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**REPORT TO USAID/PANAMA
ON
CONSULTATION VISIT
WITH THE
PANAMANIAN SEED PROJECT**

23 March -- 9 April, 1971

**Services Rendered
Under the Agreement
Between
AID/W and MSU
AID-W-607**

**SEED TECHNOLOGY LABORATORY
Mississippi State University
State College, Mississippi**

April, 1971

REPORT SUMMARY

TITLE: Report to AID/W and USAID/Panama on Consultation Visit with the Panamanian Seed Project

AUTHOR: George M. Dougherty, Assoc. Agronomist

PERIOD OF REPORT: March - April, 1971

PROJECT TITLE : AID-W-607

CONTRACTOR: Mississippi State University

SUMMARY

USAID/Panama requested assistance available under Contract AID-W-607 to review construction drawings and equipment specification lists prepared by the Ministry of Agriculture, GOP (based on recommendations provided by Mississippi State University*) for seed facilities to be constructed in David and Divisa, Panama. Construction drawings for renovation of the Panama City seed facility were also reviewed.

Panama's seed project was reviewed and visits were made to the sites of the three seed centers ie David, Divisa and Panama City; conferences were held with USAID/staffers, Ministry of Agriculture administrative personnel and seed project officials.

*"Report to USAID/Panama on Consultation Visit with Panama's Seed Improvement Program" 23 March-13 April, 1969 and "Equipment Specifications for the Chiriqui, Divisa and Panama City Seed Facilities: December, 1969.

Recommendations were made concerning changes required in construction drawings and equipment specification lists for the seed facilities in David and Divisa. Recommendations were also made relative to future planning for the seed industry in Panama and the need for USAID/Panama's support of the Ministry of Agriculture's request for additional funds to renovate the Panama City seed facility. All recommendations made were discussed in detail with USAID/Panama staffers, Ministry of Agriculture and seed project administrative personnel.

**REPORT TO USAID/PANAMA
ON
CONSULTATION VISIT
WITH THE
PANAMANIAN SEED PROJECT.**

23 March - 9 April, 1971

George M. Dougherty

Introduction

USAID/Panama requested assistance available under Contract AID-W-607 to review construction drawings and equipment specification lists prepared by GOP Ministry of Agriculture personnel for seed facilities to be constructed in David and Divisa, Panama. The materials prepared were based on recommendations provided by Mississippi State University in "Report to USAID/Panama on Consultation Visit with Panama's Seed Improvement Program" and "Equipment Specifications for the Chiriqui, Divisa and Panama City Seed Facilities," dated April, 1969 and December, 1969, respectively.

Assistance was requested for a period of approximately 14 to 21 days. Specific objectives of the assignment were as follows:

- (1) Review construction drawings and equipment specification lists for David Seed Center**
- (2) Review construction drawings of Divisa Seed Center**
- (3) Advise on consideration to be granted to plans to modify an existing structure housing the Panama City Seed Center.**

Arrival date in Panama was March 23, 1971; departure date from Panama was April 9, 1971.

Discussion

During the period of this assignment visits were made to the existing seed facilities in David, Divisa and Panama City, and to the site of the new seed center to be constructed in David. A visit was also made to the Ministry of Agriculture refrigerated storage warehouse in David. This warehouse is currently being used for seed storage because of inadequate storage facilities at the existing seed centers.

The seed project, under the supervision and direction of Lic. Luis Lopez, is functioning very well. The principal limiting factor to increasing productivity to the level required to meet project goals under terms of the loan agreement is a serious lack of adequate seed storage and processing facilities. During 1970 approximately 24,000 quintal seed were processed in the David, Divisa and Panama City seed centers. Projected goals for 1971 and 1972 are 25,000 and 27,000 quintals, respectively. Overall seed project production goals are estimated, by project officials, to be approximately 39,000 quintals, broken down as follows: 3,000 quintals (total) cowpeas and beans; 32,000 quintals rice; 4,000 quintals (total) open-pollinated and hybrid corn. It is anticipated that small quantities of other crop seed, such as kidney bean and sorghum, to be introduced into the program, will also be produced.

1. GENERAL PROGRAM:

Increases in quantities of seed handled by the seed project are expected to continue until the overall goal of 39,000 quintals is achieved by the mid-1970's. This goal is reasonable, and obtainable, if all construction presently under consideration is completed by the end of 1972. However, goals established for 1971 and 1972 are not obtainable unless construction at the seed centers is undertaken immediately. The need for the new seed center at David, and expansion of the seed center in Divisa in addition to renovation work at the seed center in Panama City, are matters requiring immediate attention.

The goal of 39,000 quintals seed ie. (32,000 rice) (3,000 bean and cowpea) (4,000 corn) is estimated, by seed project officials, to represent approximately 10% of Panama's need for good seed of improved crop varieties. At present, few private sector seedsmen exist; practically all seed of improved crop varieties being marketed are either produced by the seed project or imported. Project goals of 10% of seed needs will require that large quantities of seed will continue to be imported unless the private sector can be stimulated into greater activity in the seed industry. It is the considered opinion of this consultant that emphasis should, at this time, be directed toward stimulating greater participation of the private sector in the Panamanian seed industry.

Completion of the new seed center in David, and completion of the construction work under consideration at Divisa and Panama City, will provide the facilities required to handle the volume of seed anticipated in the project's goals. However, the seed project remains understaffed in terms of technically well trained personnel. In this regard, USAID/Panama and Ministry of Agriculture administrators should encourage seed project employees to participate, whenever possible, in Seed Improvement Courses periodically presented in Latin America by Mississippi State University's Seed Technology Laboratory under the AID-W-607 Contract. It is being recommended that the manager and assistant manager of the new David seed center be considered for participation in the course tentatively scheduled for presentation at the Escuela Panamericana, Zamarano, Honduras, November, 1971.

II. DAVID SEED CENTER:

Visits were made in David to the existing seed center, the Ministry of Agriculture refrigerated storage warehouse, and to the site of the new seed center. The site occupied by the existing seed center must be vacated; equipment currently in use at this facility is to be, under terms of the loan agreement, transferred to the new seed center. This equipment was observed; it is operative and in general good condition.

Seed processed at the Divisa seed center is currently being trucked to the refrigerated storage warehouse in David for storage, a move necessitated because of a lack of sufficient storage space at the Divisa installation. The refrigerated warehouse is primarily utilized by MAG for the storage of potatoes and fresh-cut flowers. It is equipped with several storage rooms; one of which is being used by the seed project, on a temporary basis, for the storage of seed. Environmental conditions in the room being used by the project are very unfavorable for the storage of seed, but they are the best available until construction of the new facility in David, and/or the construction of new storage rooms at Divisa can be completed. During the visit, conditions at 50°F. and 80% relative humidity were recorded in the room being used for the storage of seed. Efforts were being made to maintain conditions approximating 70°F. and 50% relative humidity, but obtaining these conditions with an environmental control system designed to produce low temperatures and high relative humidities is extremely difficult, if at all possible.

The new seed center is badly needed; construction work should be expedited. This center is to be located just off the Panamerican Highway, approximately 2 km from the existing facility. The new location, selected by MAG, is completely satisfactory to this consultant. Construction drawings and equipment specification lists for the new seed center were critically reviewed. Several changes, in

both, were deemed desirable to assure proper operation of the seed center. The changes made involved: re-arrangement of some items of equipment; additions and deletions of some items of equipment on the equipment procurement lists; changes in seed storage room construction drawings; and changes in electrical installation drawings and specifications. The changes recommended were discussed in detail with USAID/Panama staffers, MAG and seed project personnel. New equipment specification lists were prepared. The new equipment specification lists and recommendations appear in subsequent sections of this report.

III. DIVISA SEED CENTER:

Two visits were made to the Divisa seed center; one enroute from Panama City to David, the other on the return trip from David to Panama City. Rice seed was observed being processed. Processed rice seed appeared to be of satisfactory quality; clean-out was estimated, by seed project officials, to be approximately 15% to 20%. Clean-out observed was not excessive for the product being processed.

The new seed storage rooms planned for construction at the seed center are badly needed; construction work must be expedited. During my visits all space not occupied by items of equipment was being utilized for the storage of seed; this includes space in the existing storage room and space in the processing plant. Some of this seed was awaiting transport to the MAG refrigerated warehouse

in David; some will remain in Divisa under non-controlled atmospheric storage conditions. Reductions, of various magnitudes, in the quality of this seed can be anticipated if the seed is held for any appreciable length of time. All that is possible to maintain satisfactory seed quality is being done; there are just no additional favorable storage areas available in which to store the seed.

Construction drawings of the seed storage rooms to be constructed in Divisa were critically reviewed. Several changes were deemed desirable. These changes involve: providing greater detail relative to the installation of vapor barrier and insulation in the seed storage rooms; addition of electrical outlets; changes in specifications of air conditioners; changes in numbers of dehumidifiers required. All changes recommended were discussed in detail with USAID/Panama staffers, MAG and seed project personnel. New equipment specification lists were prepared ie. for air conditioners and dehumidifiers. The new specifications and recommendations appear in subsequent sections of this report.

IV. PANAMA CITY SEED CENTER:

The existing Panama City seed center is currently housed in two structures located across the street from each other. Administrative and seed storage operations are housed in one structure, the seed processing plant in the other. The structure housing the seed processing plant is a covered (sheltered) open-air type structure that is

located on property that must be vacated. MAG has requested USAID/Panama to provide additional funds, totalling approximately \$6,000, to assist in relocating the processing plant within the existing warehouse - office structure. The funds requested are to be expended for construction and electrical work required to modify the existing structure to house the processing equipment. It is the considered opinion of this consultant that the request for funds be favorably acted upon by USAID/Panama.

The original seed project loan agreement entered into between the GOP and USAID/Panama was directed toward the improvement of the agricultural output of 10,000 small farmers by the mid-1970's. Fundamental to achievement of the project's goals was the fact that the seed project must supply the quantities of seed of improved varieties required. This was, and still is a valid assumption, for there is no significant private sector in the commercial seed industry in Panama. The numbers, types, and locations of seed facilities required to provide the seed stocks needed were determined cooperatively by this consultant, USAID/Panama and MAG in 1969. The seed centers deemed necessary were: (a) continued operation of the Panama City facility (processing and storage); (b) continued operation of the Divisa facility, including the addition of three conditioned seed storage rooms; (c) construction of a new seed center in David. The need for all these facilities is just as strong today as it was when

the need was determined in 1969. The need for continued operation of the Panama City facility is even greater than it was in 1969 due to the fact that construction has not yet started at the David facility.

Of no lesser significance is the fact that both the Panama City and Divisa seed centers are currently custom-cleaning seed for private producers. These custom-cleaning activities deserve recognition and consideration. Custom-cleaning is a service not planned for originally, but it is a valuable service to farmers.

During 1970, approximately 2,500 quintals rice seed was processed at each of the seed centers ie. Panama City, Divisa; a similar amount will be processed (projected) in 1971. Additional quantities would be processed if the operational capacity of the seed centers would permit. Shut-down of this valuable service, which will result if the Panama City seed center is closed, would seriously damage chances to achieve the goals set forth, namely, to assure an adequate supply of good seed of improved varieties at a reasonable price. Arguments advanced supporting greater involvement of the private sector, at the expense of the continued operation of the Panama City seed center are groundless; there are no private sector seedsmen available to fill the "vacuum" that such action would create.

This is prejudicial, for no effort was made to assess whether Millers in the private sector could do.

In discussions with USAID/Panama staffers on April 8th, it was agreed by those present (in the opinion of this consultant) that support for the additional funds requested to keep the Panama City seed center

operational, would be forthcoming. It is sincerely hoped that this action will be taken soon; continued, non-interrupted operation of this facility is deemed vital to Panama's Agricultural Improvement Program.

Construction drawings of the renovation work planned for the Panama City seed center were reviewed. They appeared to be quite satisfactory, and they contained no alterations to the existing structure other than those actually required for a moderately efficient operation. This consultant's recommendation in support of the MAG request for additional funds appears in a subsequent section of this report.

ESTIMATED COSTS , DESCRIPTIONS AND SPECIFICATIONS
FOR EQUIPMENT REQUIRING
PURCHASE AND INSTALLATION

(April, 1971)

A. Estimated Costs (F.O.B. Manufacturer) of Equipment Items
in Revised Specifications for Equipment Items Requiring
Installation

Item No.	No. Req'd	Description	(Extension) \$U.S.
1	1	Elevator assembly (complete)	1,000.00
2	1	Elevator assembly (complete)	980.00
3	1	Warehouse Scale	800.00
4	2	Precision Grader assembly (complete)	3,900.00
5	2	Storage-Drying tank assembly (complete)	2,100.00
6	1	Heater-fan Dryer assembly (complete)	4,000.00
7	1	Bagger-Weigher	675.00
8	1	Disc Separator (complete)	3,000.00
9	6	Air Conditioners	3,000.00
SUB-TOTAL			\$19,455.00
10% Export boxing			<u>1,945.00</u>
GRAND TOTAL			\$21,400.00

B. Location and Use Description of Items Appearing in Revised Specifications for Equipment Items Requiring Installation

<u>Item No.</u>	<u>Description</u>
1	Elevator used to elevate seed to be cleaned to hopper (bin) over the air-screen cleaner. Seed can also be discharged into drying-storage tanks. Located in David Processing plant bldg.
2	Elevator used to elevate "cleaned" seed discharged from the air-screen cleaner to hopper (bin) over the Precision Graders and Disc separator. Located in David Processing plant bldg.
3	Platform scale used to weigh in-coming and out-going shipments of seed. Located in David Processing plant bldg.
4	Precision Graders used to size grade seed. The two units to be installed vertically, one above the other, over an existing grader. Located in David Processing plant bldg.
5	Seed drying-storage tanks used to dry seed and bulk-storage seed. Located in David Processing plant bldg. <u>Note:</u> Tanks must be mounted on 0.3m high concrete blocks.
6	Heater-dryer fan unit provides heated air to dry seed. Located in David Processing plant bldg.
7	Bagger-weigher used to weigh seed into bags. Located in David Processing plant bldg. (Mounted under bagging-bin).
8	Disc separator used to length grade rice seed. Located in David Processing plant bldg.
9	Air conditioners used to cool air in seed storage rooms (2 units/room). Located in David seed storage rooms.

C. Revised Specifications for Equipment Items Requiring Installation (David)

Item No.	No. Req'd.	Description
1	1	<p>Belt-bucket elevator - 24 ft. discharge height; 175 BPH, 220 CFH, capacity at 75% bucket filling; 110-125 FPM belt speed; 85-95 headshaft RPM. Complete with drive assembly and:</p> <ul style="list-style-type: none"> a) dump hopper on up-leg b) dump hopper on down-leg c) 6-inch two-way valve* d) four (4), ten ft. sections, 6-inch dia. rigid spouting (14 ga.) flanged both ends e) Six (6), 6-inch clamp rings f) two (2), 2 ft. sections, 6-inch dia. flexible spouting flanged both ends g) three (3), 6-inch loose flanges h) 1/3 h.p. TEFC motor operable on 120 volt, 1 ph, 60 cycles i) spacers for insertion between belt and buckets <p>Universal Inc. model C2-175 "Easy Dump" or similar</p>
2	1	<p>Belt-bucket elevator - 23 ft. discharge height; 175 BPH, 220 CFH, capacity at 75% bucket filling; 110-125 FPM belt speed; 85-95 headshaft RPM. Complete with drive assembly and:</p> <ul style="list-style-type: none"> a) dump hopper on up-leg b) dump hopper on down-leg c) 6-inch off-set two-way valve (with adaptor for installation on elevator) d) three (3) ten ft. sections 6-inch dia. rigid spouting (14 ga.) flanged both ends e) six (6), clamp rings f) two (2), 2 ft. sections, 6-inch dia. flexible spouting flanged both ends

*with adaptor for installation on elevator

Item No.	No. Req'd.	Description
		<ul style="list-style-type: none"> g) three (3), 6-inch loose flanges h) 1/3 h.p. TEFC motor operable on 120 volt, 1 ph, 60 cycles i) spacers for insertion between belt and buckets
		Universal Inc. model C2-175 "Easy Dump" or similar.
3	1	<p>Floor and platform type warehouse scale with weigh-beam, to be installed in shallow floor pit. All steel welded construction; heavy duty structural steel frames and weighbridges; steel checkered safety plate platform; 42 x 42-inch platform; double-beam; 2,000 pound capacity; complete with weights required to obtain 2,000 pound capacity. Burrows Equipment Co. "Winslow" warehouse scale or similar.</p>
4	2	<p>Width and thickness separators for use with agricultural seed. Dimensions: 21" (width) x 80 1/2" (length) x 34 1/2" (high). Net weight: 440 pounds. Complete with motors of required horsepower and drives operable on 120 volt, 1 ph, 60 cycles; required spout connections for installation in a 3-high series flow arrangement of "thru's" product. Complete with <u>one (1) set of grading shells sized as follows:</u></p> <ul style="list-style-type: none"> a) Slotted Shells - 10,11,13,14,15 b) Round-hole - 14,16*,18*,19,20*,24 <p>Carter-Day Co. Model 1 V^T Precision Grader or similar.</p>
5	2	<p>Corrugated metal grain and seed drying-storage tanks- 1,000 bushel (normal) storage capacity; 8 ft. shell height; 12 ft. overall height; 14 ft. diameter. <u>Each</u> complete with all parts required for assembling and:</p> <ul style="list-style-type: none"> a) foundation ring b) perforated (heavy duty) drying floor (channel type panels) c) steel supports for drying floor

*to be equipped with conveyor blade assembly

Item No.	No. Req'd.	Description
		<p>d) 6-inch dia. bin unloading auger (minimum required length <u>plus</u> 1 ft.) complete with motor and drive operable on 240 volt, 3 ph., 60 cycles.</p> <p>e) Ear-corn loading door</p> <p>f) transition fan entrance collar</p> <p>Columbian "Red Top" corrugated grain bin or similar</p>
6	1	<p>Heater-fan drying unit rated for 12,500 cfm's at 1-inch S.P. and 770,000 - 1,000,000 B.T.U.'s per hour, capable of burning #2 diesel oil, having 5 h.p. blower motor. Complete with all drives and motors operable on 240 volt, 3 p.h., 60 cycles; automatic modulating temperature controls necessary to maintain a constant temperature at any desired temperature in range of 75^oF to 120^oF; temperature limit control to close fuel valve when drying air temperature reaches desired level; flame failure switch with fail-safe features; low air-flow safety switch; power failure shut-down switch; feature insuring burner is inoperative unless blower is operating; disc thermometer on control panel indicating temperature of drying air; warning device (audio and visual) to alert operator of drying shut-down due to malfunction. American Drying Systems model 815 or similar.</p>
	1	<p>Gross bagger-weigher- automatic (all mechanical operation); portable; handle open-mouth paper, textile or plastic bags (25-140 lb.); "true-scale" weighbeam-5:1 ratio with calibrated weights. Howe-Richardson model G-17 automatic gross bagger or similar.</p>
8	1	<p>Seed length (sizer) separator - disc type; dimensions: 44 1/2 (inch) height to top of feed inlet; 49 1/2 (inch) overall width; 92 (inch) overall length. Complete with: cast ends (for use with rice); discharge spout connectors; motor and drives operable on 240 volt, 3 ph., 60 cycles. Carter-Day model 2527, style WZ 3 or similar.</p> <p><u>Note:</u> Sample of rice seed will be submitted to equipment manufacturer, by Ministry of Agriculture, when order is placed to determine correct disc pocket sizes, types and arrangement.</p>

Item No.	No. Req'd.	Description
9	6	Air-conditioners - window type (to be installed through 12-inch thick wall); heavy-duty industrial type; 24,000 BTU rating; operable on 240 volt, 1 ph., 60 cycle current. Units to have minimum warrants of one year on all parts (good in Panama). Remington Model 32A3 or similar.

Note 1: Quotations must be accompanied with complete specifications (including makes, models, styles) of equipment to be supplied.

Note 2: Ministry of Agriculture reserves the right to reject any and all quotations if equipment to be supplied is judged to be of inferior quality or performance to referenced makes and models.

Note 3: Copies of quotations are to be mailed to:

Seed Technology Laboratory
Mississippi State University
Box 5267
State College, Mississippi 39762

Attn: George Dougherty

ESTIMATED COSTS, DESCRIPTIONS
AND SPECIFICATIONS
FOR EQUIPMENT REQUIRING
PURCHASE
NO INSTALLATION

D. Estimated Costs (F.O.B. Manufacturer of Equipment Items in
 "Revised Specifications for Equipment Not requiring installation
 (David, Divisa, Panama City)!"

Item No.	No. Req'd	Description	(Extension) \$U.S.
10	1	Grain Inspection Scale	\$340.00
11	1	Filling hopper and stand	50.00
12	1	Torsion balance	300.00
13	1	Seed Germinator	255.00
14	1	Seed Moisture Tester	545.00
15	1	Grain and Seed Divider	290.00
16	1	Bag Closer (complete)	400.00
17	2	Bag Truck	150.00
18	2	Platform Truck	314.00
19	7	Thermometers	175.00
20	2	Grain Probes	44.00
21	2	Grain Probes	74.00
22	2	Seed Trier	24.00
23	1	Seed Blower	475.00
24	2	Purity Workboard	90.00
25	1	Platform Scale	390.00
26	1	Seed Treater (complete)	2,785.00
27	1	Vacuum Cleaner	350.00
28	1	Air Compressor	600.00

Item No.	No Req'd	Description	(Extension) \$U.S.
29	3	Bag Conveyor (complete)	\$2,478.00
30	2	Hygrothermographs	500.00
31	1	Bag Trier	22.00
32	6	Sample Pans	24.00
33	1	Elevator Assembly (complete)	600.00
34	2	Belt Conveyor (complete)	800.00
35	9	Dehumidifier	5,940.00
36	8	Air Conditioners	4,000.00
37	7	Humidity Guides	280.00
38	10	Screens	220.00
39	24	Screens	580.00
SUB-TOTAL			<u>\$23,095.00</u>
10% export boxing			<u>2,310.00</u>
GRAND TOTAL			\$25,405.00

E. Location and Use Description of Items appearing in "Revised Specifications for Items Not Requiring Installation (David, Divisa, Panama City)"

Item No.

- 10 Grain inspection scales used in testing Laboratory to weigh samples for moisture tests and obtain bushel weight. Located in David testing Laboratory.
- 11 Filling hopper and stand used to measure sample for bushel weight determinations. Located in David testing laboratory.
- 12 Torsion balance scale used to weigh samples for purity analysis determinations. Located in David testing Laboratory.
- 13 Seed germinator used to make germination test determinations. Located in David testing Laboratory.
- 14 Seed moisture tester used in seed moisture content determinations. Located in David testing Laboratory.
- 15 Grain and seed divider used to fractionate large samples into small samples for seed testing purposes. Located in David testing Laboratory.
- 16 Bag closer used to seal seed bags. Located in David Processing Plant bldg.
- 17 Bag truck used to move 1 - 6 bags seed in processing plant and storage rooms. Located in David Processing Plant bldg.
- 18 Platform truck used to move up to 20 bags seed in processing plant and storage rooms. Located in David Processing Plant bldg.
- 19 Thermometers used to register temperature in seed storage rooms. Located as follows:
- a) 3 - David
 - b) 4 - Divisa

Item No.

- 20-22 Grain probes (trier) used to obtain seed samples.
 Located David Seed Center.
- 23 Seed blower used in purity analysis determinations.
 Located in David testing laboratory.
- 24 Purity work board used in purity analysis determinations.
 Located in David testing Laboratory.
- 25 Platform scale used to weigh single bags seed and check
 weigh against bagger-weigher. Located in David seed
 processing plant bldg.
- 26 Seed treater used to apply fungicide to corn, rice,
 sorghum, bean seed. Located in David processing
 plant bldg.
- 27 Vacuum cleaner used in equipment clean-out and
 general plant clean-up. Located in processing plant
 bldg. (David)
- 28 Air compressor used in equipment clean-out. Located
 in processing plant bldg. (David)
- 29 Bag conveyor used to stack seed in storage rooms.
 Located as follows:
- a) 1 - David
 b) 1 - Divisa
 c) 1 - Panama City
- 30 Hygrothermograph used to obtain continuous record
 of temperature and humidity in seed storage rooms.
 Located in David seed storage rooms.
- 31 Bag trier used to draw samples from sacked seed.
 Located in David processing plant bldg.
- 32 Sample pans used to contain samples (seed) being
 handled in testing laboratory. Located in seed
 testing laboratory (David).

Item No.

- 33 Belt-Bucket elevator used to elevate "treated" seed to bagging bin. Located in David seed processing plant bldg.
- 34 Belt conveyors (2) used in series to convey corn-cobs from sheller outside processing plant bldg. Also used to convey seed in drying-storage bins to elevators (items 1 and/or 2). Located in David seed processing plant bldg.
- 35 Dehumidifiers used in seed storage rooms to maintain desirable relative humidity (approx. 50%). Located as follows:
- a) 4 - David
 - b) 5 - Divisa
- 36 Air conditioners used to maintain desirable temperature in seed storage rooms (60^o-70^oF). Located in Divisa seed storage rooms.
- 37 Humidity guides and used to register relative humidity in seed storage rooms. Located as follows:
- 38 Screens used in air-screen cleaner to clean seed. Located in David seed processing plant bldg.
- 39 Screens used in air-screen cleaner to clean seed. Located in Divisa seed processing plant bldg.
-

F. Revised Specifications for Equipment Items Not Requiring Installation (David, Divisa, Panama City (See Note 1))

Item No.	No. Req'd	Description
10	1	Grain inspection scale with face chart showing weight per bushel, percentage of dockage and grams (no loose weights required). Charts to be calibrated: 500 grams x 5 grams; 0 to 100% x 1/2%; 70 lbs. x 1 lb. wt. per bushel. Toledo 4616 grain inspection scale or similar.
11	1	Filling hopper and stand with brass funnel; locating screws in base for absolute centralization of cup; pre-set stops on upright; 1 1/4 inch dia. funnel mouth equipped with brass (machined) gate valve; over flow pan; spirit level in base; 1 pint and 1 quart measuring cup. Burrows Equipment Company No. 326 (catalog No. 15 or similar.
12	1	Torsion balance scale complete with class "P" weights (1-50 grams) in case with forceps. Burrows Equipment Company model DWL-2 Torsion balance or similar.
13	1	Seed germinator for continuous germination testing of seed of any type or size. Dimensions: 24 (inch) x 24 (inch) x 20 (inch) approximate. Operable on 120 volt, 1 ph., 60 cycles. Equipped with: 6 aluminum trays; thermostat, fully automatic and accurate to 1/2 of 1 F; strip heaters; dial thermometer; thermo-pane plexiglass door; aluminum water reservoir below trays. Burrows Co. model 1880 or similar.
14	1	Seed moisture tester with testing range of 1 1/2% - 47% seed moisture, content; operable on 120 volt; 1 ph., 60 cycles. Complete with charts for testing; rice, corn, cowpea, sesame, peanut, sorghum, red kidney and lima beans. Steinlite model DL or similar.
15	1	Grain and seed divider operating on centrifugal principle. Wearing parts to be heavy brass or copper; dimensions, 20 1/2 inch height, 14 (inch) width; operable on 120 volt, 1 ph., 60 cycles. Gamet precision divided or similar.

Item No.	No. Req'd	Description
16	1	Electric bag closer, portable, with direct drive motor switch in handle and mechanical thread cutting device; operable on 120 volt, 1 ph., 60 cycles. Complete with lock spring balancer overhead suspension unit; 2 carton (32 per carton) 8 ounces thread cones; 2 dozen extra needles; 1 quart lubricating oil; 1 gallon cleaning solvent. Fischbein model D or similar.
17	2	2-wheel bag truck with 9-inch nose; 8-inch dia. wheels; rubber tires; 48-inch length handles; roller bearings. Minneapolis bag truck (Burrows Co. catalog number 1025 AR) or similar.
18	2	4-wheel platform truck with 24-x 48 inch platform; 2600 lb. load capacity; roller bearings; hardwood frame with inter-locking round corners; removable push handles. Burrows Co. model 1051-A or similar.
19	7	Maximum-minimum registering thermometer with range of -40° to $+130^{\circ}$ F; in case (for wall mounting) sized approximately 10 inch x 2 1/2 inch; with removable shelter top. Seedburo Co. number 314-S. Registering thermometer or similar.
20	2	Grain probe, double-tube brass chrome plated; 39 inch length; 7/8 inch outside diameter; 3 openings, each 9 x 17/32 (inch), without partitions. Burrows Co. number 536-A or similar.
21	2	Grain probe, double-tube aluminum; 50-inch length; open handle; 1-3/8 inch outside diameter; aluminum point; 8 openings, without partitions. Burrows Co. number 551 or similar.
22	2	Trier for sacked rice, nickel plated steel; length 12-inch; outside diameter (large end) 3/4 inch; smooth round point; slot 3 3/8 inch with tapered back-ridge. Burrows Co. number 588 or similar
23	1	Seed blower, laboratory instrument on frame with casters complete with 1 1/2 inch and 3 inch column (with extension section); operable on 120 volt, 1 ph., 60 cycles. E. L. Erickson Products Co. Model "B" South Dakota Blower or similar.

Item No.	No. Req'd	Description
24	2	Purity workboard, sized 29-inch x 10 1/2 inch x 4 inch (elevation); working area 110 sq. inches; 1 quart drawer capacity; illuminated; operable on 120 volt, 1 ph., 60 cycles. Burrows Co. number 1838 or similar.
25	1	Platform scale with 1000 pound load capacity. Portable; double-beam graduated 100 x 1/2 lbs.; complete with loose weights to provide 1000 pound capacity. Fairbanks-Morse number 1180 or similar.
26	1	Seed treater utilizing mist application principle. Capacity up to 350 bushel per hour. Complete with two metering tanks; electric pump kit with 50 ft. poly chemical hose and fittings; 4 ft. x 8 inch film coater with variable speed drive assembly and blending rods; motors and drives operable on 120 volt, 1 ph., 60 cycles. Gustafson Mfg. Co. model M-100 D Mist-o-Matic Seed Treater or similar.
27	1	Industrial type vacuum cleaner, portable, operable on 120 volt, 1 ph. 60 cycles. Complete with: one bushel capacity dirt box; two (2) 10 ft. sections flex hose; blower nozzle; floor gulper; bare floor tool; aluminum wand and attachment for 55 gallon heavy dirt catcher. Gustafson Mfg. Co. "Booster Power" model or similar.
28	1	Air compressor, heavy duty; aluminum; two stage; 150 psi; with constant speed unloaders for continuous operation; surge tank of high tensile steel; V-belt drive with guards; pneumatic tires; 48 inch x 22 inch x 33 inch in size; 1 hp. motor operable on 120 volt, 1 ph., 60 cycles, with manual starter and thermal overload protection. McMaster Carr Co. (Catalog 72) No. MM 42471.

Item No.	No. Req'd	Description
29	3	Bag conveyor, aluminum construction; portable; 15 ft. overall length; 300 lb. distributed and 150 lb. unit, load capacity; belt speed 50 ft. per minute. Complete with undercarriages required for easy maneuverability and motor and drives operable on 120 volt, 1 ph., 60 cycles. Burrows Co. model R-15 - 3/4 HE with RUW-15 and RUC-15 undercarriages or similar.
30	2	Hygrothermograph. Daily recording type, complete with 400 daily charts, instruction booklet and special ink. Burrows Co. model Bendix No. 594 Hygrothermograph or similar.
31	1	Bag trier, double-tube brass chrome plated; 39 inch length; 7/8 inch outside diameter; 6 openings, without partitions. Burrows Co. number 536 or similar.
32	6	Sample pans, triangular, constructed of heavy tin; 10-inch x 10-inch x 2 1/2-inch. Burrows Co. number 304 or similar.
33	1	<p>Belt-bucket elevator - 18 ft. discharge height; 75 BPH, 94 CFH, capacity at 75% bucket filling; 82-98 FPM belt speed; 75-90 headshaft RPM. Complete with drive assembly and:</p> <ul style="list-style-type: none"> a) dump hopper with cover on up-leg b) 10 ft. length, 6 inch dia. rigid spouting (14 ga.) flanged both ends c) 1 ft. length, 6 inch dia. flexible spouting flanged both ends d) two (2) 6inch clamp rings e) 1/3 h.p. TEFC motor operable on 120 volt, 1 ph., 60 cycles f) spacers for insertion between belt and buckets <p>Universal Inc. Model B2-75 "Easy Dump" or similar.</p>
34	2	Belt conveyor, portable, aluminum construction, 16 ft. overall length. Complete with belt and flights, and drive with overhead motor mount; 1/2 h.p. TEFC motor operable on 120 volt, 1 ph, 60 cycles. Burrows Co. model 2500 or similar.

Item No.	No. Req'd	Description
35	9	Dehumidifier, heavy duty industrial type. Portable, with casters; use R-22 refrigerant; rated for removal of 2 pints water per hour at 60°F and 60% relative humidity. Approximate dimensions: 31-inch (high) x 32-inch (length) x 20-inch (width). Net weight 220 pounds (approximate). Complete with 5 gallon capacity condensate disposal pail. Remington model D20 "Moisture Magnet" dehumidifier or similar.
36	8	Air conditioners - window type (to be installed through 12-inch thick wall); heavy duty industrial type; 24,000 BTU rating; operable on 240 volt, 1 ph. 60 cycle current. Units to have minimum guarantee of one year on all parts (good in Panama). Remington model 32A3 or similar.
37	7	Humidity guide - direct reading dial type. Self-contained; graduated in relative humidity, from zero to 100% in 1% increments. Burrows Co. number 1444 or similar.
38	10	Perforated screens for a Crippen Mfg. Co. model H434 cleaner. Screens to be sized as follows: a) <u>Slotted</u> : 9 x 3/4, 2 x 3/4, 7 x 3/4, 1/15 x 1/2, 1/16 x 1/2. b) <u>Round-hole</u> : 14, 13, 12, 6 1/2, 6. Crippen Mfg. Co. product or similar
39	24	Perforated screens for an A. T. Ferrell Co. Model X-298 D cleaner. Screens to be sized as follows: a) <u>Slotted</u> : 16 x 3/4, 14 x 3/4, 12 x 3/4, 10 x 3/4, 9 x 3/4, 8 x 3/4, 1/12 x 1/2, 1/13 x 1/2, 1/14 x 1/2, 1/16 x 1/2. b) <u>Round hole</u> : 30, 26, 25, 24, 22, 20, 18, 17, 16, 14, 13, 12, 11, 9.

Note 1: Air conditioners (item 36) will require installation in Divisa.

Note 2: Quotations must be accompanied with complete specifications (including makes, models, styles) of equipment to be supplied.

Note 3: Ministry of Agriculture reserves the right to reject any and all quotations if the equipment to be supplied is judged to be of inferior quality or performance to referenced makes and models.

Note 4: Copies of quotations are to be mailed to: Seed Technology Laboratory, Mississippi State University, State College, Mississippi 39762 Attn: George Dougherty.

SUMMARY OF
EQUIPMENT COSTS

G. Summary Equipment Costs (F.O. B. Manuf.)

Item No.	No. Req'd.	Description	Location*			Unit Cost U.S.	Extension Cost
			1	2	3		
1	1	Elevator Assembly	1	--	--	1,000	1,000
2	1	Elevator Assembly	1	--	--	980	980
3	1	Warehouse Scale	1	--	--	800	800
4	2	Precision Grader Assembly	2	--	--	--	3,900
5	2	Storage-Drying Tanks	2	--	--	1,050	2,100
6	1	Heater-Fan	1	--	--	4,000	4,000
7	1	Bagger-Weighers	1	--	--	675	675
8	1	Disc Separators	1	--	--	3,000	3,000
9	6	Air-Conditioners	6	--	--	500	3,000
SUB-TOTAL							\$19,455
10	1	Scale	1	--	--	340	340
11	1	Hopper-Stand	1	--	--	50	50
12	1	Torsion Balance	1	--	--	300	300
13	1	Germinator	1	--	--	255	255
14	1	Moisture Tester	1	--	--	545	545
15	1	Seed Divider	1	--	--	290	290
16	1	Bag Closer	1	--	--	400	400
17	2	Bag Truck	2	--	--	75	150
18	2	Platform Truck	2	--	--	157	314
19	7	Thermometers	3	--	--	25	175
20	2	Probes	2	--	--	22	44
21	2	Probes	2	--	--	37	74
22	2	Triers	2	--	--	12	24
23	1	Seed Blower	1	--	--	475	475
24	2	Purity Boards	2	--	--	45	90
25	1	Scale	1	--	--	390	390
26	1	Seed Treater	1	--	--	2,785	2,785
27	1	Vacuum Cleaner	1	--	--	350	350
28	1	Air Compressor	1	--	--	600	600
29	3	Bag Conveyors	1	1	1	826	2,478
30	2	Hygrothermographs	2	--	--	250	500
31	1	Trier	1	--	--	22	22
32	6	Sample Pans	6	--	--	--	24
33	1	Elevator Assembly	1	--	--	600	600
34	2	Conveyors	2	--	--	400	800
35	9	Dehumidifiers	4	5	--	660	5,940

Item No.	No. Req'd	Description	Location*			Unit Cost U.S.	Extension Cost
			1	2	3		
36	8	Air Conditioners	-	8	--	500	4,000
37	7	Humidity Guides	3	4	--	40	280
38	10	Screens	10	--	--	22	220
39	24	Screens	--	24	--	24	580
SUB-TOTAL							\$23,095

* (1) = David; (2) = Divisa; (3) = Panama City

1. Items 1 - 9 (SUB-TOTAL)	\$19,455
2. Items 10-39 (SUB-TOTAL)	<u>23,095</u>
TOTAL	\$42,550
(10%) Export boxing, freight	4,255
(25%) Ocean Freight	<u>10,638</u>
(Estimated) C. I. F. Panama	\$57,443

RECOMMENDATIONS

Recommendations are grouped as follows:

I. General Program

II. David Seed Center

- A. Changes in Processing Plant
Drawings and Construction Specifications
- B. Changes in Seed Storage Room
Drawings and Specifications
- C. Changes in Electrical Drawings and
Specifications

III. Divisa Seed Center

- A. Changes in Seed Storage Room
Drawings and Specifications
- B. Changes in Electrical Drawings

IV. Panama City Seed Center

I. GENERAL PROGRAM:

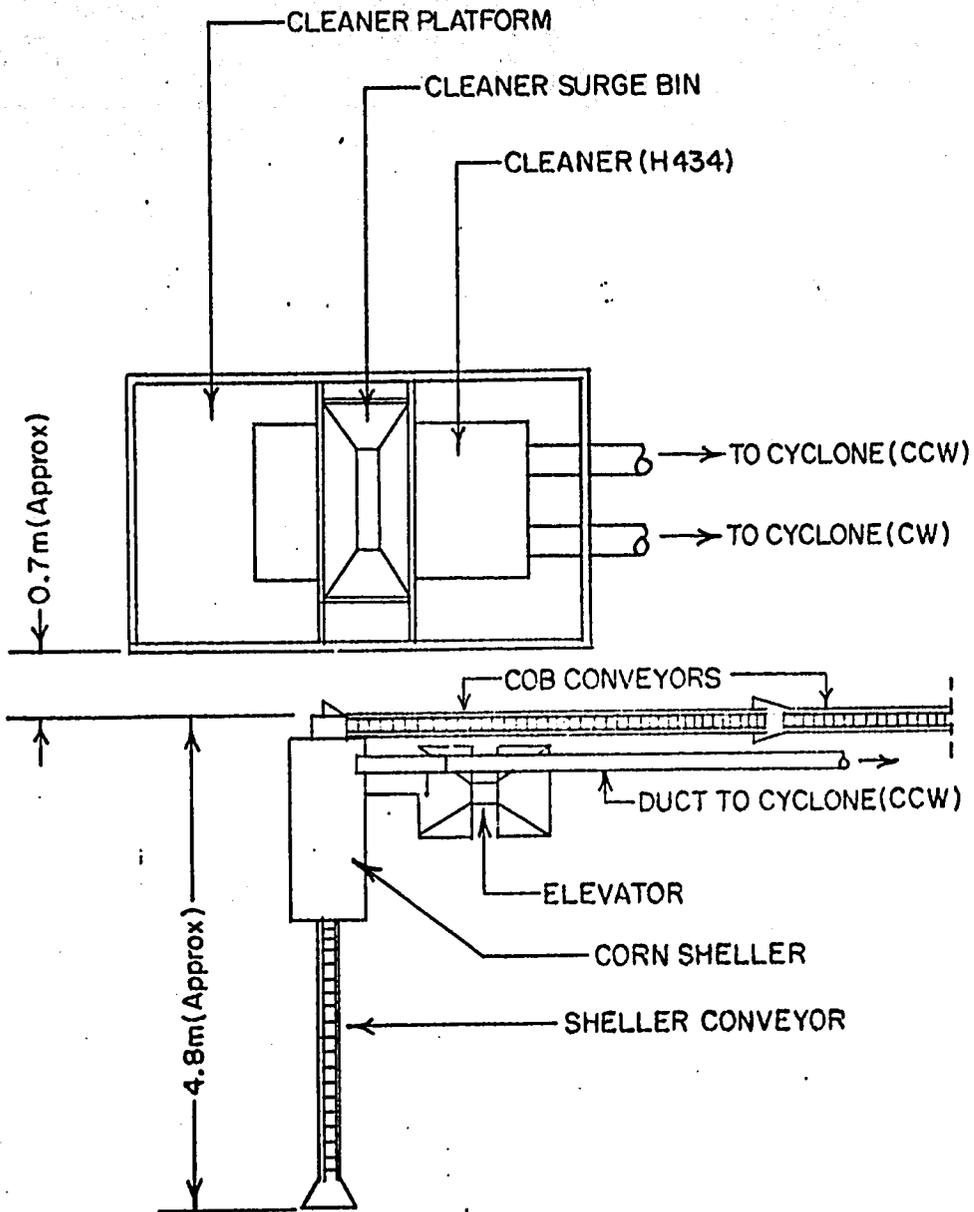
- 1) It is recommended that the Ministry of Agriculture, with assistance of USAID/Panama, undertake a study to determine basic needs for stimulating private sector to become more actively involved in the seed industry of Panama.
- 2) It is recommended that regardless of decisions reached relative to modifying the structure of the Panama City Seed Center that Luis Lopez, Director of Seed Project, be permanently stationed in Panama City to assure close contact with Ministry of Agriculture and other governmental agencies.
- 3) It is recommended that two (2) Seed Project employees namely; Ing. Ruben D. Rodriguez and Sr. Ramon Alvarez, be considered for participation in the "Seed Improvement Course," tentatively scheduled for November, 1971. This course is to be taught in Spanish; it is to be conducted at the Escuela Pan Americana in Zamorano, Honduras.

II. David Seed Center:

A. Changes in Processing Plant Drawings and Construction Specifications

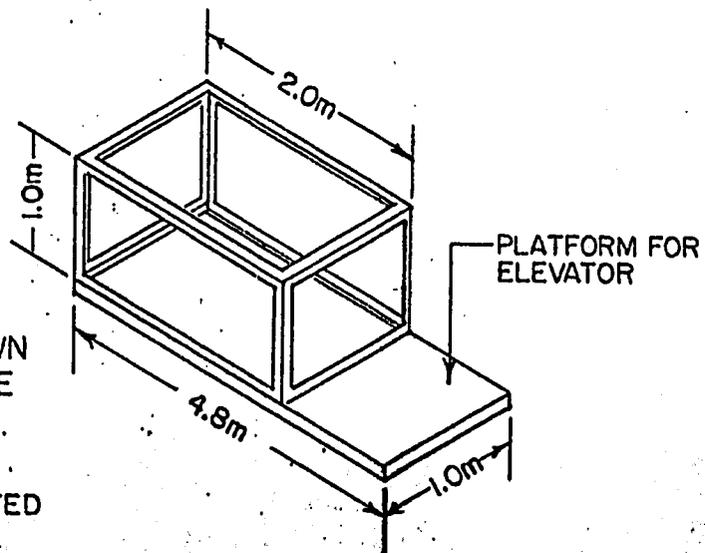
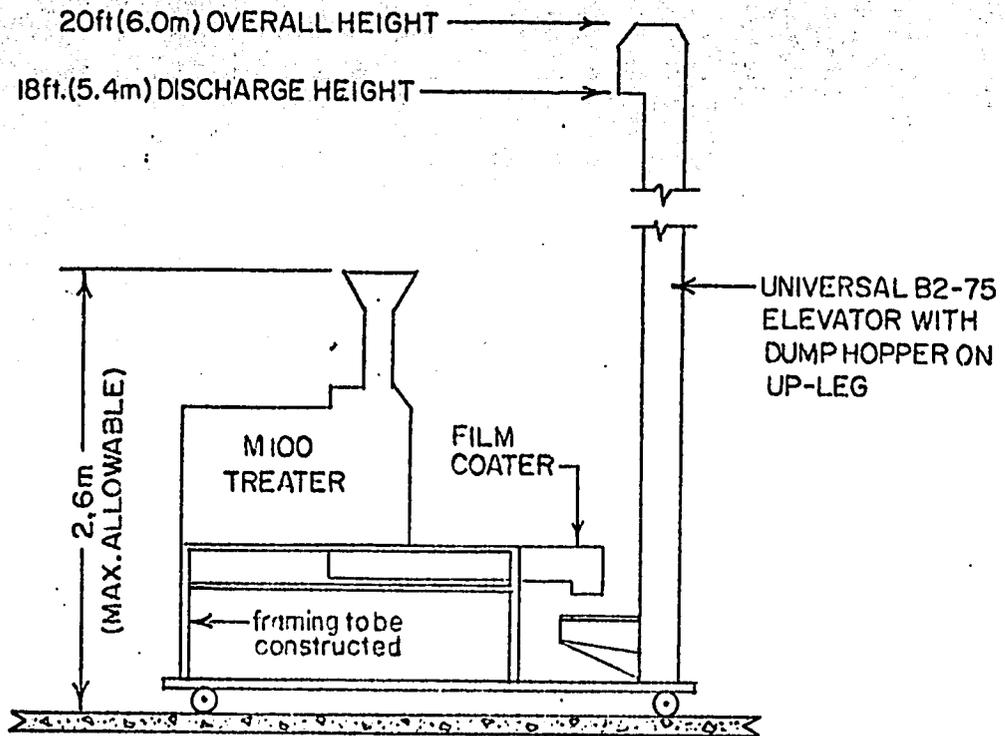
- 1) The two (2) seed storage and drying tanks must be elevated a minimum of 0.3 m. above the work floor level. The tanks are elevated to permit adequate clearance between the unloading auger and floor level. Required elevation can be obtained by mounting each tank on a ring of concrete blocks. An additional supply of concrete blocks will be required for placement under the drying floor support members. It is recommended this change be shown on construction drawings.
- 2) The corn sheller to be installed is not as shown on drawings. Consequently, the sheller and its elevator must be relocated. In addition, the sheller requires an air-exhaust duct and a cyclone. It is recommended these changes be shown on construction drawings (see Figure 1).
- 3) An additional conveyor is required to permit discharging the corn cobs from the sheller outside the processing building. Discharging the cobs outside the building will require that an opening be provided in the side-wall, through which the conveyor can protrude. This opening should be approximately 0.5 m x 0.5 m in size, and be located approximately 1.8 m above the floor level. It is recommended these changes be shown on construction drawings.
- 4) The seed treater should be portable; this will allow for greater flexibility and will provide additional work area. The seed treater also requires an elevator not shown on present construction drawings. It is recommended that both the treater and the elevator be mounted on a frame equipped with casters. It is recommended these changes be shown on the construction drawings (see Figure 2).
- 5) It is recommended that the construction drawings indicate that
 - (a) electrical conduits are to be installed below floor level;
 - (b) the warehouse floor scale is to be installed in a shallow floor pit.

- 6) Construction drawings fail to provide details required to insure proper construction of equipment surge bins. It is recommended that these details be added to the construction drawings (see Figures 3, 4, 5, 6).
- 7) Construction drawings fail to provide details required to insure proper construction of cyclones for the air-screen cleaner. It is recommended these details be added to the construction drawings (see Figure 7).
- 8) Construction drawings fail to provide details required to insure proper construction of heated-air duct that connects the heater unit to the drying tanks. It is recommended these details be added to the construction drawings.



NOTE: CLEANER PLATFORM USED AS REFERENCE POINT, IT REMAINS AS SHOWN ON PRESENT DRAWINGS

Figure 1 New location of corn sheller and elevator



NOTE: DIMENSIONS SHOWN ARE APPROXIMATE

FRAMING TO BE CONSTRUCTED OF 2x2x 1/4 ANGLE

Figure 2. Construction features of support framing for seed treater assembly.

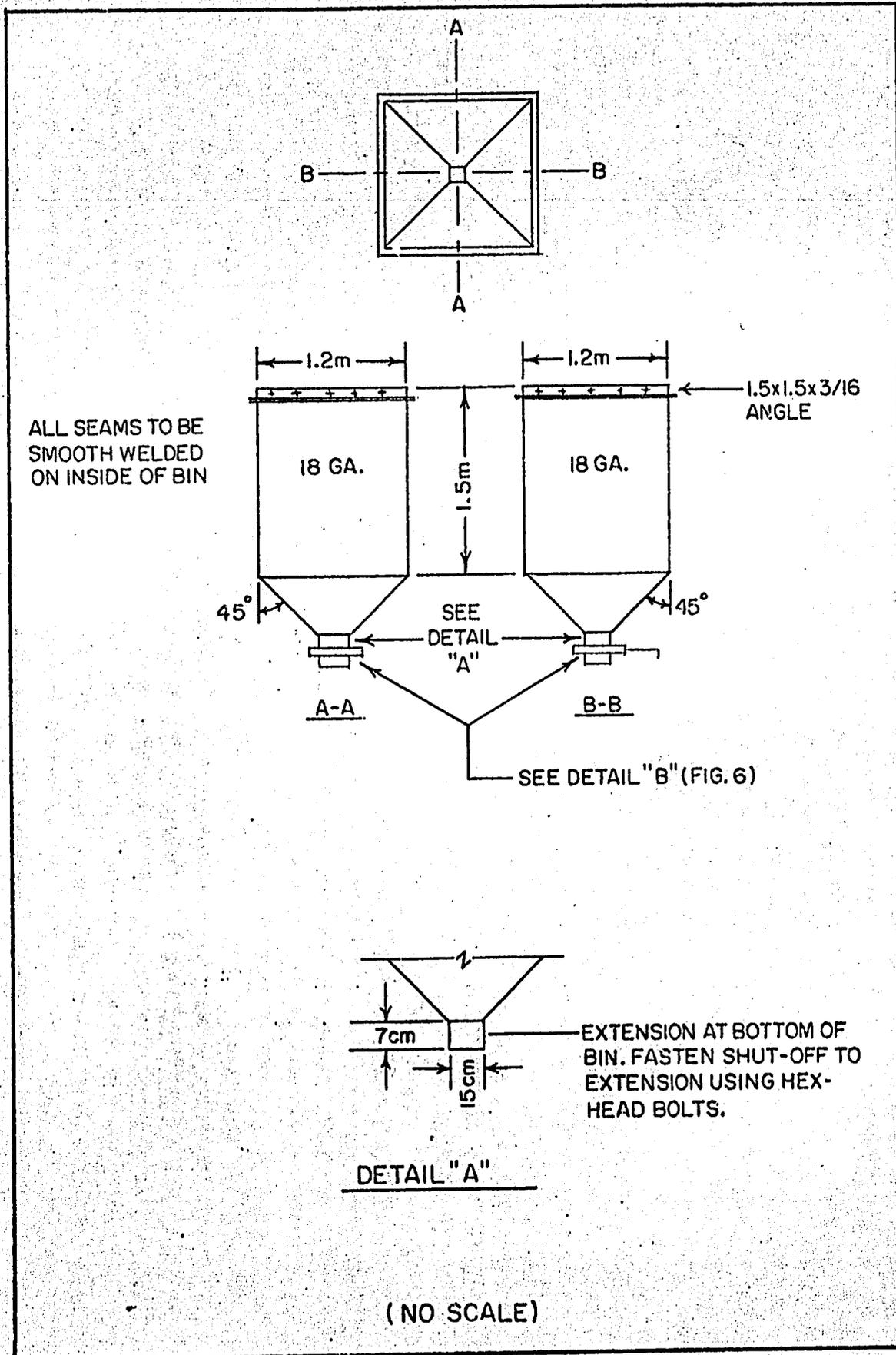


Figure 3. Construction features of treater and sack-off bins.

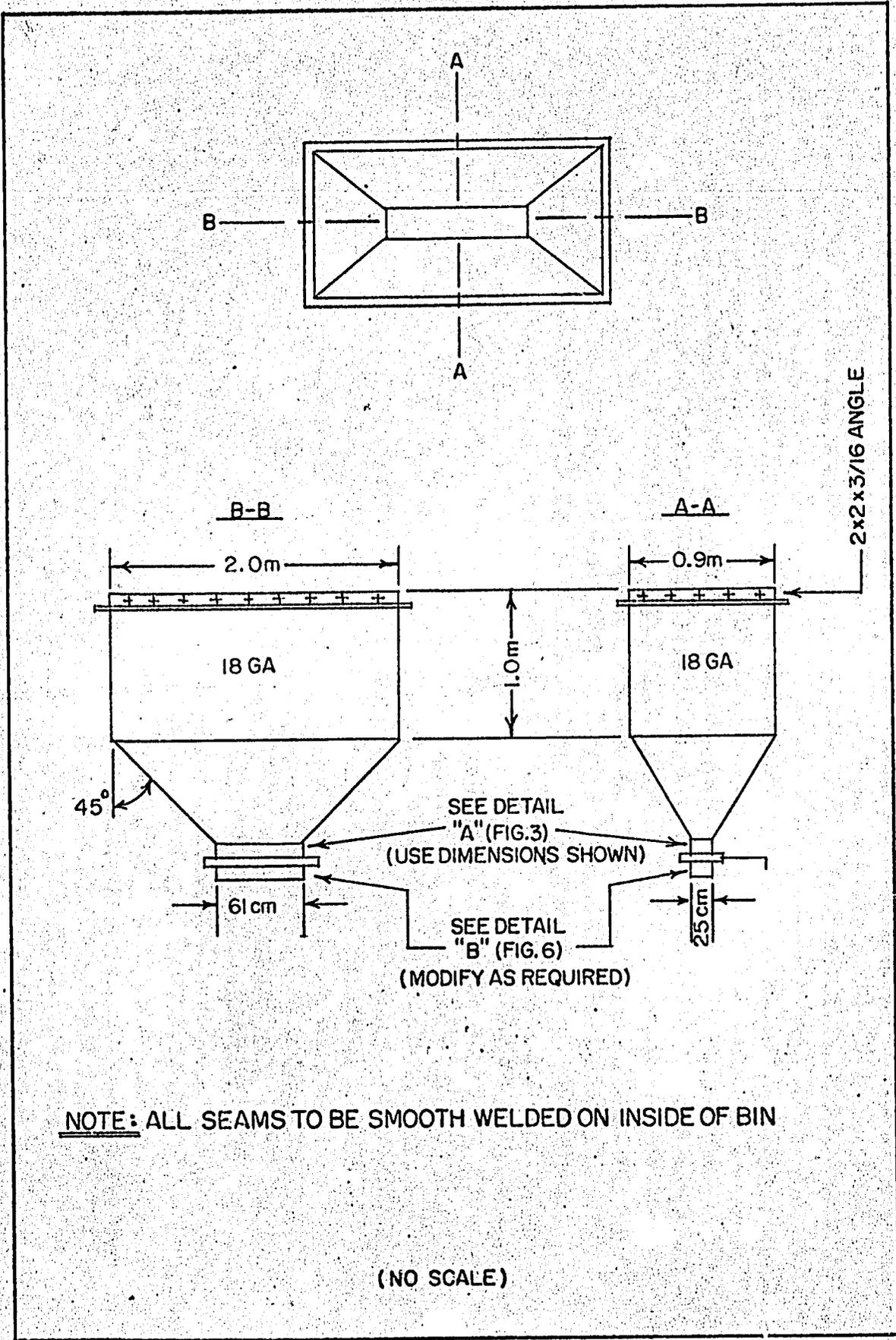


Figure 4. Construction features of cleaner surge bin.

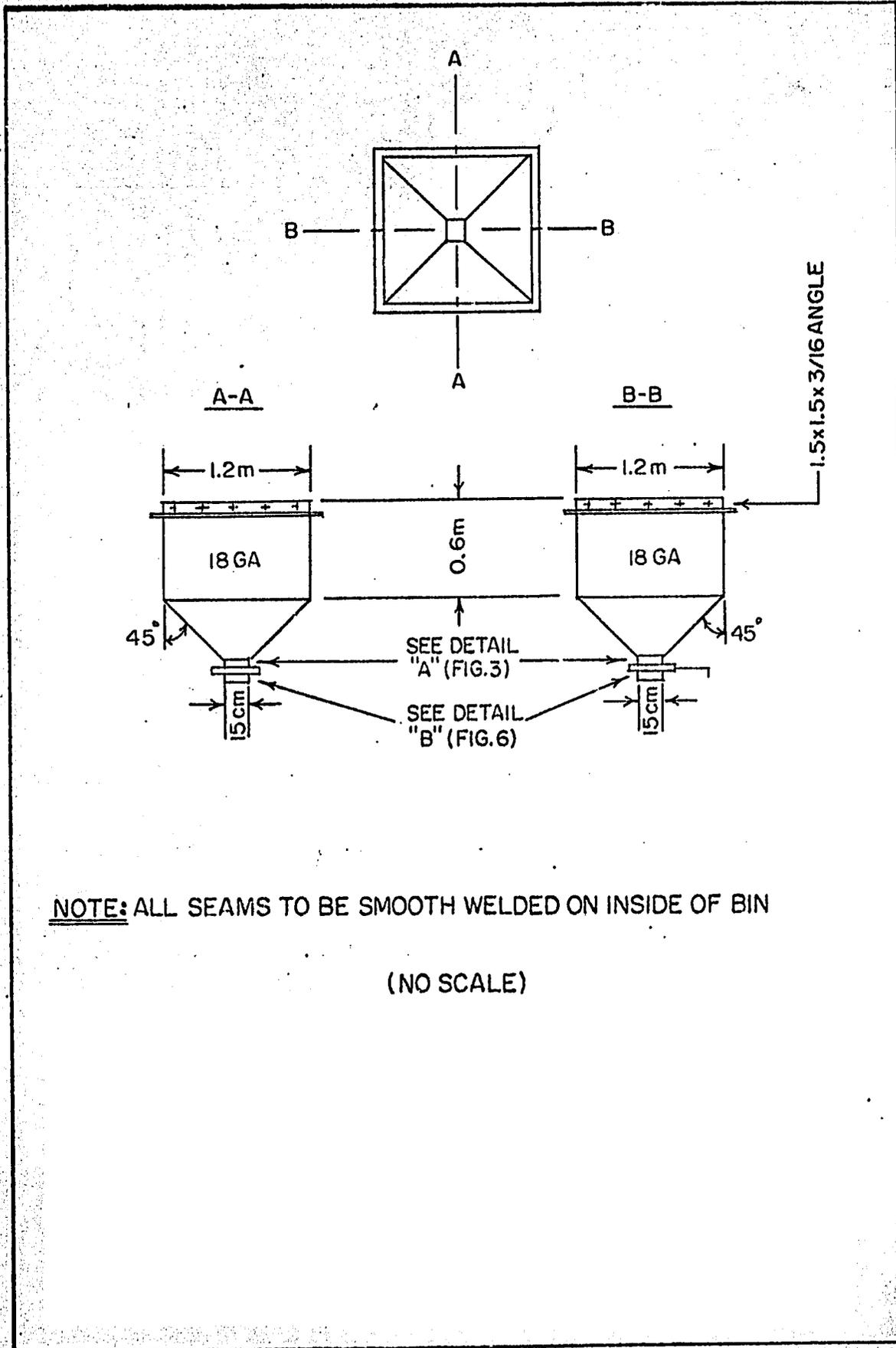
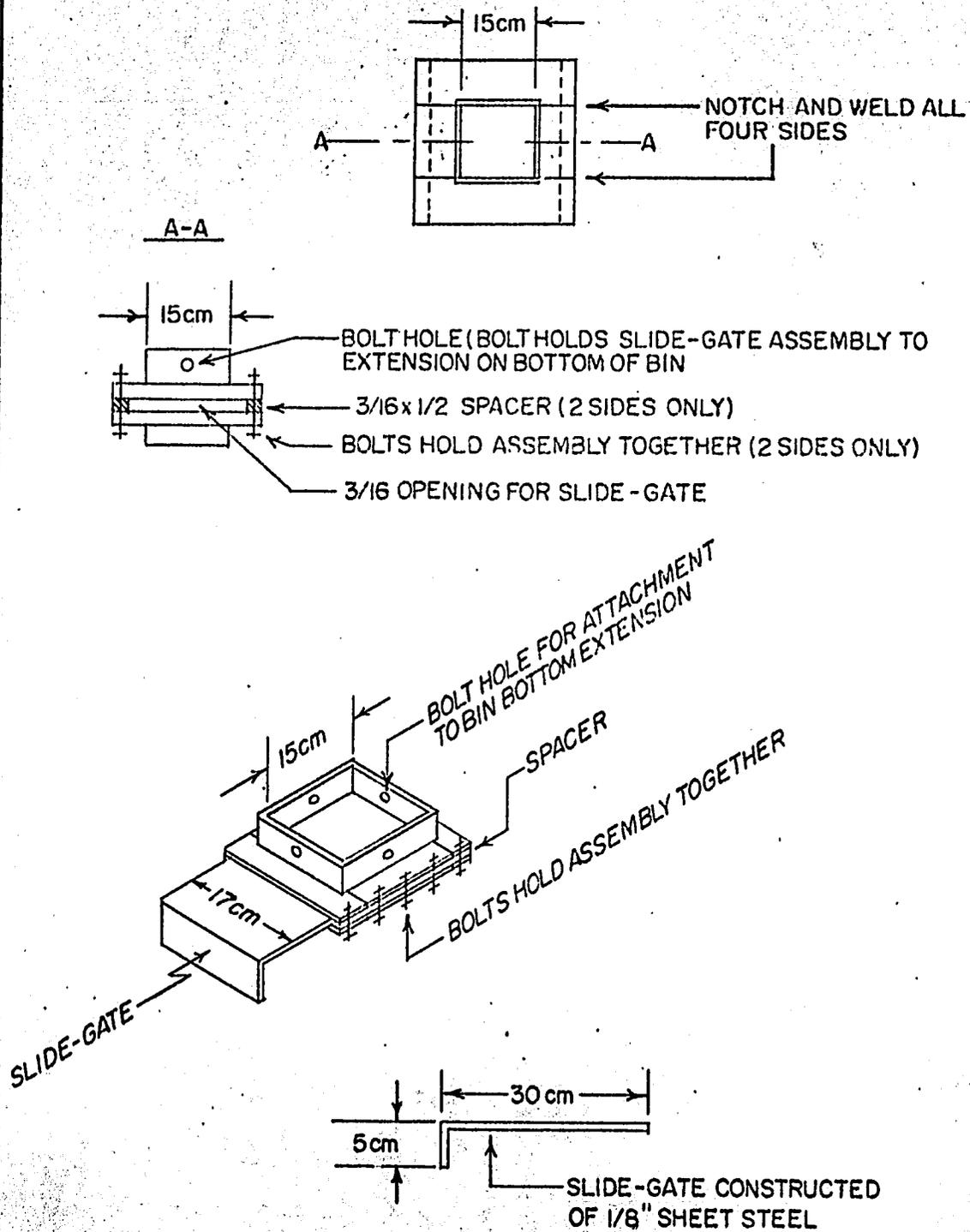


Figure 5. Construction features of precision grader surge bin.

NOTE: CONSTRUCT OF 1.5x1.5x3/16 ANGLE



(NO SCALE)

Figure 6. Bin construction - - Detail "B".

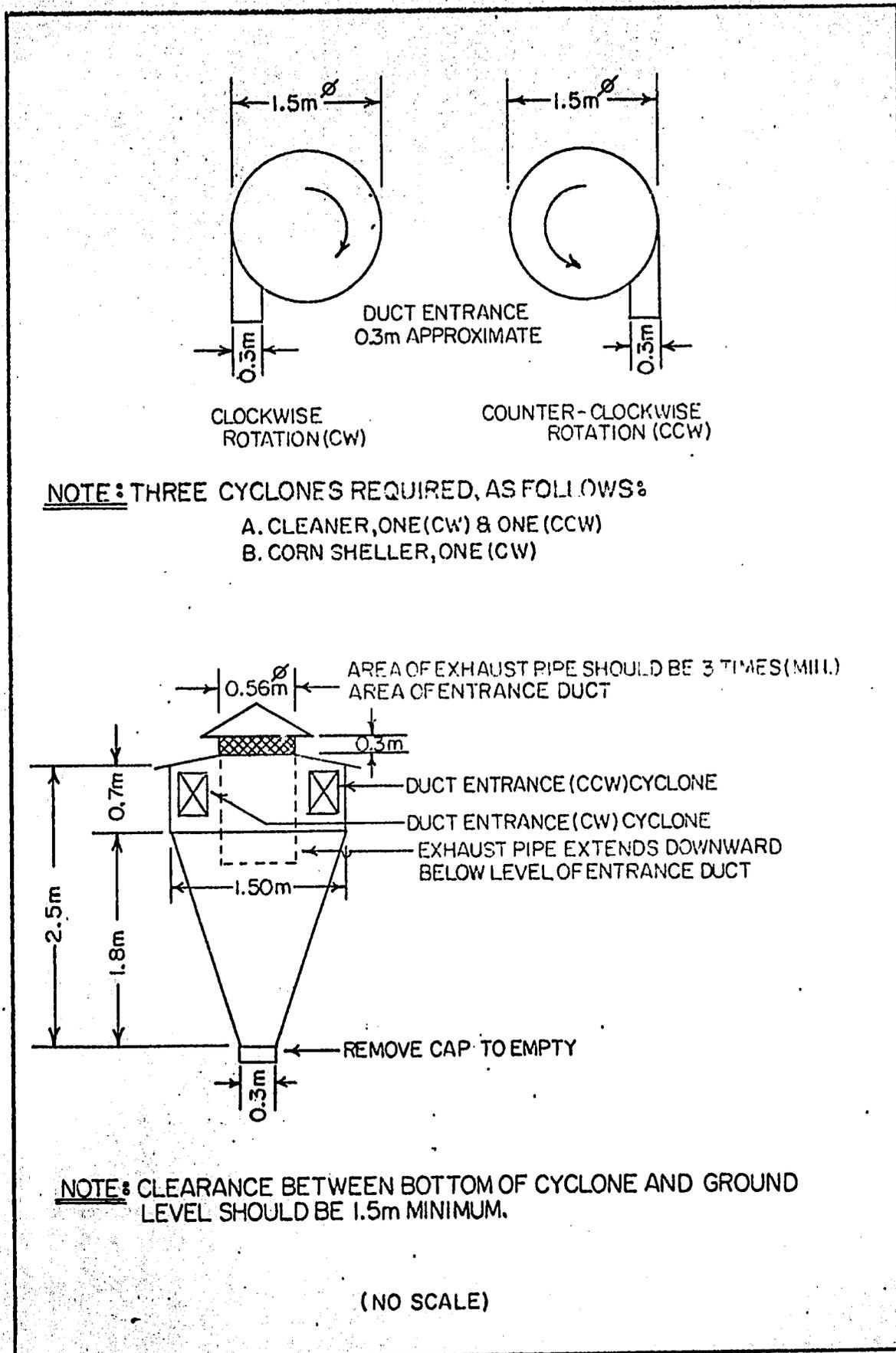


Figure 7. Construction features of dust cyclones.

B. Changes in Seed Storage Room**Drawings and Construction Specifications**

- 1) Calculations made after viewing construction drawings indicate that the air conditioners previously recommended for procurement are inadequate. It is recommended that two (2) 24,000 BTU air conditioners be installed in each seed storage room. **Note:** No air conditioner have been purchased; previous calculations were based on smaller rooms and different types of construction material.
- 2) Construction drawings fail to provide details required to insure proper installation of vapor barriers and insulation on walls and ceiling of seed storage rooms. It is recommended that these details be shown on construction drawings (see Figures 8,9, 10).
- 3) The construction drawings of ceilings in the seed storage rooms are not acceptable. These drawings must be revised (see 2 above)
- 4) It is recommended that outside walls of storage rooms be painted with a "sealer" type paint. These materials are readily available in Panama. The paint should be applied in accordance with manufacturers recommendations.
- 5) It is recommended that a ventilator (minimum of one) be installed in the roof of each storage room. This is to provide air circulation thus reducing the build-up of hot moist air immediately above the storage room ceiling. The ventilator fan is to be equipped with an insect screen to prevent entrance of insects under the roof.
- 6) Explosive type light fixtures are not required in the seed storage rooms. They are costly, consequently it is recommended that they be replaced with fluorescent fixtures.
- 7) It is strongly recommended that the Ministry of Agriculture provide constant supervision during the period of installation of vapor barriers and insulation in the seed storage rooms.
- 8) It is recommended that printing shown on drawing (page 27) be changed from "50°F - 50% H.R." to "65°F - 50%R.H. "
- 9) It is recommended that an access door be constructed above the ceiling line of each storage room. The door would be used to gain entrance into the area between the ceiling of the storage room and underside of the roof (service electrical system).

NOTE: STORAGE ROOM CEILING MUST BE SUPPORTED FROM OVERHEAD RAFTERS

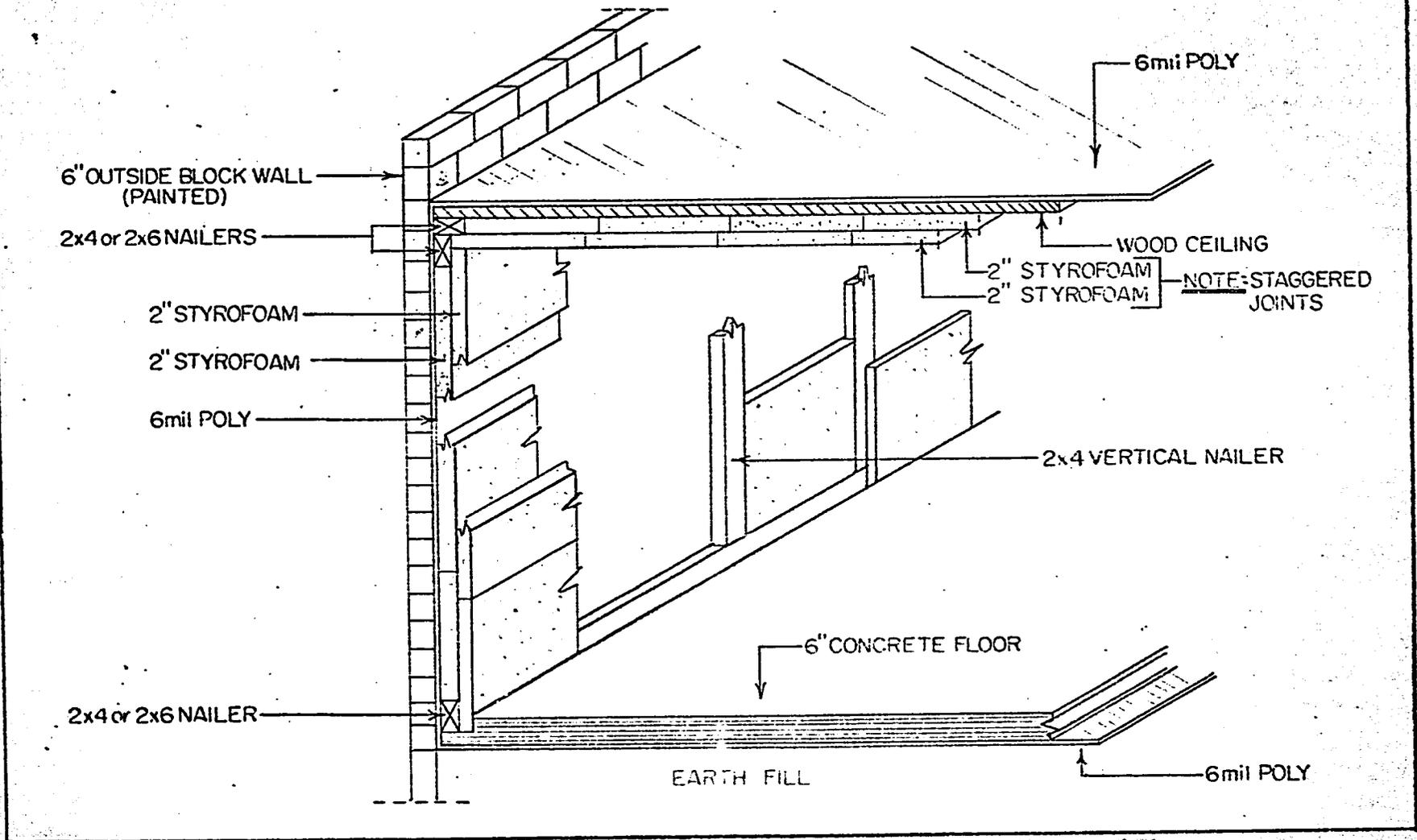


Figure 8. Details of storage room construction (David & Divisa).

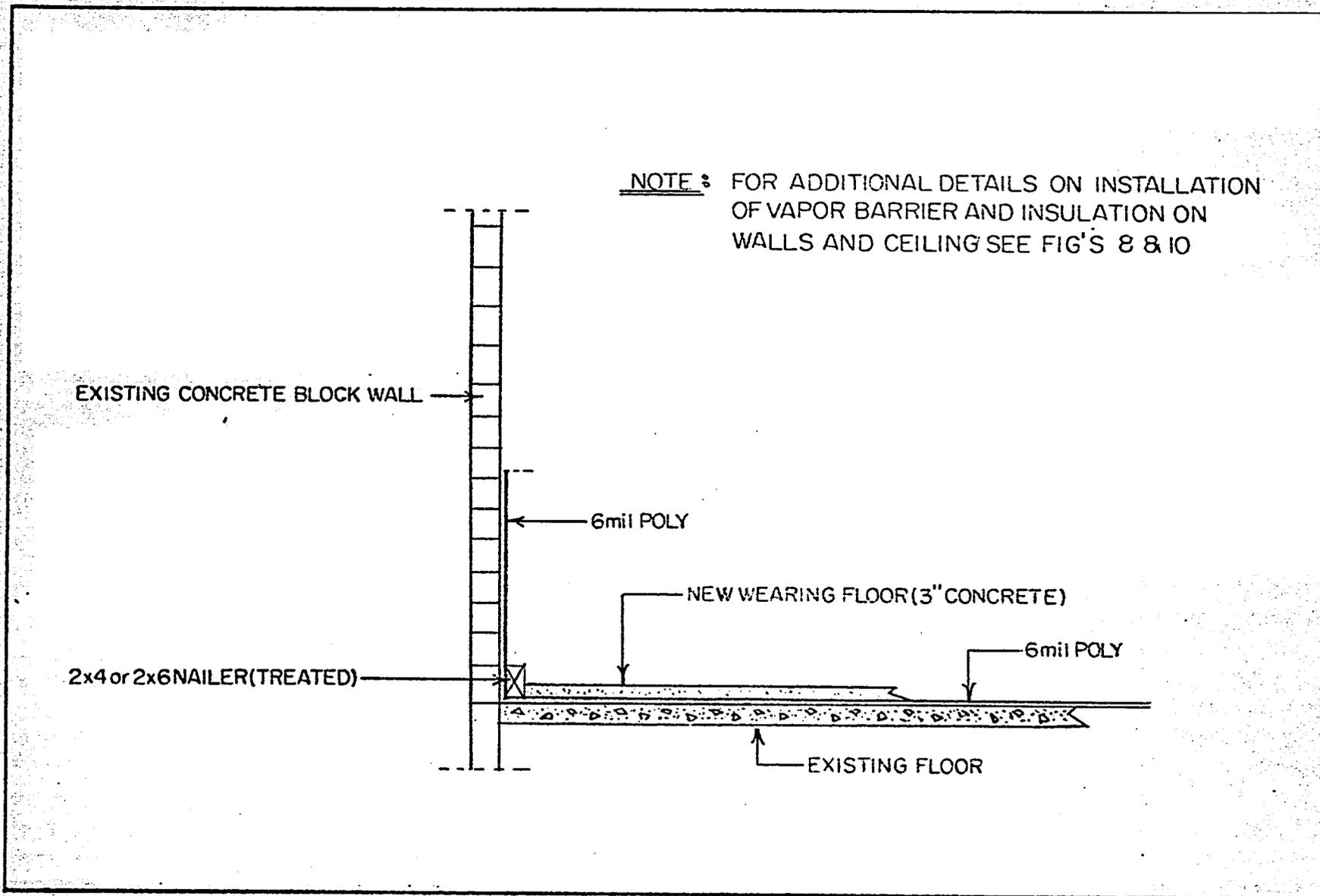


Figure 9. Details of floor installation in storage room to be remodeled in Divisa.

NOTE: INSTALLATION OF VAPOR BARRIER AND INSULATION SHOULD BE CLOSELY SUPERVISED. CONSTANT SUPERVISION IS RECOMMENDED

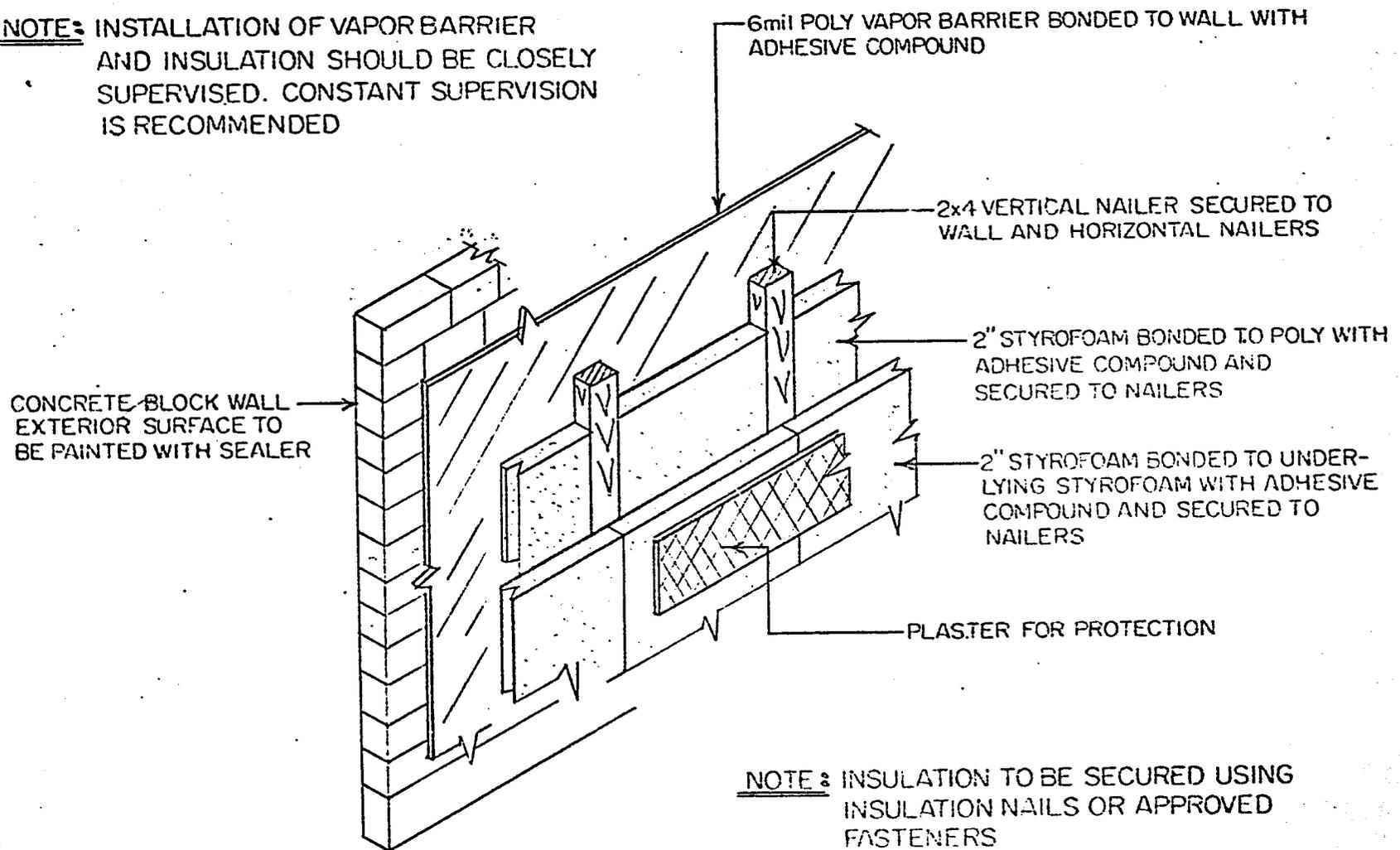


Figure 10. Details of vapor barrier and insulation installation (David and Divisa).

C. Changes in Electrical Drawings and Specifications

This consultant is not qualified to pass judgement on the correctness of all electrical calculations shown on the electrical installation drawings sheet. However, some changes are necessary. Following the incorporation of these changes the new drawing should be checked by a qualified electrician.

- 1) It is recommended that the light fixtures in seed storage rooms be changed from explosive-proof to fluorescent fixtures.
- 2) It is recommended that an additional 220 volt, 1 ph, outlet be added to each seed storage room. This outlet should be located near the center of an inside wall, approximately 1.0 m above floor level.
- 3) It is recommended that two (2) 120 volt, 1 ph, outlets be installed in corridor between the seed storage rooms. One outlet in each wall; outlets to be near storage room entrance doors.
- 4) It is recommended that the chart entitled "Cuadro de Motores" be revised to appear (in part) as shown in Table 1.
- 5) It is recommended that all electrical conduit imbedded in the floor be a minimum 3/4-inch diameter.
- 6) It is recommended that all electrical circuits and locations of conduits be rechecked. Note: some equipment has been relocated; additional motors have been added (see Figure 1 and Table 1).

Table 1. Table of motors - David Processing Plant

Equipment Description	H.P.	Phase	Volts	Amp.	Alamb.	Tubo
Corn Sheller (Conveyor)	2	3	240		3/14	3/4
Corn Sheller	15	3	240		3/6	1 1/4
Corn cob conveyor(portable)	1/2	1	120		2/14	3/4
Corn cob conveyor(portable)	1/2	1	120		2/14	3/4
Elevator (24 ft. d.h.)	1/3	1	120		2/14	3/4
Air-screen cleaner	3	3	240		3/14	3/4
Elevator (23 ft. d.h.)	1/3	1	120		2/14	3/4
Precision Grader function	1/3	1	120		2/14	3/4
Precision Grader as a	1/3	1	120		2/14	3/4
Precision Grader single unit	1/3	1	120		2/14	3/4
Disc Separator	3	3	240		3/14	3/4
Elevator (Mitchell double)	1	3	240		3/14	3/4
Treater Assembly(portable)	1/3	1	120		2/14	3/4
(includes treater and elevator)	1/3	1	120		2/14	3/4
<u>Note:</u> three 1/3 h.p. and the	1/3	1	120		2/14	3/4
3/4 h.p. motors work as a	3/4	1	120		2/12	3/4
single unit	1/3	1	120		2/14	3/4
Bag closer (sewing machine)	1/4	1	120		2/14	3/4
Heater-Fan	5	3	240		3/12	3/4
Dryer-Storage bin(auger)port.	1	3	240		3/14	3/4
Dryer-Storage bin(auger)port.	1	3	240		3/14	3/4
Air Compressor (portable)	1	1	120		2/12	3/4

III. DVISA SEED CENTER:**A. Changes in Seed Storage Room
Drawings and Specifications**

- 1) Calculations made after viewing construction drawings indicate that the air-conditioners previously recommended for procurement are inadequate. It is recommended that two (2) 24,000 BTU air conditioners be installed in each seed storage room. Note: No air conditioners have been purchased; previous calculations were based on smaller rooms and different types of construction material.
- 2) Construction drawings prepared by Diaz y Guardia, S.A. are not acceptable. These drawings must be revised to show details of installation of vapor barrier and insulation (see Figures 8, 9, 10).
- 3) It is recommended that outside walls of storage rooms be painted with a "sealer" type outside paint.
- 4) It is recommended that a ventilator (minimum of one) be installed in the roof of each storage room. This is to provide air circulation thus reducing the build-up of hot moist air immediately above the storage room ceiling. The ventilation fan is to be equipped with an insect screen to prevent entrance of insects under the roof.
- 5) It is recommended that an access door be constructed above the ceiling line of each storage room. The door would be used to gain entrance into the area between the ceiling of the storage room and underside the roof (service electrical system, etc.) Door should be on outside of building.
- 6) It is strongly recommended that the Ministry of Agriculture provide constant supervision during the period of time in which vapor barrier and insulation materials are being installed.
- 7) It is recommended that the insulation material be changed from Urethane to Styrofoam. Change is recommended to simplify installation.

B. Changes in Electrical Drawings

- 1) It is recommended that an additional 220 volt, 1 ph, outlet be added to each storage room (total of four (4) per room required). This outlet should be located near center of inside wall, approximately 1.0m above floor level.
- 2) It is recommended that two (2) 120 volt, 1 ph, outlets be installed in corridor between the seed storage rooms. One outlet in each wall; outlets to be near storage room entrance doors.

IV. PANAMA CITY SEED CENTER:

- 1) It is recommended that USAID/Panama favorably consider the Ministry of Agriculture request to modify the structure housing the seed facility. The Panama City seed facility is deemed vital to the success of the operation, and is in the best interest of Panama 's Agricultural Improvement Program.

ACKNOWLEDGEMENTS

Sincere appreciation is expressed to Lic. Luis Lopez, Director Seed Project, and Ing. C. J. Facey, of the Ministry of Agriculture for their valuable conseling and assistance during the period of this assignment. The author is also indebted to: Dr. Robert Moffett, Chief, Rural Development Division; Dr. E. T. Bullard, Deputy Chief; Mr. D. Robertson, Agricultural Advisor, and Mr. G. Hoover, Structural Engineer Advisor, USAID/Panama for their assistance. Special thanks is extended to the secretarial staff of the Rural Development Division, USAID/Panama for their patience in typing the final draft of the preliminary report.

Respectfully submitted by,

George Dougherty