

5. No indication provided on the installed Aerzener Blowers i.e. size, type

6. Operating instructions for de-dusting filters to be replaced — in German

7. No information provided for the installed screwconveyor;

8. No information provided for the installed elevator and conveyor belts

9. No information provided for electrical safety devicex
   i.e. * off-track indicators
   * speed control indicators

Landside Installations Part B

1. On Flender drawings no indication given of gearbox and couplings locations

2. Installation/manual of Foss temperature measuring system is not of the one installed.

3. Silo air compressor:
   * Part list of starter assembly incorrect other starter installed

Remarks

* No operating instructions and trouble shooting check list enclosed

4. Information on electromotors not enclosed

Handside Installations, erection drawings

1. Motor Plan. Flow diagram to be updated.

2. Motor and Instrument list to be enlarged and updated.

3. Erection Plan floor and 19.54 to be updated.

4. Erection Plan floor and 23.03 to be updated.

5. Dust collection of aspiration system drawing REMG - 1786 - 00, aspiration system to be updated.

6. Arrangement Plan Transfer Tower drawing REMG - 01768 - 00, aspiration system to be drawn.

7. Aspiration Plan, drawing REMA - 00417 to be updated.

8. Aspiration Plan, drawing REMA - 00416 to be updated.

9. Flow diagram, drawing REAG - 00991 - 04 to be updated.

Silo Scales

1. Eventual changes in electrical diagrams executed by service engineer to be updated.

2. For truck loading scale a complete new mannual to be supplied.

Bagging off stations

1. All electrical diagrams to be updated in accordance with installed equipment.

2. Low level to be connected and integrated into the circuit of the scales.

3. In description list all cables to be described.

4. Survey of drawings complete in the English language.

5. The copies of the Union Special bag closing machines are not clear particularly in the photographs.

6. Function description type EME to be updated.

General Remark

* Oil and grease chart to be provided included with intervals.
* All general lay out drawing to be provided.
* Information on the installed electrical equipment from B.B.C. such as:
- list of installed material
- documentation of installed material

APPENDIX 13

Date: 25/10/85

TO : BUHLERMIAG - BRAUNSCHWEIG
FROM : J.G. HERREBOUT - MALTA

ATTN : MR. E. JANKE

- REF. TO OUR TELCONS IN REGARDS TO THE MALFUNCTION OF THE E M E BULK WEIGHER FITTED WITH ANALOGUE CONTROL PANEL, THE FITTED CONTROL PANEL IS IN CONTRADICTION WITH THE BASIC VERSION AS DESCRIBED BY MOLEN PAMPHLET.

- SEE PAMPHLET OF THE MOLEN ELECTRONIC BATCH WEIGHERS TYPE E M E

X PAGE 2, REFER TO BASIC VERSIONS

. E M E - 90/200 - E (A B)

. BATCH WEIGHT APPROX. 180 KG (0.75)

. TYPE OF PRODUCT - WIDE VARIETY

. NOMINAL OUTPUT/HOUR - 80 T/H (0.75)

X PAGE 3, REFER TO PARAGRAPH 2

QUOTE

FOR THE BULK WEIGHER VERSION OUR WELL-KNOWN AB - BASIC CONTROL UNIT IS SUPPLIED

UNQUOTE

- WITH ABOVE EVIDENCE IT WILL BE UNDERSTOOD THAT THE CLIENT CANNOT BE ADVISED TO ACCEPT THE INSTALLED BULK WEIGHER, BECAUSE WEIGHT CANNOT BE CONTROLLED WITH THE ANALOGUE CONTROL PANEL.

BELOW A FEW TRUCK WEIGHT EXAMPLES, FAR EXCEEDING THE 2 PROMILLE, ACCEPTED AS INTERNATIONAL STANDARD AND GUARANTEED BY MOLEN

BULK LOADING

DATE	TRUCK NO.	K.G.T. WEIGHT	CUSTOM WEIGHT
28/8/85	K 2875	12,000	11,720
28/8/85	Z 2259	9,000	8,450
29/8/85	K 2875	11,000	11,190
30/8/85	Z 2259	8,500	8,380
3/9/85	E 4292	6,000	6,720
18/9/85	G 6474	8,500	8,735
18/9/85	G 6474	8,800	8,725
25/9/85	R 3592	9,500	9,600
25/9/85	E 4292	7,000	7,155
26/9/85	K 2875	11,000	11,110
26/0/85	R 9290	9,000	9,020
27/9/85	K 2875	11,000	11,125
1/10/85	W 0319	15,000	14,090
1/10/85	R 3592	9,500	10,265
2/10/85	R 9290	9,000	9,145
2/10/85	W 0319	15,000	15,140
16/10/85	K 2875	11,000	9,810
16/10/85	K 2875	10,100	11,470
16/10/85	K 2875	9,200	10,180
17/10/85	E 4292	6,000	6,105
17/10/85	R 3592	8,000	8,110

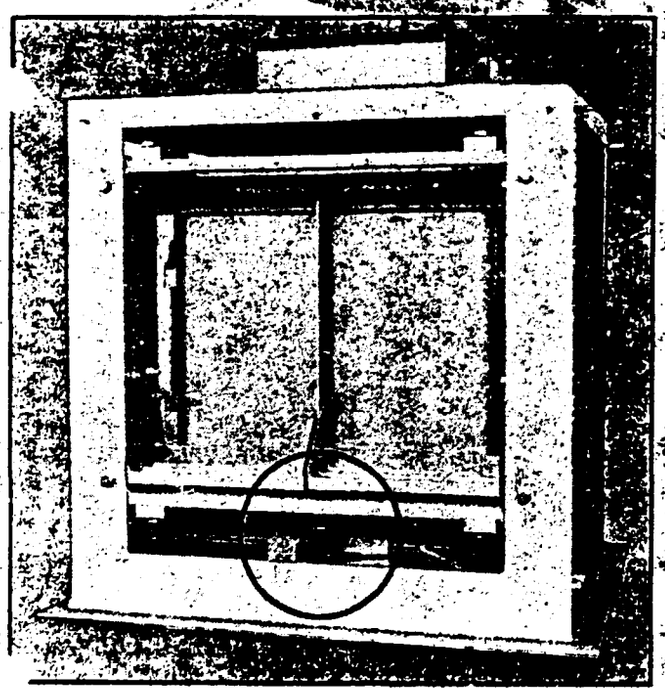
BEST REGARDS

G.E.M. CONSULTANTS

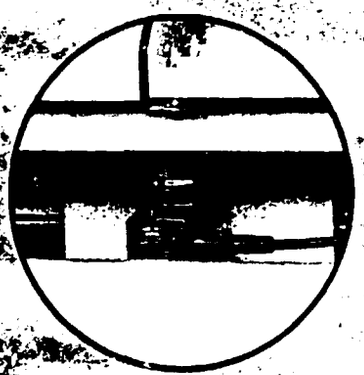
WELL RECEIVED PLS?
K
THANKS AND BIBI

1340 MEDGEN MW
952700Z BM DO

The automatic weighers of our EME series are designed to handle a wide variety of products with exceptional accuracy at high output. Depending on the selected control-unit, the weighers can be operated on the equal batchcounting principle (e.g. for bagging-off units) or on alternate gross/tare weighing principle (e.g. as bulk scale for intake and/or outloading. The size of the weighbin and the material feeding system are determined by the product-characteristics and the required output/hour. The low building height is a remarkable feature of the EME weigher.
Detailed planning-drawings are available for all types.
The weigher can be combined with almost every type of bag closing equipment, provided by you, or supplied by us if so required.
The accuracy of the EME-weighers is well in excess of that required by the Weights and Measures Authorities in most countries.



EME-weigher with electro-pneumatically operated filling-slide.



detail of high precision loadcell type USP as mounted in EME-weighers.

Following basic versions are available:

Type	Bag/batchweight	Type of product	Nominal output/hour
EME-25- 50-DS	presettable 25- 50 kg	granular	650 bags
EME-50-100-DS	presettable 50-100 kg	granular	600 bags
EME-25- 50-TN	presettable 25- 50 kg	granular + meal	500 bags
EME-50-100-TN	presettable 50-100 kg	granular + meal	450 bags
EME-40/100-E (AB)	approx. 125 kg (0.75)	wide variety	40 t/h (0.75)
EME-80/200-E (AB)	approx. 180 kg (0.75)	wide variety	80 t/h (0.75)

* For larger bulk weighers, ask for our AB-pamphlets.
* The EME-bagging scales can be supplied with a screw-conveyor for non-free flowing products (e.g. minerals).
* Special constructions on request.

Control units

Molenschot provides made-to-measure control units for the EME-weighers.
They vary from the simple analogue controller for a straight-forward bagging-off scale to most modern micro-processor systems for integrated control in larger installations. A standard micro-processor system for bagging-off scales includes:

- digital weight display
- operation by function keys
- automatic tare
- automatic limit-check
- feed-time check
- standstill check
- preset bag counter
- mimic panel with pilot LED's
- selection for 32 materials
- keyboard for data-input
- preselection of bag-weight
- automatic correction for in-flight material
- pushbutton controlled zero-adjustment within ¼ scale-division
- PLC-control unit for 24V solenoid-valves

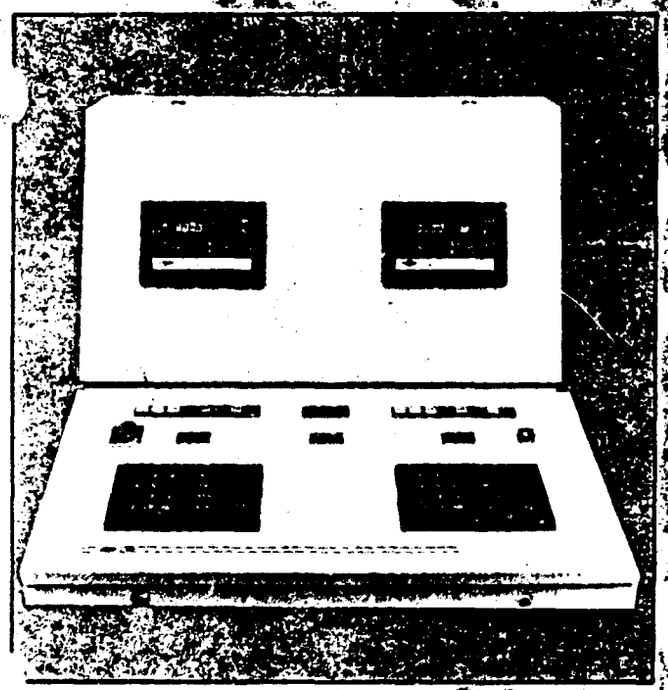
Optionally available are:

- printer
- remote display
- serial interface for computer connection

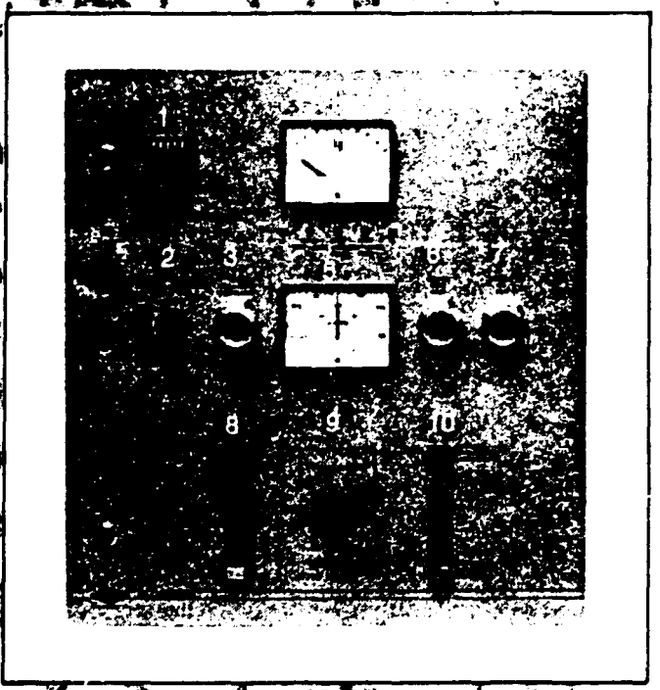
For the bulk weigher version our well-known AB-BASIC control unit is supplied.
A special pamphlet is available.

Hereunder the elements on the analogue frontpanel.

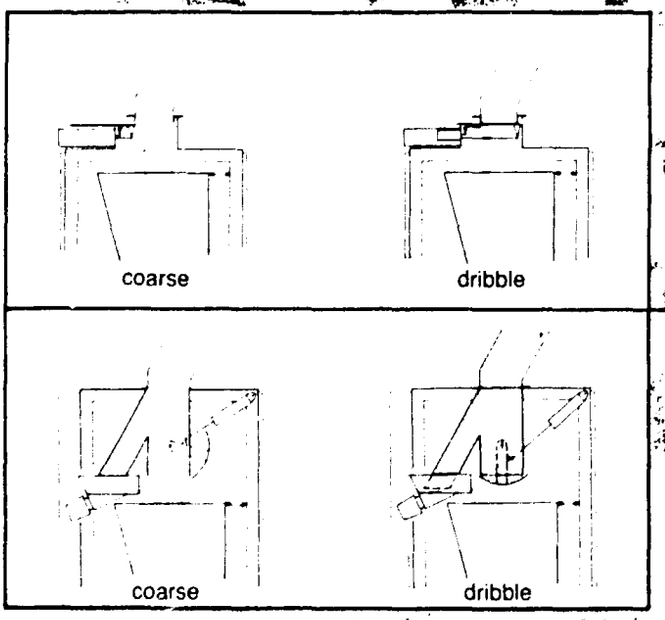
1. Preset bag-counter
2. bag weight selector
3. zero adjustment
4. bag weight indicator
5. bag weight-deviation indicator
6. coarse feed adjustment
7. dribble feed adjustment
8. operational controls (on/off, start, stop)
9. mimic diagram
10. operational controls



View of control-panel for twin weighing unit type EME-D (digital control system) - suitable for remote installation.



View of control-panel for EME-A weigher (analogue control system) - suitable for remote installation.



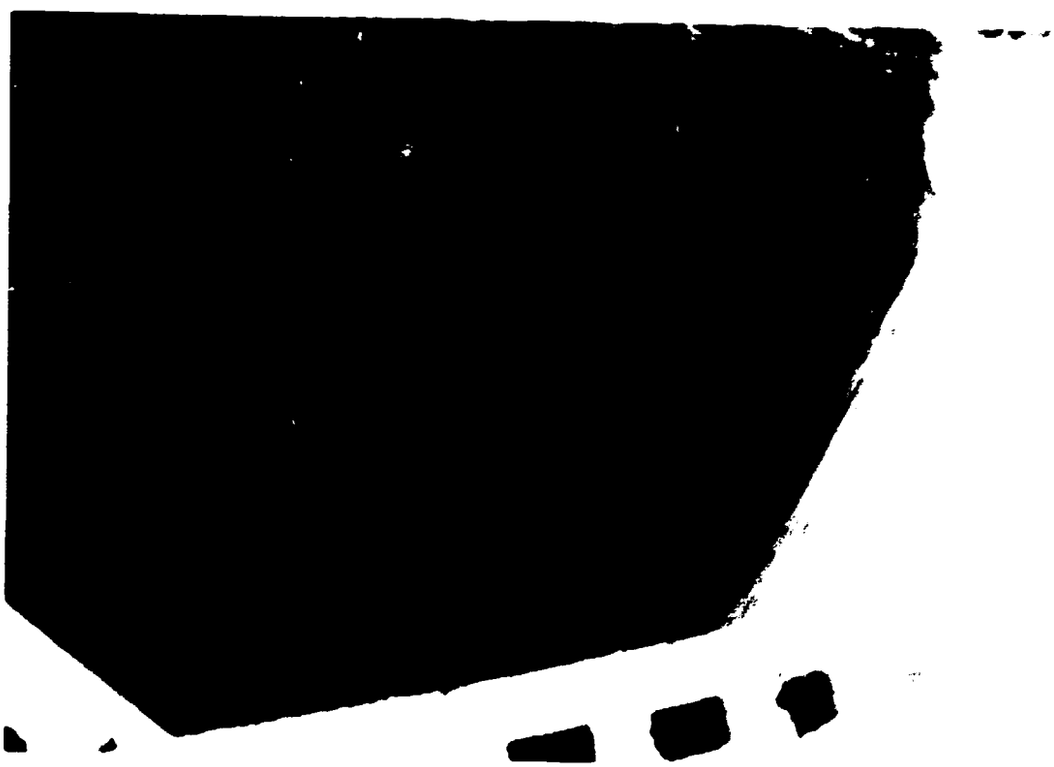
dosing system of type EME.....DS

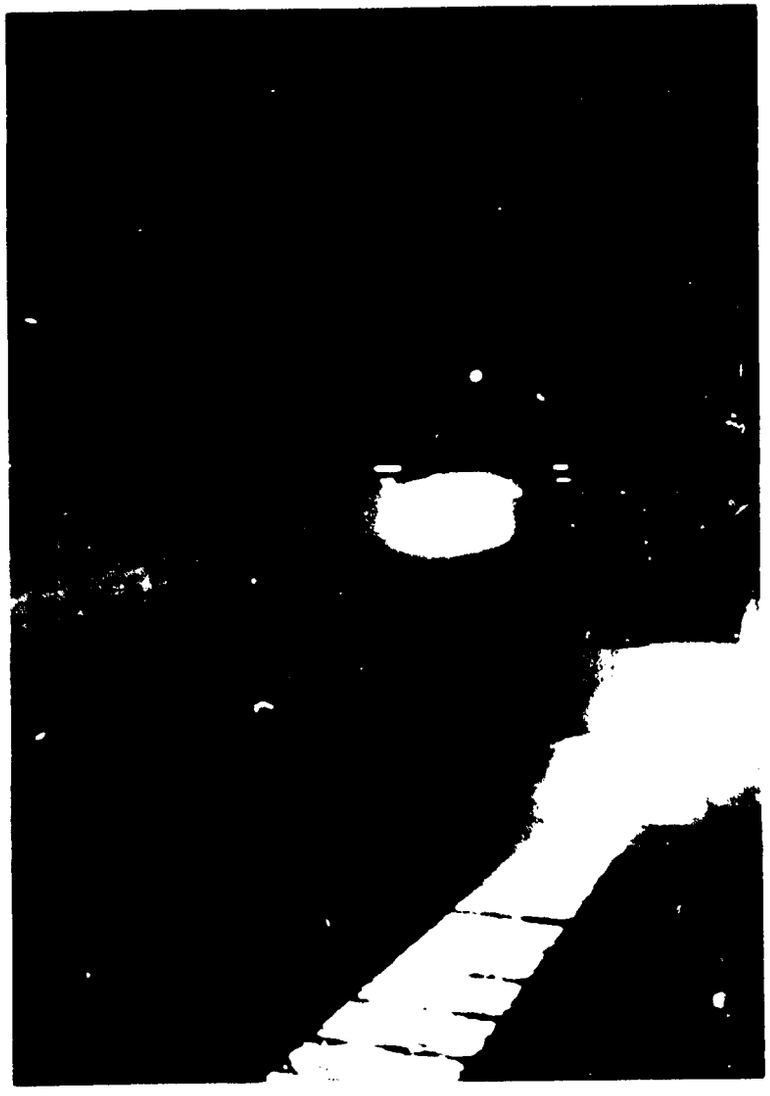
- 2 filling slides open = coarse feed
- large filling slide closed + small slide open = dribble feed

dosing system of type EME.....TN

- feed gate open + vibratory feeder operating = coarse feed
- feed gate closed + vibratory feeder operating = dribble feed

APPENDIX 14





APPENDIX 15

- lubrication of conveying equipment in operation is only authorized in cases where the parts to be lubricated are safely located, or provided with a device which will permit lubrication without danger, and if guards have to be removed, lubrication can only be carried out after the equipment has been rendered inoperative.

The best form of accident prevention is intensive training of operating and maintenance personnel.

4.1.3 Basic Operation Rules

Many failures of components and equipment related accidents can be prevented by proper safety precautions and operation rules. Some of the more important are listed below.

1. No conveying device should be used for duties other than those for which it is designed.
2. At no time should the conveyors be used to handle products other than those originally specified.
3. The user shall not make alterations which affect the design, construction and installation of the conveying elements without the consent of the constructor, as some alterations may have detrimental consequences.
4. No one should be allowed to ride on, step on or cross-over a moving or operable conveyor, nor to walk or climb on conveyor structures, without using the walkways, stairs, ladders and cross-overs provided for the purpose.
5. All starting operations shall be only carried out by qualified and competent personnel.
6. No unauthorized person shall operate or interfere with the manual working of the plant.
7. Emergency stopping devices shall be easily accessible to all personnel. All areas giving access to them shall be kept clear of obstacles. Their proper operation shall be periodically checked.
8. All restarting operations on a conveyor which has been inoperative because of an emergency or accidental stoppage shall be preceded by an inspection determining the cause and the repair of the fault.
9. Any conveyor found to be unsafe for operation, or one that does not have all guards and safety devices in excellent condition, should not be used until adequate supplementary safety devices are installed.
10. Only trained personnel should be allowed to operate the conveyor system. They should have complete knowledge of conveyor operations, electrical controls, safety and warning devices, and the capacity and performance limitations of the system.

4.2 The Belt Conveyor

4.2.1 Introduction

The belt conveyor is an all-round, economical and reliable continuous transportation device with many applications. It is able to transport bulk products at enormous hourly capacities, over long distances following different profiles or paths of travel, horizontal, inclined or declined at moderate slopes or with the inclusion of concave or convex curves.

Of the available types of handling equipment, it is probably the best known and the most widely used. So numerous are its uses and arrangements that it would be impossible to illustrate all the possibilities.

Simplicity of construction, high efficiency with low frictional loss, resulting in small driving power and economy, are a few of the features which make belt conveyors the most commonly used types of conveyor.

Also, grain handling facilities use more belt conveyors than other types but if not properly designed they may become a nightmare for maintenance and production personnel. Design and construction should therefore consider all factors necessary to give it a minimum starting resistance, high efficiency, a long life with low maintenance and high load capacity. The above criteria impose considerable responsibilities upon the designer of conveyor systems, especially considering that in this particular equipment field a contractor will have to optimise the capability of various items such as idlers, belting, and structural steel work each of which are commonly supplied by different manufacturers.

The ever-increasing use of belt conveyors as an economical means of transport has given an impetus to the research and development of the most important parts. More attention is focused on the quality of materials and their most rational use in the construction. This section gives a description of the outstanding features of design and provides essential data to produce a correct installation most suitable to requirements.

4.2.2 Operation and Main Parts

The belt conveyor, as schematically illustrated in Figure 4.01, consists of an endless belt that wraps around two pulleys, the drive and the return pulleys. Between the terminal pulleys the belt must be supported by idlers or roller-sets and tightened by means of a take-up device.

Special features may be required such as the possibility of having several discharging sites and the ability of the belt to run both ways.

90

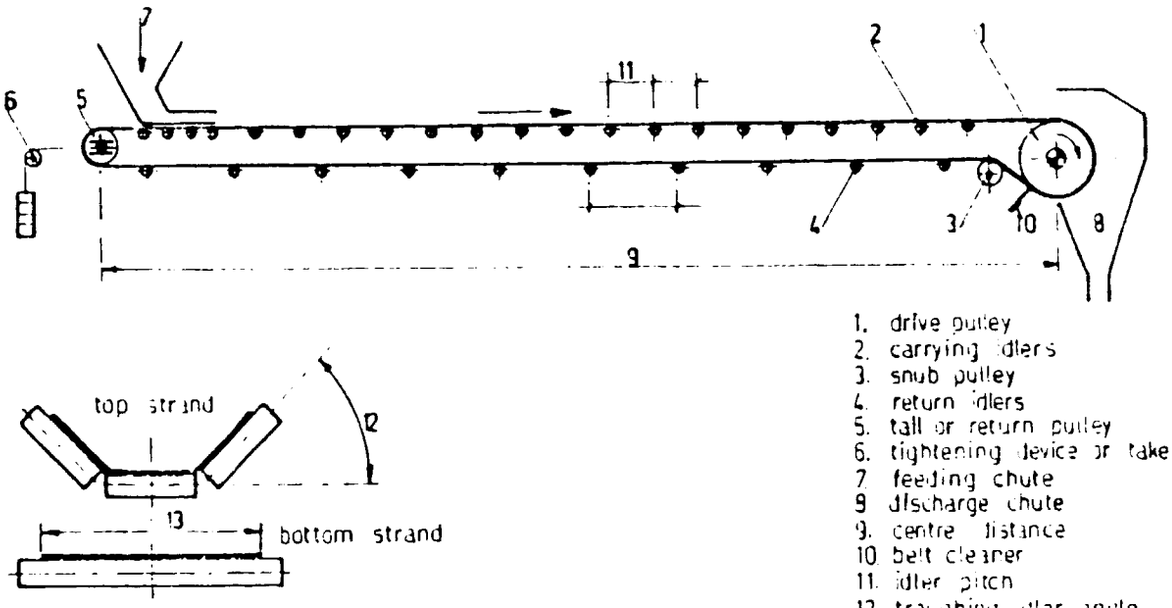


Fig. - 4 01 : The belt conveyor operation and main parts

4.2.3 Design Data

The design of a belt conveyor system requires the following information: available space; horizontal conveying length and conveying height or lift; characteristics of the product to be conveyed; required nominal capacity per hour; required peak capacity and duration of the peak; number of loading sites and method of loading; how many discharging sites are required; how many hours per day, per week, per year, must the belt conveyor operate; will the belt conveyor be installed indoors or out, and any notable site conditions of rain, snow or wind for example.
The overall information will be used to determine the following data:
belt width, belt speed, required motorpower, maximum belt tension and breaking strength of the belt, diameter of the pulleys, quality of the belt (carcass and cover thickness) and the means of support (idler configuration, type of rollers, and idler pitch).

4.2.3.1 Conveying Length

Almost any distance can be covered by a belt conveyor system.
The length of a single conveyor belt is only limited by the tension strength of the belt. For average installations belts are manufactured with a carcass consisting of one or more plies of synthetic fibre. Some very large installations have belts with steel-cord reinforcements.

4.2.3.2 Conveying Capacity

The desired capacity must be specified before designing the conveyor.
Although vital in achieving maximum system efficiency, rated capacity of a total system is determined by a number of factors other than horsepower capacity of the drive motor.
Idler spacing, belt selection, correct belt width, belt speed and belt troughing, permissible angle of inclination which depends on the characteristics of the bulk product itself, are interrelated items which influence the capacity in some way. For maximum capacity troughing idler rollers are used to raise the edges of the belt.

4.2.3.3 Relationship between Belt Speed and Belt Width

The first step in the design of a belt conveyor with a specified conveying capacity is to determine the speed and the width of the belt. It is tempting to think of high speed rates when designing a belt conveyor, because this enables narrow belts and a cheap transmission. However, consideration should be given to the fact that whilst high speed conveyors are economical as regards initial cost, maintenance cost will be higher compared with a wide conveyor operating at a lower speed.

The belt speed should be selected to minimize product spillage or removal of fines due to the velocity of the belt. Certain types of bulk commodities are not suited

for high belt speeds because of segregation and dust emission.

The maximum allowable belt speed mainly depends on the bulk density, the composition of the product (dust content) and the angle of incline of the belt conveyor.

If voluminous light products such as grains are transported at speeds exceeding 3.5 m/s the air resistance reaches a level where the product has a tendency to be blown off the belt. With kernel-shaped products this speed should not be exceeded. With soyabeans 2.8 m/s is recommended due to the round shape of the kernel. For extra light and dusty products such as grain derivatives a maximum belt speed of 2.5 m/s is recommended.

There are other reasons to avoid high belt speeds.

1. If a loaded belt is restarted after a standstill at a speed which is too high, product friction will occur on the belt and the surface of the product will be levelled by the starting shock, this may cause spillage.
2. Possibly jet unloading of the belt may be disadvantageous at too high belt speeds. In this case it is possible to divert the product flow, but the unloading chute required wears very quickly and certain products may be damaged.
3. Due to sag, light products are thrown upwards at the idlers if the belt travels at a high speed; this may cause spillage. If sag is decreased by reducing the idlers space or by increasing belt tension, the savings effected by the increased belt speed are offset.
4. If the loading speed of the bulk product is equal to or smaller than the belt speed, choking may occur in the feeding chute. Feeding chutes should be shaped in such a way that both the travelling direction and the product speed upon arrival on the belt match the belt speed, or exceed it by about 10%.

The selection of belt width depends on the required capacity, belt speed, angle of inclination of the belt conveyor, trough angle and depth, method of loading, and particle size of the product to be conveyed. If, in Figure 4.02, S (m²) is the product cross-section and V (m/s) the belt speed, then the capacity per hour Q (m³/h) = S (m²) x V (m/s) x 3,600.

Multiplication by the bulk density (t/m³) of the product to be conveyed gives the conveying capacity per hour (t).

When calculating the belt width one must also consider a large clear margin which prevents spillage of the product. The S' volume, depending on the angle of slope (for grains $\alpha = 12°$) of the product surface, is to be disregarded when calculating the capacity. In practice, volume S' only exists during the first few metres

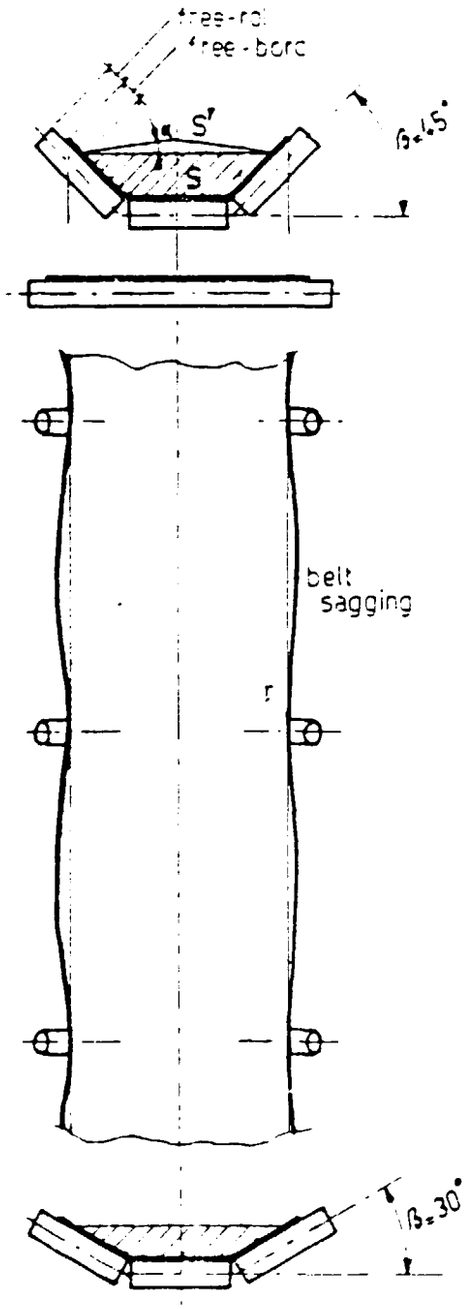


Fig. 4.02. The conveying capacity depends on factors such as material cross-section, belt speed and sagging

behind the loading site. Due to the light lateral and vertical displacement of the belt between the idlers, the material surface becomes levelled, thereby decreasing the clear margin that existed immediately after loading the product. In some cases the product surface becomes completely horizontal.

With belt conveyors having high idler spacing and low belt tension, the opposite phenomenon may occur: the belt surface may become hollowed. In order to main-

tain the required conveying capacity when implementing a trough with a smaller angle, a wider belt will be necessary. As illustrated in the figure, it is always more advantageous to implement a larger trough angle.

The above mentioned considerations only apply for horizontal belts. If, however, a conveyance capacity must be ensured via an inclined belt, the product may flow back and a larger belt width may be required.

Before a final decision can be made regarding belt width, it is necessary to calculate the number of belt plies required to provide the necessary strength and to decide upon the troughing angle to be used.

4.2.3.4 Inclined Belt Conveyors (see Figure 4.03)

Belt conveyors can be arranged to follow different paths of travel: horizontal, inclined or declined. The difference between the level of the loading site and the discharging site is the conveying height or lift, which is determined when selecting the conveyance path.

The maximum angle of slope at which the belt may be inclined depends on the characteristics of the product being handled and is theoretically almost equal to the natural angle of repose of the product. In practice however, for most grains, the angle of slope of an inclined belt conveyor should never exceed 12-15°. The angle of slope for soyabeans should even be less.

The conveying capacity of an inclined belt conveyor is smaller than that of a horizontal conveyor. When engineering an inclined belt conveyor the horizontal transporration capacity has to be multiplied by an inclination factor.
If very steep conveyance is required, the addition of a cover belt which runs synchroneously with the main carrying belt and presses it own weight on the conveyed product, can increase the transport capacity of the belt conveyor.

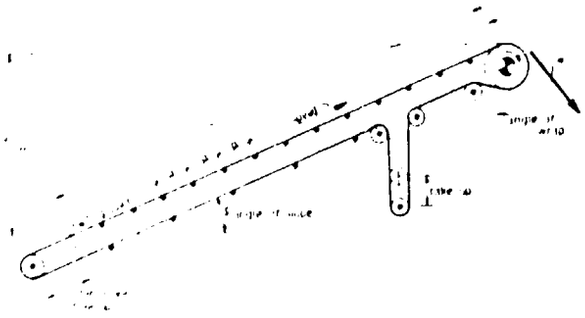


Fig. 4.03 The inclined belt conveyor

4.2.3.5 Curved Belt Conveyors

Belt conveyors may be curved in a vertical plane. Two types of vertical curves can be distinguished: concave curves and convex curves.
The following guidelines are to be considered during the design.
In «concave curves», belts with a reasonable cross stiffness and deep trough will appear not to maintain the trough as opposed to the horizontal section of the belt conveyor. The belt tends to be lifted off the idlers to run on top of the outer rolls which causes misalignment. Therefore the arc of radius R in Figure 4.04 must be large enough to enable the empty belt always to rest on the middle roll of the troughing idler, even in the curve. The size of the arc of radius R depends on the weight of the belt itself and on the stress of the belt in the curve area.
With the «convex curve» the troughed belt is tightened over the rolls and may have to stretch. There is a difference between the length of the belt sides and the middle of the belt, which is offset by elongation and compression. A belt is less resistant to compression than to extra stretch. When limiting the troughing angle, the arc of radius R can be decreased, but this also reduces the conveying capacity.

On conveyors of the type shown in the Figure 4.04, there are two portions which require special attention: the concave curve from B to C and the convex curve from D to E.
At D the tension in the edges of a trough-shaped belt increases at the transition from straight to curved path; the largest possible bending radius should therefore be utilized, for example 25 times the width of the belt for a 45° trough angle. Carrying idler units must at least be of three-roller type and the distance between them should be less than half the usual spacing.

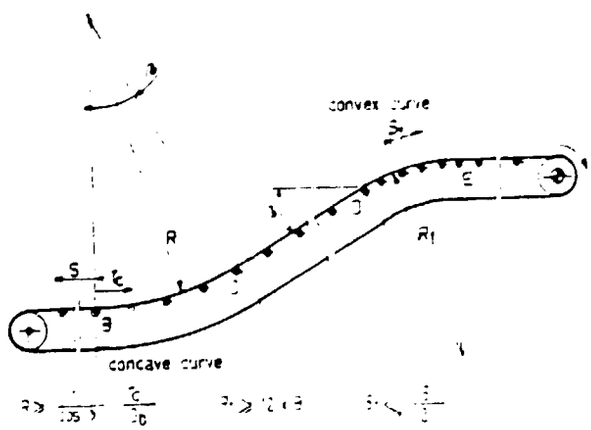


Fig. 4.04 The curved belt conveyor

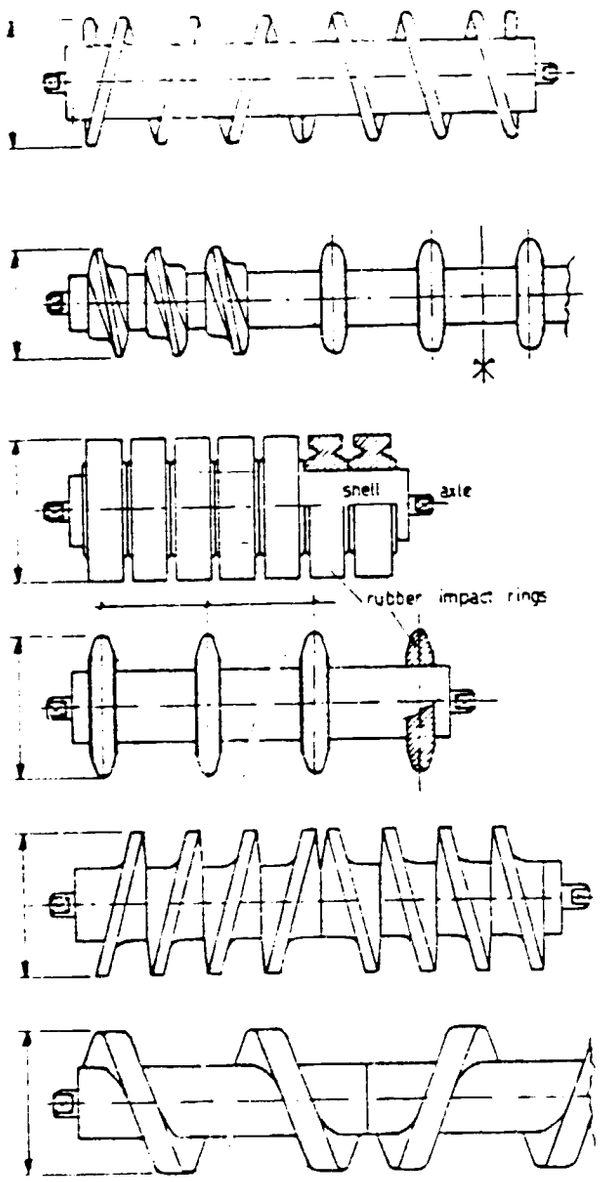


Fig - 4.07 Typical impact and spiral return idlers

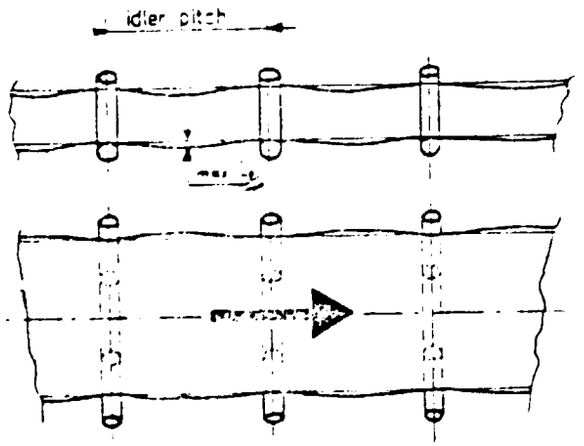


Fig - 4.08 Vertical and lateral undulation of the belt

This causes a more difficult steering of the belt and it may start running crooked. In the worst case the diameter of the rolls enlarges enough to block the system. Adherence is greatest on the return idlers near the discharge pulley and decreases towards the return pulley. Action should be taken to limit the adherence and its side effects.

Apart from the flat roll the industry also provides other types which may help in special problem applications due to their cleaning effect. Generally these special rolls consist of a flat roll that holds tightly mounted steel, rubber or plastic rings (see Figure 4.07). They are secured against any side movements by fillings. Several types of rings may be considered:

1. disc rings which are normal cylindrical rings mounted on the flat roll,
2. tumbler rings which are used in combination with disc rings and prevent the belt from running crooked; tumbler rings are mounted both with left and right pitch, and
3. cage rings which consist of a profile steel cage welded onto flat rolls. It is a costly implementation which does not always give better results.

The spacing between the idlers, as illustrated in Figure 4.08, is widely recognised as a significant influence on whether or not a belt retains its correct troughing. Test studies have shown that incorrect idler spacing may cause the belt to undulate vertically and laterally (sagging), thus increasing friction and reducing the effective capacity of the drive motor. The required power may also surmount the calculated power due to the vertical and lateral movements of the belt and the product. The idler pitch is determined by the idler load rating or the carrying capacity of each idler, on the sag of the belt between the idlers, belt tension and belt speed. If the idler pitch is too great this may, in certain cases, threaten the belt and the conveying capacity; the load of the belt plus the product will be increased on each idler. As a general rule, heavier products and wider belts require closer spacing of the carrying idlers.

For defining the maximum distance one may consider the belt sag between the idlers to be less than 1% of the idler pich. As an indication, the space between the carrying idlers should be approximately equal to the belt width, not exceeding 1.2 m. Suitable spacing between the return idlers may vary between 2 and 3 metres. Usually the upper idlers and the return idlers are placed at a certain distance from one another. This is based on the idea that the tensile force is equal in every cross section of the belt, and that it has the tension set by the tensioning device.

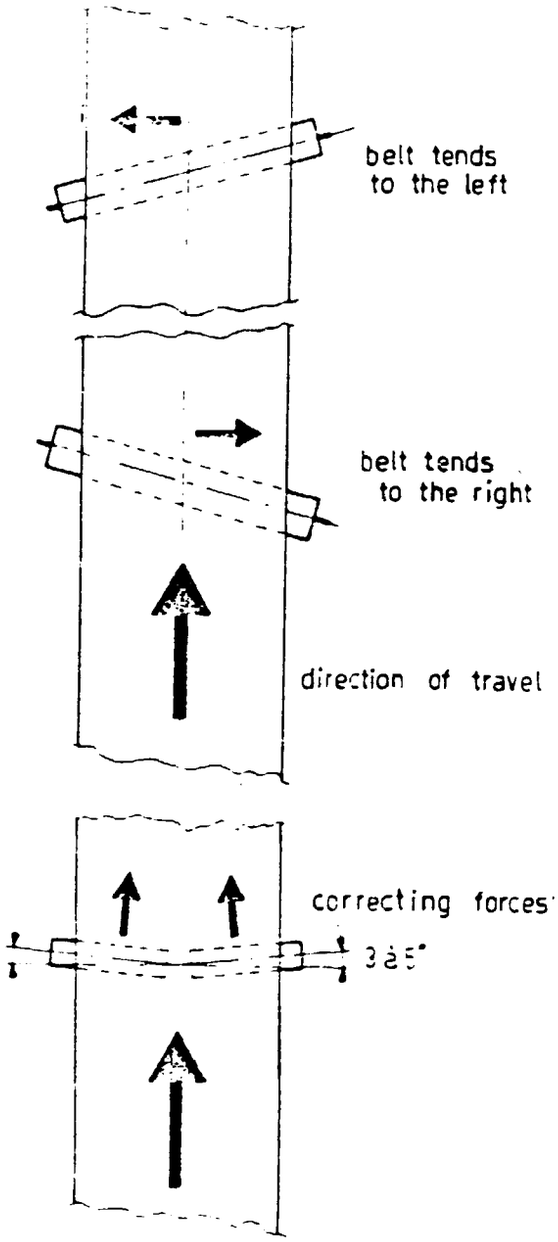


Fig - 4.10 Guiding function of the idlers

Every trough shape holds the risk of pressing the belt between the rolls at the fold zones, especially if the belt is too flexible; this may damage the belt, as shown in Figure 4.12. With troughing idlers the gap between two neighbouring rolls must be carefully set in order to avoid this damage. The gap can also be controlled by remounting the rolls. The centre roll may be somewhat longer than the side roll and offset. This will prevent belt impingement between rolls (see Figure 4.13). In addition, a common method of correcting imperfect product flow is the use of self-correcting idlers with the aim of recentring the commodity and the belt itself; this avoids possible damage through contact with adjacent structures.

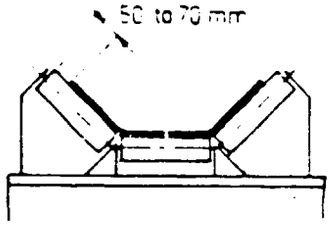


Fig - 4.11 : Minimum running clearance

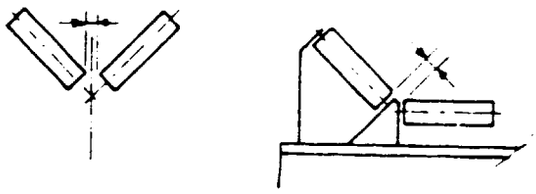


Fig. - 4.12 : Preventing impingement of belt between rolls.

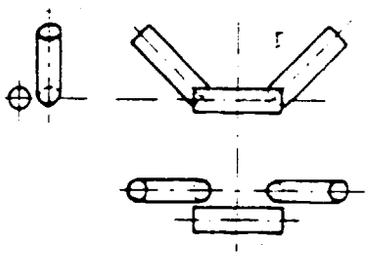


Fig - 4.13 : Typical grain idler with remounted centre roll and zero roll gab

Rollers

The efficiency of a belt conveyor depends largely on the correct design and selection of the idler rollers, not because of the relatively high number involved, but mainly because of the load to which they are subjected. The load capacity of a roller depends on several factors such as: belt load, belt speed, idler pitch, belt weight and impact and friction factors.

A number of criteria should be observed in the design, construction and selection of rollers. First consider the various parts and principal dimensions of a roll as it is generally conceived by most manufacturers. The parts of a roller are (see Figure 4.14): roller shell or steel body, roller end cap, inner seal ring, bearings, seeger circlips, labyrinth ring, shaft, dust cover cap and outer seal ring. The principal dimensions of a conventional roll are: shaft length and diameter, roller length and diameter, span between the supports and the flats for support slot at the shaft ends (Figure 4.15). There is a tremendous range of rollers available on the market. Figure 4.14 shows some of them.

cated. In order to build up these resistive forces the unvulcanized rubber must be mixed with fillings or additives such as: emulsifiers, vulcanizers, vulcanization accelerators, colouring products and anti-oxidation products. Some of the types of rubber which are used today in conveyor belting are listed below:

1. Natural rubber: obtained from the sap of the rubber tree Hevea Brasiliensis and comes mainly from large rubber plantations in south-east Asia. Until World War II, practically all rubber goods were made of natural rubber.
2. Styrene-Butadiene rubber: this has ousted natural rubber from many uses, particularly for conveyor belting where this type of rubber, together with special types of carbon black, provide an extremely hard-wearing rubber compound.
3. Neoprene or chloroprene rubber: in special applications, this has superior properties to natural rubber and styrene-butadiene rubber. It resists moderate action of oil and grease, withstands higher temperatures and has better resistance to sun and ozone.
4. Nitrile rubber: this is extremely resistant to the action of grease and oil (animal, vegetable and mineral) and is used in conveyor belting where these characteristics are at a premium.
5. Butyl rubber: is extremely resistant to strong acids and alkalis, and is used in conveyor belting designed to operate under high temperature conditions.

Grain handling facilities require the belts to be anti-static or static conductive, to be fireproof and oil and grease resistant. It is known that under certain conditions of humidity and temperature considerable electrostatic charges can be generated in the conveyor belt which may cause sudden discharges. An ISO standard indicates the requirements and test procedures an anti-static conveyor belt must fulfil. In order to achieve low electrical resistance, various fillers and/or emulsifiers are added to the rubber mixture.

To limit the spread of fire, it is better to use non-flammable belts. Attention should also be paid to the fire characteristics of the applied fabrics. To make the fabrics fireproof they are impregnated with a mixture of PVC and non-flammable emulsifiers.

Grains which contain vegetable fat or oil products, leave a film on the belt. This film may first affect the top layer, followed by the various fabric plies. The oil and grease resistance can be increased by using nitrile rubbers.

According to the ISO standards the following belt widths are most currently used: 400, 500, 650, 700, 800, 900, 1,000 mm and more increasing by steps of 200 mm through to 3,000 mm.

D. The Splicing of the Belt

The type of splice used, mechanical or vulcanized, dictates the maximum permissible operating tension of the belt. Mechanical connection procedures, by means of hooks and a pierced nail (metal joiners or fasteners), is an inferior system that never equals the tightness of a vulcanized splice. Therefore, this method is not recommended. Vulcanized splices will utilize the full strength of the belt plies (fabric) and should always be considered on long conveyors, the additional splicing cost will be recovered by using a thinner and less costly belt. Some companies guarantee vulcanized splices for the life of the belt.

E. Belt Tracking

It is very important for the operation and the protection of the belt that it runs in the centre. When a belt runs crooked, it will rub along the frame and will be soon destroyed. Belt misalignment and rubbing the conveyor frame are inherent problems in troughed belt conveyors. Tripper belts and reversible belts are especially prone to tracking problems, enclosed troughed belts also give cause for concern, as the conditions of misalignment are not easy to monitor and because the belt is exposed to a much greater area of possible rubbing contact. A misaligned belt can rub in a small area where the unit area load is high enough to produce more heat than the frame can readily dissipate. Adjustments must be precise and are relatively difficult to make.

To prevent any damage to the belt both the designer and the assembly and maintenance personnel must take adequate measures to keep the belt on the right track. The first condition for the belt to run straight is the alignment of the installation and the parallelism of the drive, tensioning and return pulleys. A tensioned belt always tends to run straight and thus deviates from a bent frame. If the frame of the conveyor is inclined laterally, the load will always try to find the lowest point and take the belt along. The idlers must be accurately levelled.

Notwithstanding good alignment of the framework, other influences may cause the belt to run crooked:

1. a pulley may come loose on its shaft and move to one side,
2. the belt splice may be misaligned,
3. the belting material may change its dimensional stability and nature,
4. an irregular and persistent stretch in certain parts of the belt, caused by plies absorbing moisture or a manufacturing error in the belt fibres, may have the same results,
5. the idlers are not square with the centre line-carrying rolls skewed (any belt supported by idlers will always try to run square with the supporting idler).

6. a roll rotates heavily or is blocked (self centering idler stuck); this is the case especially with the side rolls. If one side roll revolves more easily than the other, then one side of the belt feels less resistance than the other side; the belt will deviate to the stiffer side. A roll may be rotating heavily because the shaft is bent, the bearing is broken or the labyrinth sealing has excessive friction,
7. loading may be eccentric or uneven: the product loaded onto the belt from the side will tend to push the belt out of alignment. In this case the product flow exerts a force square with the direction of travel of the belt. This has the same effect as a heavily rotating side roll,
8. the idle tension or slack side tension is too low: the take-up mechanism may not maintain proper belt tension under varying conditions of load and temperatures. If the belt is not tightened enough it may easily drift,
9. the rolls or pulleys are covered with dirt; product may build up on a pulley or roll face and distort the shape causing the belt to go off to one side. For example, if one end of a roll has become thicker than the other and, by accumulated dirt, the peripheral velocity rates will be different, and the belt and the roll slip locally,
10. the cross stiffness of the belt is too high; the belt cannot take the trough shape so that an unloaded belt tends towards the upper edge of the side rolls and wobbles (see Figure 4.16).

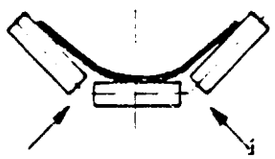


Fig. 4.16 Belt cannot take the trough shape.

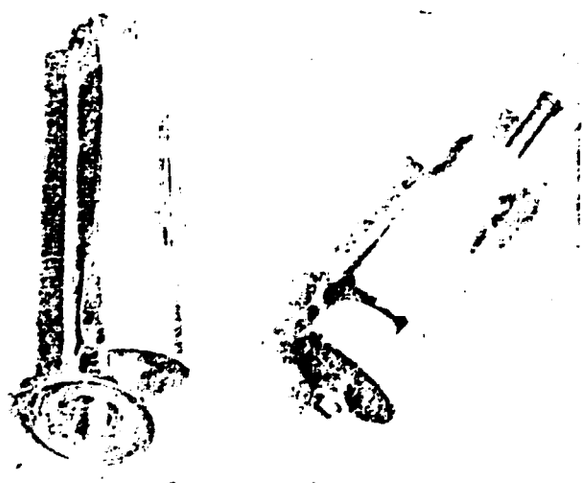


Fig. 4.17 Worn idler rollers as a result of a too stiff belt

Figure 4.17 shows a worn idler roll as a result of a too stiff belt,

11. one side of the belt is wet (rain) while the other is dry. This causes a different resistance on each side of the belt, and
12. The mobile unloading tripper is not well aligned; the respective rolls are not perfectly set square with the conveyor frame.

Some of the aforementioned causes of misalignment are related to the design of the belt conveyor, while others are related to the installation, the operation or the maintenance.

Several guiding devices can be applied if the deviation of the belt remains within reasonable limits.

1. Crowned pulleys

A belt always tends towards the highest point, which improves the guidance. Therefore the drive pulley rim is outwardly rounded double conically or convex. In Figure 4.18, side B will be stretched more than side A because the diameter of the pulley is larger at B. This causes the belt to tend to the right as indicated exaggeratedly in the figure. The oncoming part of the belt is a little more to the right than that which is on the pulley already. In this way the belt moves further towards the highest point. The opposite happens when the belt is located in the dotted line position. The convex shape has the best results with fast-moving belts. Slow-moving belts can better be implemented with cylindrical pulleys. In view of the even distribution of the tension in the belt, the convex shape should not be overdone. The difference in diameter D1-D2, must be smaller than 0.4 per cent of D2. Generally the convex rim is only applied with the driving pulley, although for long conveyors the return pulley can be crowned in the same way.

To correct sideways movement of the belt special idlers may be provided at regular intervals.

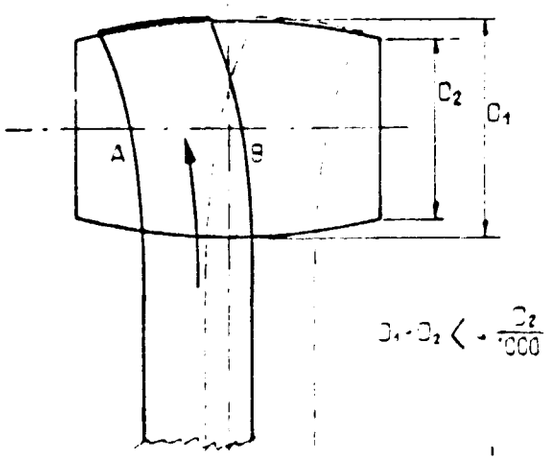


Fig. 4.18 Belt tracking

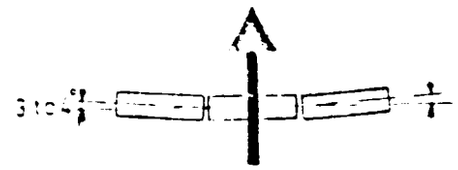
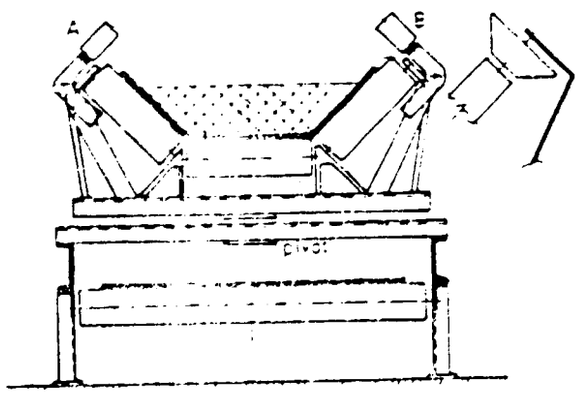


Fig - 4.19 Forward tilted idlers in direction of belt travel.

2. Forward tilted idlers (Figure 4.19)
   A steering effect can be reached by mounting the side rolls of a three-roll idler equally inclined to the front, in the travel direction of the belt, and the middle roll square with the frame. With long belts about 20% of all side rolls are thus mounted in a corrective way.
3. Self-aligning idlers
   By making the steering idlers self-aligning, i.e. turnable around a vertical pivot, the crookedly running belt is automatically guided to the centre line of the installation. These self-aligning idlers can only be applied in case of a uni-directional belt, i.e. a belt which travels only in one direction. Sometimes the self-aligning idlers are implemented with side idlers (A and B) which, by means of a lever arm, have a strong side deviation effect on the side-rolls of the troughing idlers (see Figure 4.20). The pressing rolls A and B are always mounted to the front of the self-aligning guiding idlers.
   When the belt touches pressure roll A, angle a is increased and angle b is decreased, which has a correcting effect on the path of the belt. This means that the force with which the belt moves to one side is used to make it return to its original path. The steering effect of the self-aligning guiding idlers is increased if this idler is mounted a little higher than the level of the previous idlers.
4. Side guide idlers
   The same Figure 4.20 shows a guiding idler with conical side rolls. When the belt runs on one of the conical side rolls a return force is generated which, depending on the direction of travel, will lead the belt back to the centre.



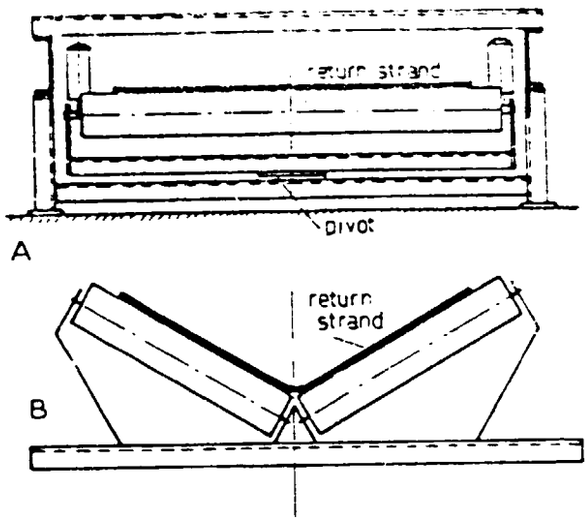


Fig - 4.21 A Self-aligning return idler
B Steering return idler

Belt adjusting idlers to improve tracking tend to be used with the top strand rather than with the bottom strand of the belt conveyor. The guidance of the bottom strand, however, is equally important and even more difficult, because of the adherence of dirt.
As the problem is basically the same, the solutions, already mentioned for the top strand may be applied on the bottom strand. Figures 4.21 A and B show some supporting idlers giving a steering effect to the belt.

For protection against belt damage by rubbing, a system of belt misalignment sensing switches is recommended. Ordinary contact type limit switches can be used. Sustained misalignment, detected in this way should close down the conveyor.

4.2.4.4 The Pulleys

The drive-, tail-, snub and take-up pulleys around which the belt runs also require special attention. The width of all pulleys should be at least 15% greater than the width of the conveyor belt itself. Pulley diameters are selected in relation to the number of plies and the grade of the belt fabric. The use of excessively small diameter pulleys may lead to separation of the plies and splice problems. Figure 4.22 shows some typical pulley designs.
The shell of the pulleys can be rolled of heavy mild steel plate welded to steel plate discs and bosses; it can also be made in cast iron.
Welded steel pulleys are preferred and are used increasingly because of their great strength and enclosed construction. For better guiding of the belt, the shell can

Fig - 4.20 Deep troughing self-aligning idler

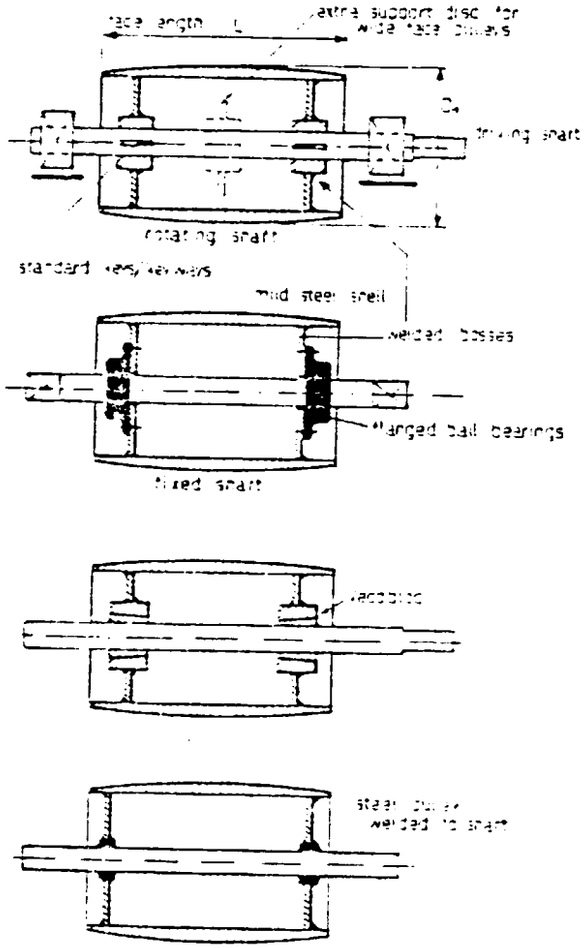


Fig. 4.22 Typical pulley designs.

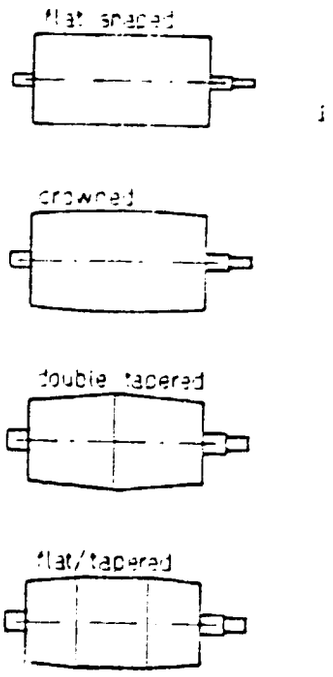
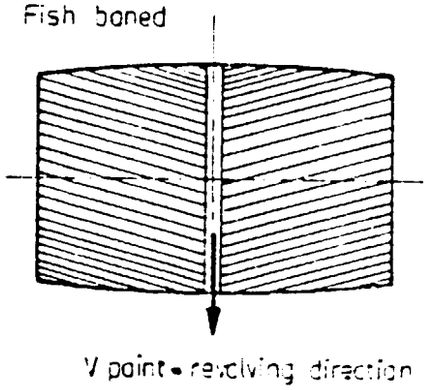
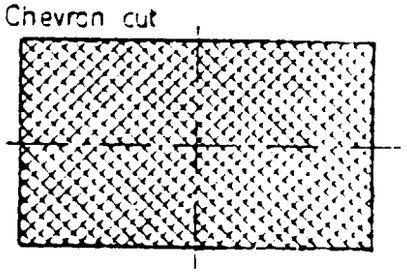
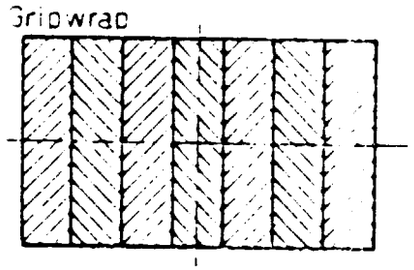


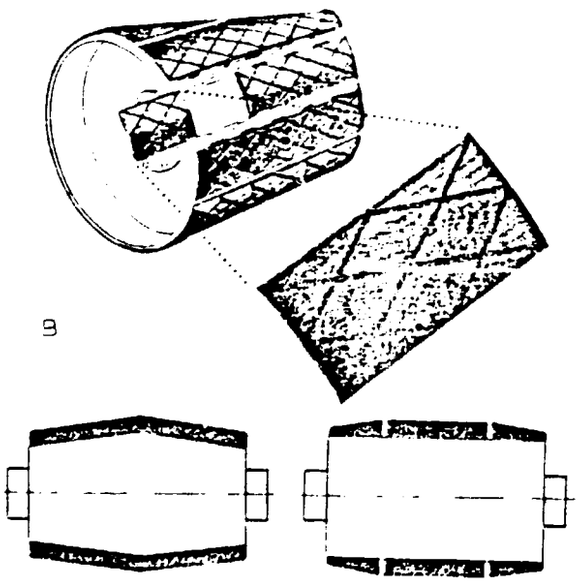
Fig. 4.23 Guiding of the belt







A



B

Fig. 4.24 A. Rubber lagged drive pulleys to improve belt grip
B Slide lagging on flat crowned or tapered pulleys

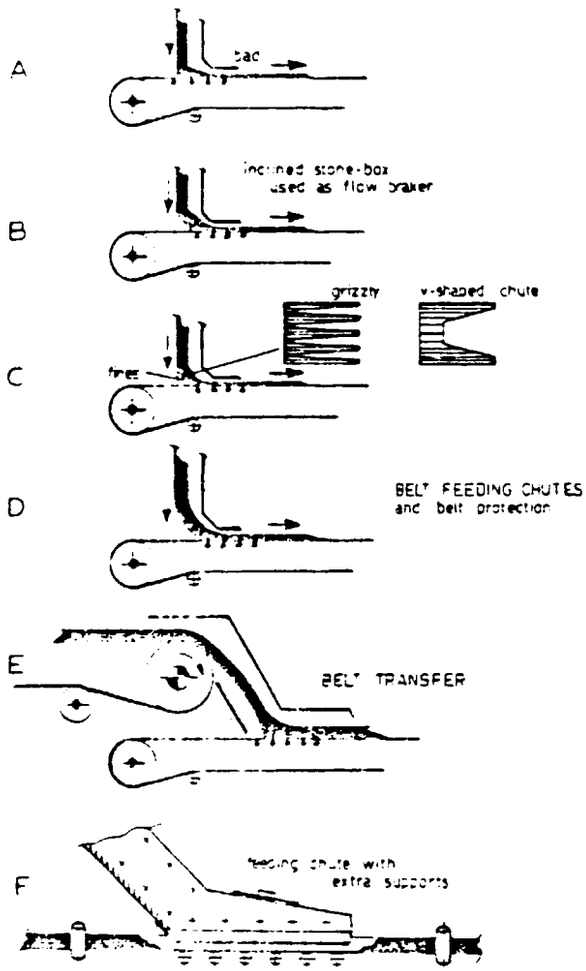
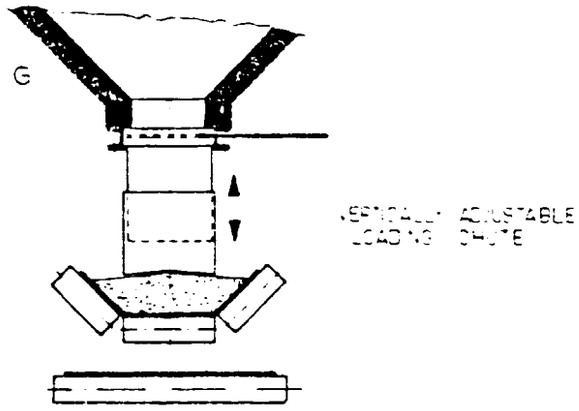


Fig - 4.28 A to G Various belt feeding chutes



the ballast weights have been replaced by a motor winch or a hydraulic system. The tension carriage is connected to a winch pulley via two steel ropes. A dynamometer is placed between the tension carriage and the winch which automatically controls the motor according to the belt tension. Automatic take-up's can best be mounted at the location where the tensile force in the belt is at a minimum; this is found directly behind the driving pulley.

4.2.4.6 Belt Loading

A belt conveyor will attain its highest efficiency and longest life when it can be loaded uniformly at its maximum rate. Any obstacles and welds in the inside of the loading chute may influence the optimum flow of the product.

With regard to the shape of the hopper and the loading chute, special attention should be given to the following items (see Figures 4.28 A to G)

1. Loading must take place in the direction of travel. When loading the belt, friction caused by the abrasive product on the wear resistant belt is very important. The product must be prevented from falling onto the belt from the side as this exerts lateral forces which push the rather unstable belt to the side. The result is an eccentric loading which in turn causes the belt to move sideways over its whole length hence reduced conveying capacity, spillage and rubbing between the belt and the structure.
2. The falling height of the product should be minimized and, at the loading point, the belt and its carrying idlers must be able to absorb the falling inertia of the product elastically.
   This can be achieved in various ways:
   a. applying product boxes around the loading spout in which the falling product flow is slowed down via collisions, by absorbing at least some of the dynamic force of the falling product before it reaches the belt,
   b. implementing a fingergrating (grizzly) with longitudinal slots pointing towards the direction of travel in the lower part of the feeding chute, and
   c. avoiding excessive wear and tear, by incorporating a short independent feed belt section which absorbs initial product impact while commencing the horizontal travel of the product, before transferring it to the main belt system.
3. The forward velocity of the product flow should coincide with that of the conveyor belt; this will minimize belt cover wear and power requirements.
4. Centring of the commodity is also regarded as an important feature of belt loading; a good troughed belt should reduce spillage and help to keep the product centred on the belt.
5. The opening of the chute at its narrowest part should be in accordance with the particle size of the products to be loaded; the width of the chute at the bottom should, however, not exceed 2/3 of the width of the belt.

6. Loading at too steep an incline may cause «rollback»; the product should be loaded on the lowest possible incline, preferably horizontal and certainly no more than 10 degrees. Once the product has settled on the belt, the incline may be increased to a maximum of 15 degrees.
7. The belt must have an extra support under the loading point to absorb the falling inertia or to weaken the kinetic energy of the falling product. Therefore, several extra carrying idlers are mounted closely together at this point.
   To prevent idler damage, immediately below a loading point, most manufacturers incorporate rubber-coated shock-absorbing idlers in their system.
   All carrying idlers under the loading zone should be positioned in such a manner that the load strikes the belt between two carrying idlers. Using the elasticity of the belt by omitting or mounting the middle roll lower under the loading point is not an adequate solution. Thus the belt can sag between the side rolls and be excessively deformed.
   Another alternative is an impact saddle with a low coefficient of friction, which permits a smooth running belt and is designed to replace conventional impact idlers at loading points (see Figure 4.29). The saddle absorbs the impact of falling product and prevents premature damage from product spillage by eliminating belt sag associated with conventional idlers. The impact saddle lasts substantially longer than the conventional idlers, improves belt alignment, prolongs belt life and considerably reduces replacement, maintenance and cleaning costs. The trough angle can easily be varied from 25° to 50° to cater for different belt loads and conditions. The 25 mm mat has a very low coefficient of friction allowing the conveyor belt to run smoothly despite the absence of moving parts.
8. Spillage should be prevented. Apart from the potential loss of conveying capacity through incorrect running of the belt and excessive friction, spilled grains may crushed between the belt and pulleys causing damage to the belting. The belt will become stretched at the point of crushing and the accumulation of sticky material on the return pulley makes steering of the belt more difficult. To avoid this, skirtboards should be located around the loading chute which will prevent the product falling onto the return strand of the belt.
9. Skirtboard design should be carefully considered (see Figure 4.30).
   They must always be mounted at right angles, just touching the belt, and be sufficiently long and high to allow for the greater product mass before it settles on the belt. The skirtboards should also open slightly towards the direction of travel to allow the release of spilled kernels. It is important that the sealing strip is of such a grade that it wears faster than the belt cover itself. Where several loading chutes are to be implemented on the same belt it may be advisable to have hinged skirtboards.

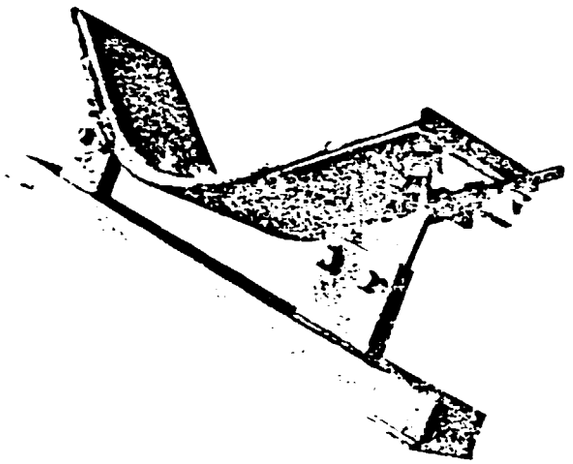


Fig. - 4.29 : Vari-angle impact saddle (Courtesy of Conveyor Improvement Ltd., Gr. Britain)

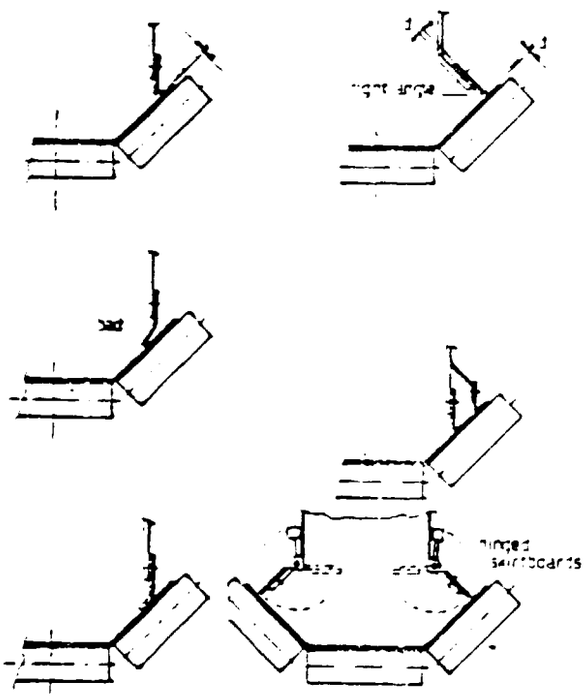


Fig. - 4.30 : Various skirtboard configurations

Figure 4.31 A illustrates a belt under several bin-outlets, each with its own loading chute. In this case the skirtboards must be hinged so as to prevent the disturbance of the product layer on the belt by the loading chutes located further on.

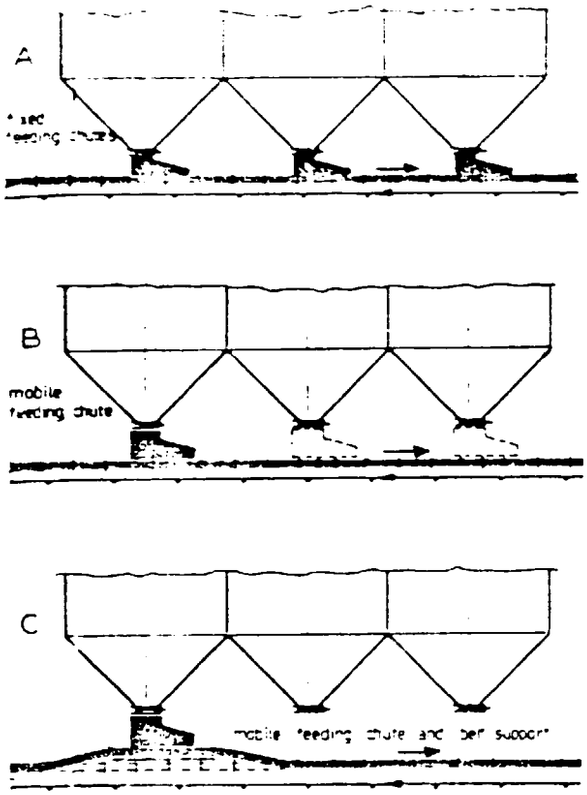
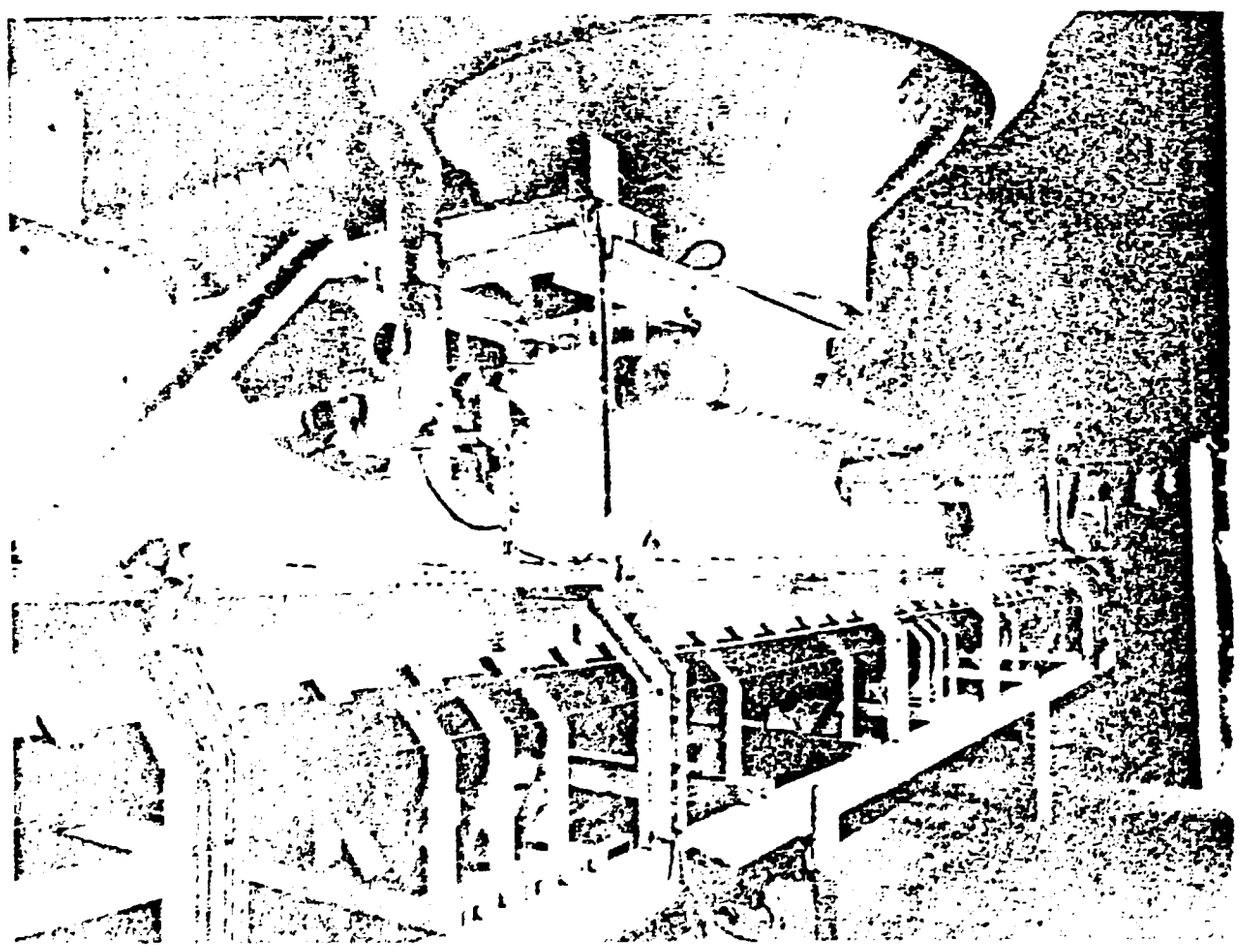


Fig. 4.31 A, B and C Various belt loading systems

Figure 4.31 B shows a mobile loading chute or tripper which is placed under the bin to be emptied. The skirt boards may be either fixed or hinged. A blocking device must be provided to prevent movement of the tripper due to friction between the product and the belt. As mentioned before, the belt must have extra supports under each loading point; several extra idlers are mounted under each point. If several loading points are required it may be cheaper to use the tripper with the required supports. Figure 4.31 C illustrates a tripper and extra idlers. At the location of the tripper the belt is lifted off its idlers and carried over the mobile construction.

Where a number of belt loaders discharge onto a single belt in series, the installation of a continuous belt cover, with suction applied at several points, is the best method of controlling dust. Internal surfaces which could collect dust should be avoided (see Figure 4.31 D).

Fig. 4.31 D Different bin outlets and continuous belt hood with rubber skirting and inspection doors. (Courtesy of Brabant-Van Opstal B.V., The Netherlands)



4.2.4.7 Belt Unloading

According to the circumstances, several possibilities exist for discharging the belt.
The most common is the discharge of the product flow over the head pulley of the conveyor, usually the drive pulley, into a metal chute. When leaving the belt, product flow will describe the path of a throw parabola, the form of which is very important for the design of the unloading chute (see Figures 4.32 A, B and C).

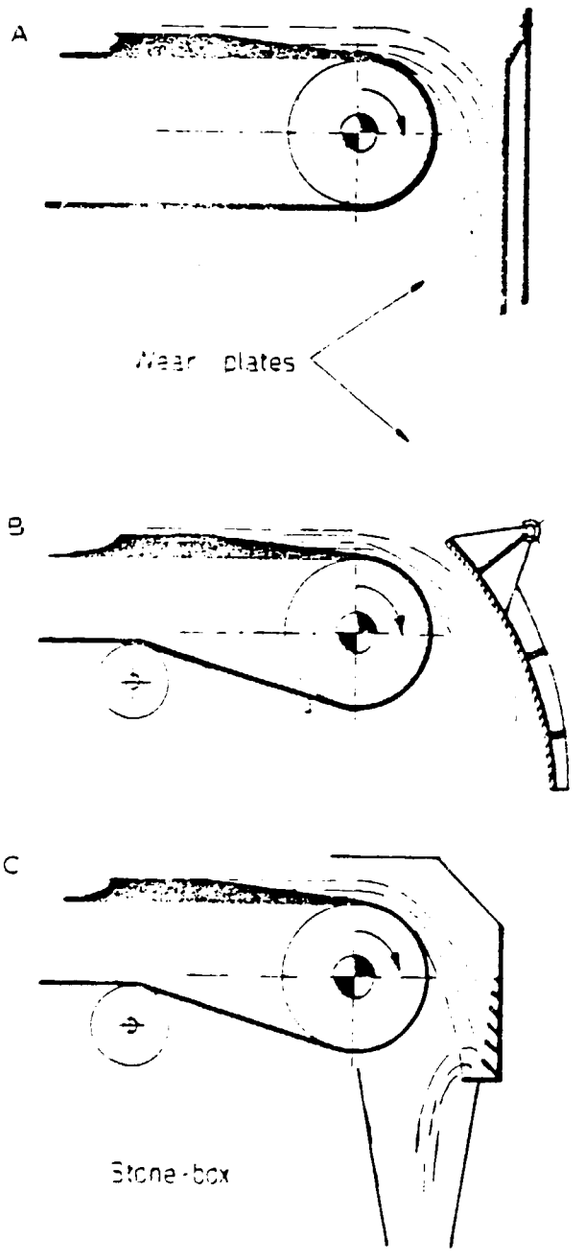


Fig. 4.32 A, B and C Various belt unloading systems

The form of the parabola can be approximately calculated for a given belt speed and pulley diameter. The receiving element may be, for example, a following conveyor, the loading aperture of a bin or a bunker or the hatchway of a ship.

In practice, the belt need not always be discharged at one single point.
If discharge is to take place at several points along the conveyor, scraper or discharge ploughs, which divert the product flow over the sides of the belt, can be used on flat and horizontal conveyors. Scrapers or ploughs are mounted diagonally (ca. 30° across the direction of travel) to one side, or plough-shaped to both sides of the belt. The continuous contact causes rapid wear on the top cover of the belt. It may also damage the belt if some part gets stuck between the scraper and the belt. For these reasons the belt scraper is not convenient for belt speeds higher than 1 m/s and is only used for small conveying capacities.

Horizontal conveyor belts can be discharged at various locations much more safely by means of a mobile tripper carriage which can be moved back and forth along the conveyor (see Figures 4.33 A and B).
In this case the loaded belt is lifted off the carrying idlers and diverted over the inclined section of the tripper (Figures 4.34 A and B). According to the construction, discharge can take place on one or on both sides.

When the empty belt has passed the discharge point, it is guided back towards its troughed path by means of a return pulley. Recessed trippers require adequate space. The required length is mainly determined by the natural angle of inclination of the product. If the angle of inclination of the tripper is too great, the product may flow backwards or slip off the belt.

The disadvantage of trippers is that the belt has to describe an extra S-bend which may decrease the life of the belt, and its splice.
It should also be noted that the tension of the conveyor belt round the tripper pulleys is practically the same as round the drive pulley. As a consequence, the tripper pulley diameters must not be less than that of the drive pulley.

Fig. 4.33 A and B The distribution floor above the bin battery provided with belt conveyors and tripper carriages (Courtes, of Braband-Van Oostal B.V., The Netherlands)

4.2.4.8 Belt Cleaning

Belt cleaners should be provided, especially when handling dusty and caking products such as derivatives and substitutes. Surplus products and caking dust on a belt after it has discharged are known to cause unnecessary build-up beneath the belt structure, as well as fouling idlers or causing damage by becoming lodged between the belt and the idlers or pulleys.
For these reasons belt cleaners are located on the underside of the head pulley, and for preference in the discharge chute. They considerably reduce the adherence of dirt to the idlers and pulleys which are in contact with the dirty side of the belt.
Cleaner blades can be made from a wide variety of materials including metal, ceramic, rubber and plastics.

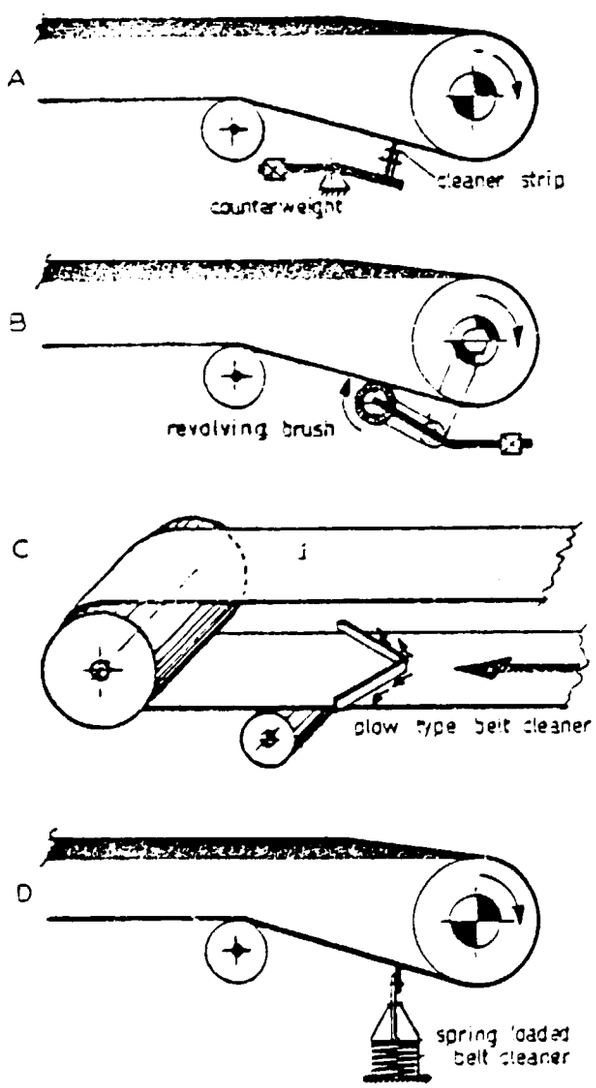


Fig. 4.38 A to D: Various fixed and counter-weighted belt cleaners

Metal and ceramic blades clean effectively, but may damage the belt and the belt splice. Rubber and plastics are to be preferred, since they are less harmful to belts and particularly, splices. The cleaners, generally composed of rubber strips, may be provided in several qualities. Optimum results can only be reached if an adequate quality is used, keeping the belt wear and friction to a minimum. It is wrong to apply any old rubber material such as a waste end of a belt, for the purpose of cleaning. The rubber manufacturers have developed special kinds of rubber for cleaners. Polyurethane scrapers are more wear resistant than other materials and have proved to be a very successful blade material, although the initial cost may be higher. The efficiency of a belt cleaning system also depends on the applied pressure. Excessive pressure may improve efficiency slightly, but will considerably reduce blade and belt life.

The cleaner blades should be located as near to the discharging point as possible in order to allow the cleanings to be taken along with the main product stream. In case the housing measurements are inadequate, spillage can be gathered by a vibrating mechanism or a screw conveyor.

Normally a cleaner consists of one cleaning blade of 10-20 mm width, which is pressed between metal strips. The blades are mounted perpendicularly or under a slight angle (ca. 15°) to the direction of travel of the belt. They are pressed to the belt via compression springs or a hinging lever mechanism with adjustable weights. The weight load has the advantage of keeping the pressure force constant, even as wear increases. When the cleaning blade is worn out, a stop must prevent the metal mounting strips from touching the belt. Where the cleaning effect of the primary device is inadequate, secondary devices can be fitted to the underside of the return belt strand.

The cleaner device should be designed in such a way that it can be inspected, adjusted and maintained with the minimum of downtime.
Accessibility to worn parts which have to be replaced periodically should be provided. There are numerous other types of cleaners such as rotary brushes and counter-weighted scrapers, (see Figures 4.38 A to D). Figure 4.38 B illustrates a counter-rotating brush. When compared with the stationary brush it has the advantage of being self-cleaning. The revolving brush always works against the direction of travel of the belt at a surface speed of about four times the belt speed and is driven by a V-belt (belt propelled) connected to the shaft of the pulley, or by an independent motor. The brushes are pressed against the belt with a certain for-

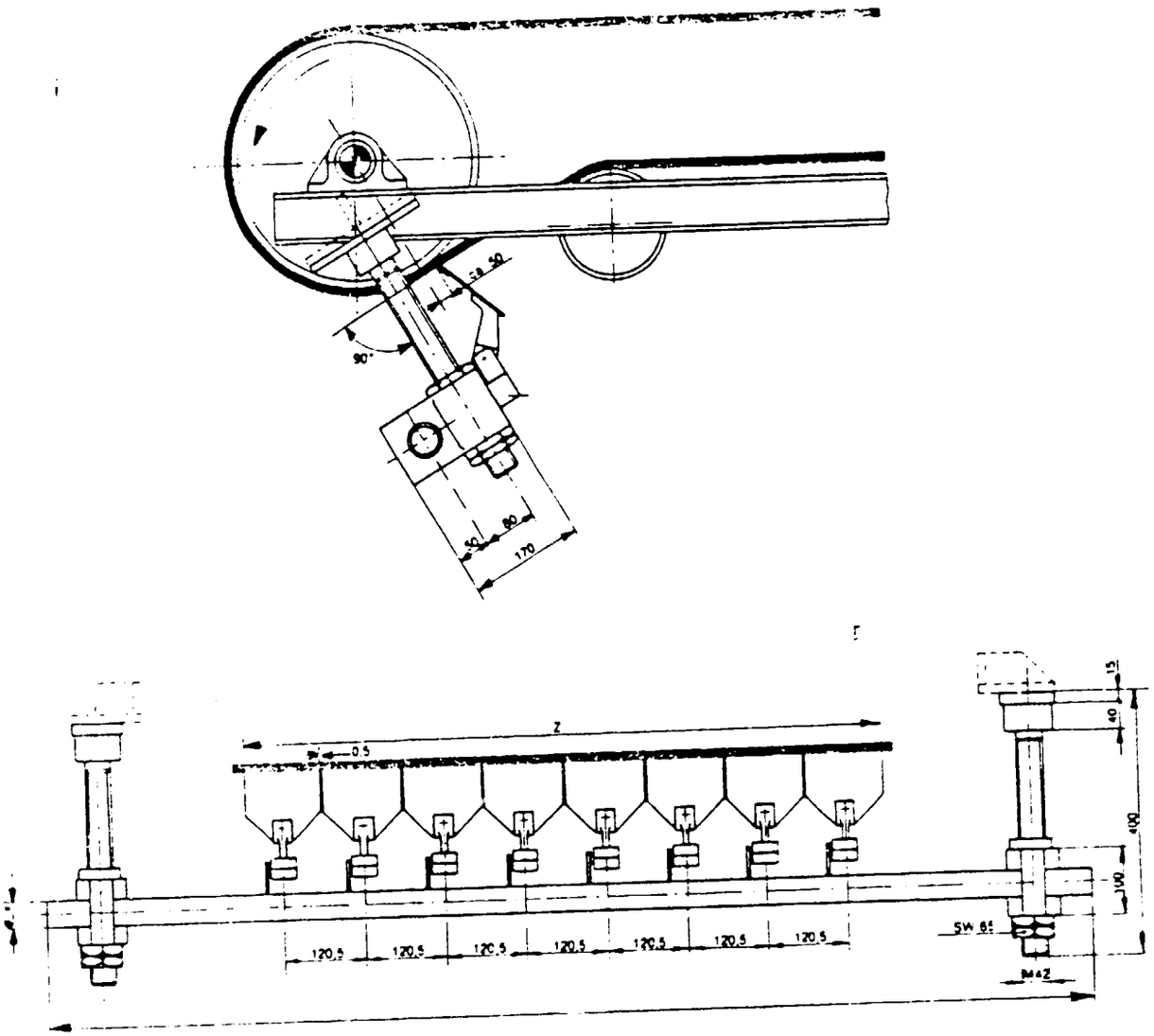


Fig - 4.39 : Special belt cleaner (Courtesy of Hosch, W. Germany)

ce. Nylon fibre has been an important invention which makes the brush last longer. Worn brushes should be able to be replaced fast and easily. When brushes are used, belt wear is kept to a minimum.

Figure 4.39 illustrates a stripper which is pressed to the head pulley, unlike other stripper mechanisms. The system consists of separate segments mounted at 15-20° against the direction of travel. Practice shows that the slight angle of the segments gives more efficient cleaning. The scraped cleanings are simply taken along with the main stream.

A newly designed belt scraper is coupled with two air operated cylinders which, allied to a unique new blade, ensures that a constant, even pressure is maintained on the belt (see Figure 4.40). The most obvious advantage of this system is that once the blade has been brought into contact with the belt, it is not necessary to touch the cleaner until the blade is completely worn out. The pneumatic control system ensures that the same pressure is applied to the blade, no matter how quickly the blade wears out. The new blade, developed to complement this system, has all its wear on one edge, thereby eliminating the need for changing to a different edge and ensuring that the maximum amount of wear is obtained from the blade. The fact that the pressure applied to the blade is both even and constant also tends to slow down the wear rate. The new blade also incorporates a blade-life warning and safety control system. Initially there is a visual warning when the blade is nearing the end of its life. This allows time for the changing of the blade to be incorporated in a planned maintenance scheme. In the event of this warning going unheeded and the blade becomes completely worn a second system lowers the blade away from the belt to a predetermined position and gives a visual and audible warning that this has been done. Remote controlled warning circuits can be mounted on a central panel.

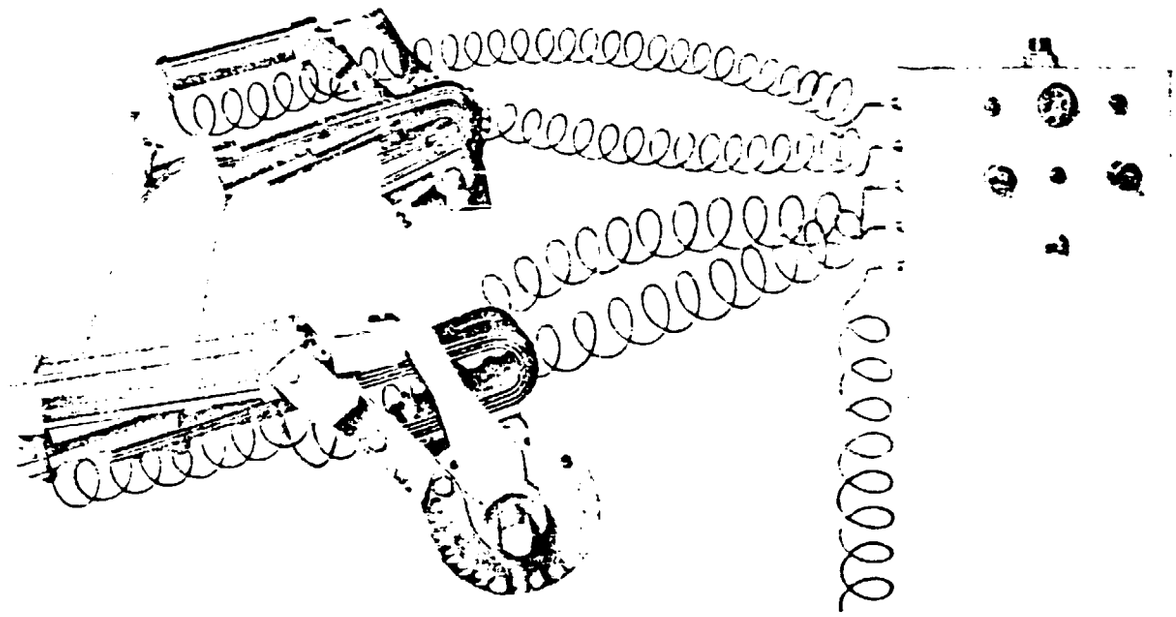


Fig. - 4.40 : Automatic belt cleaner (Courtesy of Conveyor Improvements (Doncaster) Ltd., Gr Britain)

Sometimes the problem may be the accumulation of dirt on the pulley or idlers. This also effects belt tracking and may possibly result in belt damage. Cleaning the pulley or the idlers by means of stationary or movable rubber or steel scrapers is much more complicated than belt cleaning, and does not succeed with all bulk cargo. The reason is that this dirt adheres to the surface of the pulley and is then compressed by the movement of the belt.

On very long belt conveyors, belt twisting is a useful method of avoiding build-up on the return idlers (see Figure 4.41). With this facility, the dirty upper side of the belt remains upside-down on the return run. In this way the dirt does not touch the return idlers: it remains on the belt. Spillage will occur only at the twisting point. The twisted belt drive is usually applied on conveyors with a long conveyance length. When twisting the belt must be turned 180° twice. It is carried by horizontal idlers at the beginning and the end of the twisted length, and by vertical idlers in the middle. Like troughing, twisting causes the centre of the belt to be compressed and the belt sides to be elongated.

Practice has shown that the tensioning device must be located between the drive pulley and the first turn. If the tensioning device is located between the second turn and the end pulley, too much waving will be caused in the return run when starting the belt. Belt twisting of course causes additional installation costs, and the

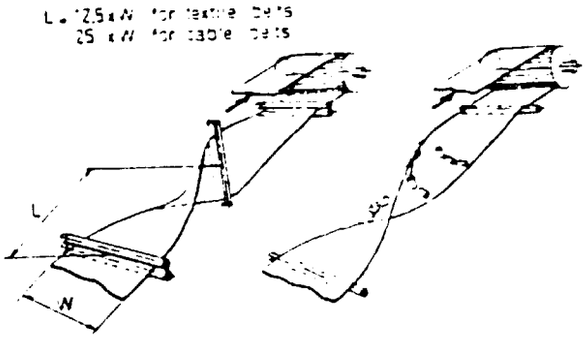


Fig - 4.41 : Belt twisting.

height of the installation must be raised. Both the construction of the conveyor, and the width and the character of the tensile fibre are of considerable importance.

Correct belt cleaning should be provided during the design stage of the belt conveyor. Subsequent efforts to install a belt cleaning device after commissioning are rarely as easy to execute, and often involve considerable extra cost and reduced efficiency. Special attention should also be given to the fact that most belt cleaners are designed to operate in one particular direction of belt travel. Reversing belts normally require a cleaning system at both ends and special precautions are to be taken to prevent belt damage due to belt splices travelling against the cleaner blades.

4.2.4.14 Belt Conveyor Maintenance

The need for repair and maintenance of a belt conveyor may be largely obviated by good design and with suitable precautions taken before and during installation. The belt itself, which represents approximately 40% of the cost of a conveyor, should be carefully handled during storage and transport. When first installed, it should be correctly spliced and fitted by experienced engineers to ensure that the edges of the belt cannot be damaged by the conveyor structure. Any minor damage must be repaired as soon as possible to avoid deterioration. Most of the leading belt manufacturers have engineering teams available to perform this service.
After completion of the entire belt conveyor system and associated equipment, and before putting into service, a general check-up with trial runs is recommended.

Most irregularities concerning the operation of a new belt conveyor are caused by tracking of the belt. General check-up and periodic safety inspections during operation should include all mechanical and electrical components, plus the structures, walkways, guards, stairs and access ways. Safety devices and warning signs should be maintained in their proper positions and in good working order. A daily walking inspection by a first class and properly trained person is a good way to detect potential problems, for example, by listening for any unusual sound made by moving parts and all components that are susceptible to wear such as idlers, shafts, bearings, drives, belts, cleaners and scrapers. In operation it is essential to ensure that grains or other materials are not trapped between the belt and the pulleys, idlers and skirtboards. This is especially liable to happen at loading points.

First class and regular maintenance is a prerequisite for the safest operation and long service life of a conveyor. It may only be performed with the conveyor stopped and locked out. Good lighting contributes to a safe working environment and simplifies the maintenance. Only original spare parts should be used and should be available at any time to allow quick replacements.
The following check-list should be used during inspection and maintenance. Some of the points have to be inspected during operation, others with the belt at rest.

1. Drive mechanism:
   Check : a) motor - temperature (heat sensors); unusual noise; alignment; vibration; bearings; lubrication; mounting bolts fastened; connection box closed; motor fan free-moving; air outlet and motor casing dust-free;
   b) gearbox - temperature of the casing; unusual noise; alignment; vibration; oil level; oil change; leaking seals; mounting bolts; and
   c) couplings - (high and low speed) temperature; alignment; tightness on the shaft; keys and keyways; shock-absorbing rubberblocks; oil level; oil leaks (hydrodynamic coupling)

2. Pulleys (drive, return and take-up):
   Check : a) pulley lagging; wear; cracks; tightness; signs of stress or fatigue; caking on faces due to adhesion of dirt; lateral alignment on shaft;
   revolving resistance; steering effect; slip between belt and drive pulley; functioning of the belt cleaners and pulley scrapers; free movement in and on take-up guides;
   b) pulley shaft - tightness of pulley on the shaft; vertical level-mounting at right angle to the direction of travel; and
   c) bearings - temperature (heat sensors); unusual noise; alignment; shaft movement in the bearings; set screw or locking device tightened; greasing according to schedule; leakages; mounting bolts securely fastened.

3. The troughing and return idlers.
   Check : free movement of rolls; even or excessive wear; grooves worn by rubbing belts; idler units square with centreline of conveyor; mounting bolts properly fastened.

4.2.4.15 Special Configurations and Alternatives

The following figures illustrate some interesting belt conveyor configurations.
Figure 4.50 shows a «two-way belt conveyor» that is able to transport the product in both directions at the same time.
Figure 4.51 illustrates the «telescopic belt conveyor». The drive pulley and discharge chute may be moved over a certain length.
Figure 4.52 shows a «shuttle belt conveyor which is an adequate means of distributing grain into the underlying bins.
Figures 4.53 A and B show a conventional tripper carriage and a shuttle belt arrangement to fill a flat storage silo.

APPENDIX 16

General evaluation of the Kordin Grain Terminal construction and testing works in progress.

Summary of items which have been completed and the remaining items which still have to be carried out.

Unloader

Item 1, B.M.B. intended to install a second monitor, but they still look into a more reliable solution

Item 2, Completed

Item 3, In hand, will be completed in week 43

Item 4, Material on site, not installed yet, will be completed week 45

Item 5, Completed

Item 6, Most likely not necessary to modify due to replacement of item 7

Item 7, Completed

Item 8, Completed

Item 9, Completed

Item 10, Completed, but not tested yet

Item 11, Completed, but not tested yet

Item 12, Completed, but have to be tested when unloader is loaded with grain

Item 13, Not installed yet, most likely when B.B.C. supervisor will return to Malta, planned in week 45

Item 14, In hand by P.L.

Item 15, Completed, but have to be tested with full load of grain

Item 16, Completed

Item 17, Replaced temp. indicator, but can only be checked if outside temperature is as high as in summer

Item 18, Compressor renewed, but if cooling is sufficient can only be checked in summer

Item 19, Not installed yet – Locks and handles ordered

Item 20, Not yet repaired

Item 21, Completed

Item 22, Still not completed

Item 23, Replaced, but to be tested in a vessel with grain

Item 24, Completed

Item 25, Still outstanding

Item 26, So far no adequate action taken

Item 27, Material on site, not installed yet

Item 28, So far no adequate action taken

Item 29, As long as residual hopper for the remaining grain has to be used this problem will remain

New Item 30, Air leveling on B.K.T. casing to be carried out) completed

Item 11, Signal device [illegible] (broken)

Item 31. Rottle Ende Antrieb to be greased [illegible] with applicable greas.

Loader

Item 1, Still awaiting material to modify filter on backside of portal belt conveyor

Item 2, So far no adequate action taken, suggested additional triangle adjustable grain flow break plates, after installation, it has to be tested again.

Item 3, Proposal of B.M.B. to install on membrane casing an air knocking hammer, to avoid malfunction of membrane

Item 4, Completed

Item 5, Additional steering plate in transfer point installed, but after testing in vessel loading not very successful, suggested to install in loading shoe similar triangle plates as point 2, testing has to be executed again

Item 6, Enlargement not possible due to the design, high level indicator will be replaced, will be completed week 45

Item 7, Completed

Item 8, Cabling and local switches installed, remain cable connection

Item 9, Still outstanding

Item 10, Material on site, not installed yet

New
Item 11, Compressor capacity sufficient?, see filter problems

Most likely are the filter (see point 3) problems

See point 3

According to B.M.B. capacity of compressor sufficient.

Transfer tower and wharf gantry

Item 1, . Additional filter on site, partly installed, more parts for filter will arrive in week 45

Item 2, . After filter unit is installed, a local sub-contractor will fabricate and install all the necessary piping – estimate completion in week 48

Item 3, – Completed
– See item 1 and 2
– Completed.

Item 4, – See item 1 and 2
– Completed
– In hand

Item 5, – Completed
– Still outstanding

Item 6, Completed

Item 7, Some work carried out, but has to be checked with full grain load on belt.

Headhouse and Silo

Item 1, Completed

Item 2, Material arrived 24/10/85, estimated installation ready week 45

Item 3, Completed, capacity tests to be carried out

Item 4, Completed, capacity tests to be carried out

Item 5, Completed, capacity tests to be carried out

Item 6, Completed, capacity tests to be carried out

Item 7,
- Completed
- In hand

Item 8,
- Installation)
- Installation) mechanical in hand

Item 9, Modification of flap boxes completed

Item 10, Completed

Item 11, Completed

Item 12, Material will not arrive before week 46

Item 13, In hand

Item 14, Completed

Item 15, In hand

Item 16, Completed

New
Item 17, Bulk loading scale to be supplied with AB - basic control panel instead of the installed analogue control panel

. Above problem has been discussed extensively with B.M.B., but it seems so far that not much progress is made to settle the dispute between B.M.B. and Molen, the scale supplier.

Remaining Points

(telex dated 27/03/85)

Item 3, still not completed with common practical standard

Item 11, Partly carried out but for the remaining no action taken

Item 12, Sub contractor started but after one week abondoned the site

Item 16, In hand

Item 17, Still the same, the additional installed de-dusting filter and screw conveyor have to be incorporated also

Item 18, No action taken so far, about four months ago agreed that these emergency stops will additionally fitted with a similar box as for a fire alarm button

Item 19, Still not completely acceptable

Item 20, No action taken so far.

Remaining Electrical Points

(telex dated 02/04/85)

Item 1, To remedy this item P.L. announced durin, a meeting several weeks ago, attended by all parties concerned that P.L. have by letter dated May '84, informed D.O.W. in regards to the proposed interlocking system, with the request to check and return approval or comments within a certain period. P.L. repeated this several occassions but reply never received.

As far as P.L. is concerned, they feel that at present no modifications will be carried out

Item 2,) . Partly B.B.C. modified the sequential starts
) in between the three de-dusting filters but
Item 3,) the sequentials starts per filter is not carried out yet.

. be aware that for the newly installed de-dusting filter, interlocking in the system and sequential starts have to be carried out

. So far no drawings supplied for this modification.

Progress Reports

(remaining points)

Item 1,
- even after much pressure from the Prime Minister's Office to D.O.W., no action has been taken so far
- At present already great problems in emptying the silo bins, a large remainder of grains have to be removed manually

Item 2, This obligation still not fulfilled by D.O.W.

Item 3, Same as item 2, both items 2 and 3 are contractual obligations

Item 4, Proposal list supplied but ignored by D.O.W.

Item 5, Various equipment numbering completed with the co-operation of M.S.C.L., but also ignored by D.O.W.

Item 6, Still no action taken

Item 7, Partly executed, but on existing dangerous rock formations no action has been taken

Item 8, Proposal supplied, but again no action taken

Item 9, Telephones and accessories arrived week 42. Installation by P.L. started week 43

Item 10, This great problem still exists, attempts have been made to request a contractor to quote for sufficient forced ventilation around silo. [illegible] to ventilate been dropped due to the high costs involved.

Meanwhile, already a portion of damage in the stored grains

General remark : For future operational purpose, items 1 and 10 have to be remedied otherwise use of this silo cannot be expected and will be a great limitation for an operating company.

Item 10. : [illegible]

Remaining mechanical items

Item 1, about 10 percent installed and since weeks no further work have been carried out

Item 2, Completed

Item 3, No action taken so far

Item 4, No action taken so far

Item 5, Only placed in Aux. building due to wrong delivered brackets

Item 6, Installation completed but testing not been carried out

Item 7, Installation started week 41

Item 8, see item 8 /

Item 9, No action taken

Item 10, No action taken

Item 11, No action taken

Item 12, No action taken

Item 13, Only partly carried out

Item 14, Action is taken by M.E.D. and Medigrain but so far no co-operation from D.O.W. and P.W.

Item 15. Maintenance [illegible] to be [illegible]

Remaining Electrical items

Item 1, In hand

Item 2, Level indicators placed, but electrical connections still not made P.L. is waiting for B.B.C.

Item 3, Switches installed and cabling carried out, but electrical connections still not made; P.L. is waiting for B.B.C.

Item 4, Completed, but padlocks with one masterkey to be provided

Item 5, Not ready, only missing adjusting knobs to be placed

Item 6, Not ready

Item 7, In hand by P.L.

Item 8, In hand by P.L.

Item 9, In hand by P.L.

Item 10, Material on site, but P.L. waiting for B.B.C.

Item 11, Replacement completed

Item 12, Material on site, but P.L. waiting for B.B.C.

Item 13, Stabilisers on site, but B.M.B. is not convinced that stabilisers are necessary; requested P.L. to carry out voltage measurements and register the fluctuations

Item 14, Material already for months on site but still not installed

Item 15, The reply of B.M.B. on comments was that these rotating flash lights are in addition of the contract free of charge

Above reply not accepted because with running machinery telephone bell is not loud enough, so B.M.B. have to supply add. horns

Item 16, Motor drives will arrive on site not earlier than week 46

Item 17, Completed

Item 18, Completed

Item 19, Cabling ready but bag counters not delivered yet

Item 20, Still not the correct ones/delivered

Item 21, Completed

Item 22, Material arrived and P.L. started installation week 43

Item 23, B.M.B. do not see this as common standard to have a switch for inspection drive motors directly near elevator maintenance covers which are on level 15.50 meter and the presently installed switches on level 55.85 meter, additional quotation will be presented.

Item 24, Also this item is regarded by B.N.B. as additional

Item 25, Completed

Item 26, See item 18 in remaining points (telex dated 27/03/85)

Item 27, B.M.B. and B.B.C. were not prepared to co-operate in carrying out modification

Item 28, Telephones arrived and P.L. started installation week 43

Item 29, Completed

Item 30, Completed

Item 31, Completed

Item 32, So far no adequate action taken by B.M.B. as well as B.B.C. and M.S.

Item 33, So far no adequate action taken by B.M.B. as well as B.B.C.

New item 34.

Cabling and installation in MCC and relay panel for the additional screw conveyor de-dusting.

- Installation material will be sent by B.B.C. 1st week of November.
- New electrical diagrams not received yet.

New item 35.

Cabling and installation in MCC and relay panel for additional de-dusting filter in transfer tower

- see item 34

New item 36.

Control voltage for Mimic panel feeds also the scale panels, temperature control panel and telephone this cannot be accepted.

- These items already in the past verbally discussed with B.B.C. engineer, but not carried out.

- scale panel) to have their
- temp. panel) own separate
- telephone) supply.

Justified views in the overall feasability of the finalisation

---

Ready for the handing over of the Terminal to the operating company by the end of the year

---

- Main topics which have influenced the planned modifications followed by tests and trials and acceptance of the terminal

  . See list with the summary of items which still have to be carried out

  . Facing the fact that arrival of additional equipment is far behind schedule prepared by B.M.B. on August 15th, 1985, will jeopardise finalisation and testing the modified equipment before the 18th of December, 1985.

  . The latest shipment of B.M.B. will arrive in Malta week 46

  . The malfunction of the loader is still not solved. From B.M.B. design office no directives received, all the changes carried out so far have been established on site, but observation have learned that the function is still not acceptable.

  . B.B.C. service engineer will not return to Malta before end of the week 45

  . Shipment of electrical parts of B.B.C. will arive not earlier than week 45

  . In week 41, Mr. Ch. Cassar / D.O.W. was summoned at the Prime Minister's Office and been instructed to start the remaining works immediately.

    So far not a single item have been carried out.

- Handing over the terminal to an operating company the end of the year will not be feasible

  As informed by M.E.D. week 43, that inspite of all the efforts G.R.M. and M.E.D. made, no company is interested to start operating the terminal

  In respect of these circumstances G.R.M. and M.E.D. are forced to make arrangements in establishing a company (parastatal) fully realising the disadvantage of not having sufficient resources of knowledge and experience in handling and marketing grain terminals.

APPENDIX 17

PANTA LESCO LIMITED
Mechanical & Electrical Contracting Division

P O Box 59 Panta House
Birkirkara Road, Msida, Malta
Telephone 41361 Telex 1374 Panta MW
Telegraphic Address PANTA Malta

Our Ref: AJB/RC/85/081M

7th November 1985

Mr. C. Cassar A & C E
Marine Section,
Public Works Department,
Pinto Wharf,
Valletta.

Dear Sirs,

Grain Silos
Ventilation System
Quotation No. 85610

We would like to refer to your recent verbal request and various meetings for the supply, delivery, installation, testing and commissioning of a Ventilation System for the above mentioned premises and have pleasure in submitting below our offer for your kind consideration as follows:-

System Description

The proposed system will incorporate 2 No. supply air axial flow fans to provide 10 air changes per hour, each to be mounted external to the building just outside the emergency exit corridors. Ductwork systems will commence from each fan and led at ceiling level inside emergency corridors. Duct branches will be run into each corridor leading to the bin outlet areas. Ducts will be complete with aluminium ventilation registors complete with manually operated volume control dampers for easy balancing of air flows.

Each duct branch inside the bin outlet area will also be provided with a purpose made air volume control damper for balancing air throughout the whole length of the tunnel. Test holes will be provided after each damper for air flow measurement and eventual balancing.

.../2

Twentyfour propeller type exhaust air fans will be supplied and fixed in each doorway leading to the rock face, exhausting air from the tunnel areas.

Equipment offered

a) Supply Air Fans

The fans offered will be as manufactured by Messrs 'Myson' of the United Kingdom type 24E - 2P having a nominal air volume of 15,500 CFM each against system resistance. Motor horse power will be 16. Fans offered will similarly be supplied complete with mounting feet, flexible connector, finger proof impeller side wire guard and anti vibration mountings.

b) Exhaust Air Fans

The fans offered will similarly be as manufactured by Messrs 'Myson' type '355mm propeller fan' each having a nominal air volume of 1290 CFM at free air conditions. Motor power will be 285 watts. Fans offered will be supplied complete with mounting plate and finger proof motor side wire guard.

c) Ductwork Systems

Ductwork will be manufactured from aluminium-zinc plates of appropriate thickness and be to 'SMACNA' low velocity duct standards. Ductwork systems will be complete with all necessary stiffeners, brackets, duct sealer, etc.

d) Ventilation Registors

Ventilation registors will be of aluminium construction throughout, single deflection type complete with manually operated volume control damper for easy adjustment of air flows. Ventilation registors will be as manufactured by Messrs 'Brooke Air' model SDH/OB.

Our price for carrying our the above amounts to ..... Lm 29,500.00.0

.../3

Electrical and Builders Work

A. Electrical Works

A.1 Standard

The electrical installation will be carried out according to the specification of the main contract.

A.2 Supply Voltage

The supply characteristics will be 3 phase, 415 Volts, 50Hz A/C, 4 wire system earthed neutral.

A.3 Scope of Work

Our scope of work will include the supply and installation of the following:-

(i) Main power feeder from the existing M.C.C. panel to a new distribution board.

(ii) 100 Amp T.P.N. main switchfuse complete with H.R.C. fuses.

(iii) 1 No. 6 way T.P.N. main distribution board complete with circuit breakers.

(iv) 2 No. 4 way T.P.N. sub distribution boards complete with circuit breakers.

(v) Sub main feeders from main distribution board to 2 No. sub main distribution boards.

(vi) 2 No. power points for axial flow supply air fans complete with starters and disconnecting switches.

(vii) 24 No. power points for propeller exhaust air fans controlled by individual circuit breakers.

(viii) 2 No. T.P.N. contactors complete with controls.

A.4 General

The installation will be carried out as per main contract and will include the dismantling of parts of the existing installation that may be in the way of ducts, etc.

.../4

B. Builders Work

We will provide steel doors in 12 of the access doorways leading to the rock face. Twelve of the proposed propeller fans will be installed on the top part of the door. Lower part of door will be openable for access into void. The remaining doors will be blocked up using 6" soft stone. Twelve of these doors will have an opening to accommodate the 12 remaining propeller fans.

The two front emergency exist doors will be lined with galvanised sheet to make doorway airtight.

Our price for carrying our the above amounts to .... Lm 6,742.00.0

Total for all services ..... Lm 36,242.00.0

Terms of payment : As per main contract.

Execution of work : To be carried out to an agreed programme of works.

Validity : 30 days after which confirmation in writing may be necessary, however work is foreseen to take approximately 13 weeks.

We sincerely hope that the above quotation is to your satisfaction and look forward for your further instructions in due course.

Yours faithfully,
PANTA LESCO LIMITED

A.J. Borg
Manager
Mechanical Contracting Division

cc. Mr. M. Sant

APPENDIX 18

BÜHLER-MIAG GMBH

BÜHLER-MIAG GmbH, Postfach 3369, D-3300 Braunschweig/BRD

By express - airmail

Mr. J.G. Herrebout/GEMCO
c/o Malta Government
Economic Division
Auberge de Castille

V a l l e t t a
MALTA

Please contact : Mr. Janke
Direct dial/phone: (0531)594-2998
Direct dial/telex: 952700-40 bm d
Our ref. : FS-4.2/Jn/Km

Your ref:
Your letter of:

Braunschweig, November 7, 1985

Re.: Kordin Grain Terminal

Dear Sirs,

Regarding your requests for additional safety precautions at the ship-unloader for the boom-BKT we would like to inform you as follows:

The installed electrical operated safety device is sufficiant for the purpose.

Your proposal of having an additional pressure relieve valve to stop the movement at the conveyor drive shaft immediately cannot be executed technically.

The operating pressure of the hydraulic motors depends on the position of the boom-BKT. The highest pressure point at lowest working position is within the range of the pressure control valve. An additional pressure relieve valve at that position will indicate false conclusion at peak points.

At highest working position, when material nearly conveys by means of gravity, the full torque of the drive can be in operation to demage the chain.

Under this circumstances item 1 of your snag-list is to be nominated as completed.

...

BÜHLER-MIAG GMBH

BÜHLER-MIAG GmbH, Postfach 33 69, D-3300 Braunschweig / BRD

We hope the foregoing meets your approval, and remain

Yours faithfully,

BÜHLER - MIAG GmbH

i.V. E. Janke

i.A. W. Huber

BÜHLER-MIAG GmbH Postfach 3369 D-3300 Braunschweig / BRD

By express - airmail

Malta Government
Economic Division
Attn.:Mr. Michael Sant
Princ. Assistant Secretary
Auberge de Castille

Valletta / MALTA

Please contact : Mr. Janke
Direct dial/phone: (0531)594-2998
Direct dial/telex: 952700-40 bm d
Your ref:
Your letter of:
Our ref. : FS-4.2/Jn/Km

Braunschweig, October 24, 1985

GEM Consult...

Re.: Kordin Grain Terminal

Dear Sirs,

Regarding the quality of the supplied conveyor belts of Messrs. Conrad Scholtz AG Hamburg, inspected by their head of Sales Department, we herewith would like to give you their comments, which we received today.

Quote
1) Parts of conveyors B1 and B2 are showing visual deficiencies.

2) We herewith declare that the visual deficiencies are without influence over mode of running and life time of the belts.

3) For your own safety, and supporting our statement, we extend the guarantee period for the conveyor belts from 12 months to 24 months.

Unquote

We hope, the foregoing meets with your approval, and remain

Yours faithfully,

BÜHLER - MIAG GmbH

i.V. i.V.

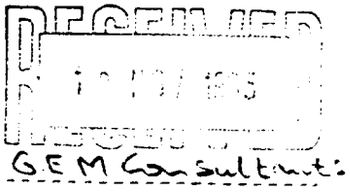
H. Krökel E. Janke

MICHAEL SANT PAS ECONOMIC DIVISION 20352

MR W HERZMANN

BUHLER MIAG

952700 - 40 bm d

5 November 1985  MICHAEL SANT PAS

WITH REFERENCE TO YOUR LETTERS DATED 8 AND 10 OCTOBER 1985 THIS IS TO INFORM YOU OFFICIALLY THAT WE STRONGLY REJECT WHAT APPEARS IN YOUR TWO LETTERS. DETAILED LETTER TO FOLLOW.

RE HOT TEST FOR LAST WEEK OF NOVEMBER: WE WILL ON OUR SIDE PROVIDE PERSONNEL AND ENERGY. MATERIAL WILL ONLY BE PROVIDED IF STILL AVAILABLE AT KORDIN SILO. IF NOT, IT WILL BE BMB'S FULL RESPONSIBILITY TO PROVIDE. WOULD ALSO LIKE TO MAKE IT VERY CLEAR THAT SHIPPING ARRANGEMENTS, VESSEL CHARTERING, ETC. WILL BE BMB'S COMPLETE RESPONSIBILITY AND TO BMB'S ACCOUNT.

RE YOUR SCHEDULED VISIT TO MALTA. WOULD NOW LIKE TO INFORM YOU THAT WILL BE AVAILABLE FOR DISCUSSIONS ON 28 AND 29 NOVEMBER AND NOT ON 21/22 NOVEMBER AS AGREED UPON WITH MR S BARBARA LAST WEEK.

REGARDS,

MICHAEL SANT
ECONOMIC DIVISION
PRIMIN OFFICE
MALTA.

FLOHNTDMLT MT
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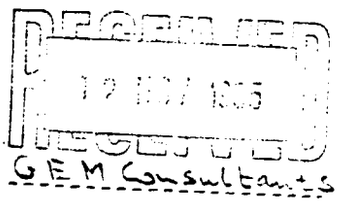

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ATTN. MR. MICHAEL SANT - ECONOMIC DIVISION

DEAR SIRS,

THANKS FOR YOUR TELEX DATED NOVEMBER 5, 1985. WE WOULD LIKE TO CONFIRM MEETING WITH YOU ON NOVEMBER 24/25.

FOR YOUR INFORMATION MOST OF THE ITEMS ACCORDING TO THE CHECK LIST ARE COMPLETED.

WE WOULD BE RATHER GRATEFUL IF YOU COULD GIVE US YOUR ASSISTANCE DURING THE LOADING OUT TEST.

PROCEDURE WILL BE DISCUSSED DURING ABOVE-MENTIONED MEETING.

WE WILL DELEGATE OUR MR. JANKE TO KEEP CLOSE CONTACT WITH ALL PARTIES CONCERNED TO COMPLETE THE PROJECT.

REGARDS,

DUEHLER-MIAG BRAUNSCHWEIG

PV-1 / M. HERZMANN

1100 MODMLT MT
952700Z BH D

BÜHLER MIAG GMBH

BUHLER-MIAG GmbH, Postfach 3369, D-3300 Braunschweig / BRD

By express - airmail

Malta Government
Economic Division
Attn.: Mr. Michael Sant
Princ. Assistant Secretary
Auberge de Castille

Valletta / MALTA

Your ref:
Your letter of:

Please contact : Mr. Janke
Direct dial/phone: (0531)594-2998
Direct dial/telex: 952700-40 bm d
Our ref. : FS-4.2/Jn/Km

Braunschweig, November 6, 1985

RECEIVED
GEM Consultants

Re.: Kordin Grain Terminal

Dear Sirs,

We have contacted Messrs. BBC Braunschweig regarding the claim of your technical advisor that abnormal rectification work in their working drawings was noted.

Messrs. BBC gave their comments in writing to us last week and the sense we herewith would like to forward to you.

1) Additional requests by your technical advisor, such as local start-stops for winches, individual start of aspiration systems and various requests at manual operation forced BBC to rectify their working drawings, further drawing alterations were based on normal commissioning experiences. The total drawing alteration was based on approx. 10 % of the wiring diagrams.

3) The function of the electrical control according to contract was based on operation in 'automatic' from the control panel and 'manual' from the local start-stop switches.

This system has been changed at site in accordance with and on request of your technical advisor as follows:

at various points additional level indicators were installed, and are to be connected to the system.
At first malfunction an visual and acoustic signal will be given and interlocked system will stop. After confirmation of the acoustic signal, drives can be started again. In case if a second malfunction appearing whilst first malfunction is not cleared, the system is not operating in interlock.

Wilfried Baetge (Vorsitz) Dipl. rer. pol. (techn.)
Wilfried Heidelk
Braunschweig
Ernst-Amme-Straße 19
Amtsgericht Braunschweig
Telefon (0531) 594-1
Telex 952 700-0 bm d
Telefax (0531) 594 2...
Deutsche Bank AG, Braunschweig
Dresdner Bank AG, Braunschweig
Commerzbank AG, Braunschweig

BÜHLER-MIAG GMBH

BÜHLER-MIAG GmbH Postfach 3369 D-3300 Braunschweig / BRD

A quotation for the installation of electrical equipment to indicate a second alarm when one alarm already exists, will be given to you by Messrs. Panta Lesco directly.

3) In automatic control only the aspiration systems belonging to the route selected will be in operation.

The selector on-off at the control panel only serves to start-stop the aspiration in manual control.

4) When the commissioning engineer of Messrs. BBC left site, the electrical installation was in working condition.

Change of relays for the power factor correction unit was completed by 80 %. It was decided to install the outstanding 20 % during next visit at site.

5) Start of electrical erection for the additional equipment will be week 45/85.

6) Material for additional electrical installation has been shipped from Germany on 31.10.85.

General

Outstanding electrical items of the snag-list will be attended to whilst insta'ling the additional equipment.

We hope the foregoing meets your approval, and remain

Yours faithfully,

BÜHLER - MIAG GmbH

i.V. H. Krökel

i.V. E. Janke

Wilfried Baetge (Vorsitz)
Braunschweig
Telefon (0531) 5941
Deutsche Bank AG Braunschweig

APPENDIX 19