Republic of the Philippines
MUNICIPALITY OF LINGAYEN
Province of Pangasinan

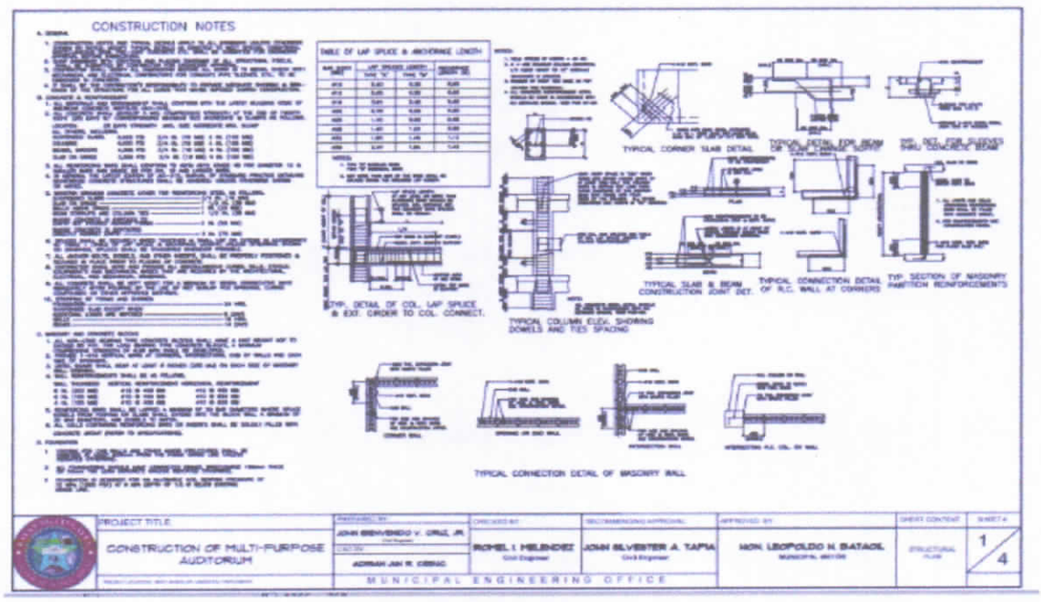
LGU - LINGAYEN
BAC
BIDS AND AWARDS COMMITTEE

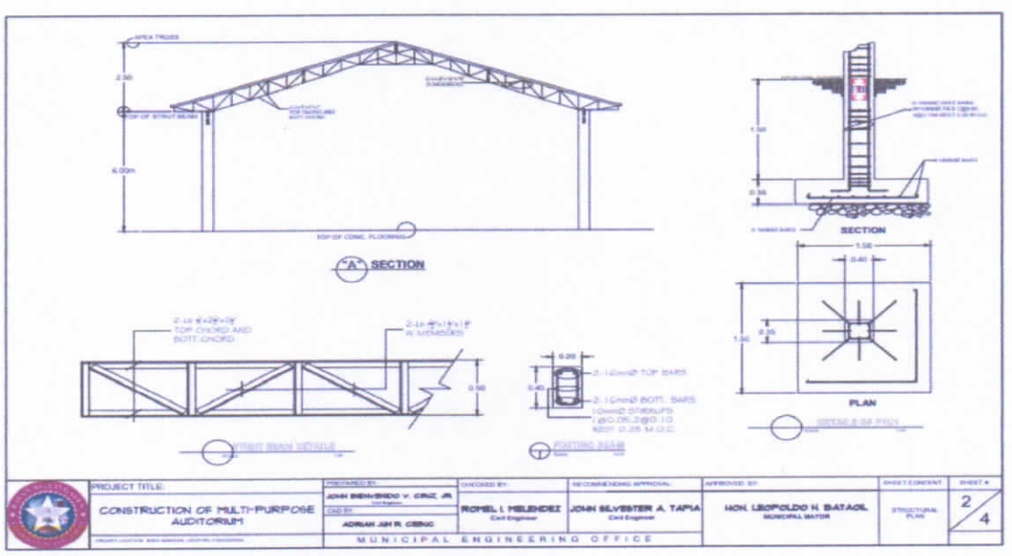
BID SUPPLEMENT

In reference to Invitation to Bid for the ***Construction of Multi Purpose Auditorium at Barangay Namolan, Lingayen, Pangasinan*** with an Approved Budget for the Contract of ***Seven Hundred Thousand Pesos (P700,000.00) only*** which was published, where certain components and technical specifications has been overlooked when being encoded. Thus, said procurement shall have the following revisions.

FROM

Section VI. Specifications





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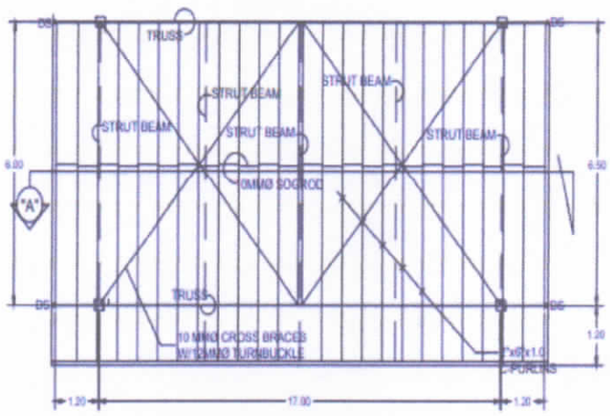
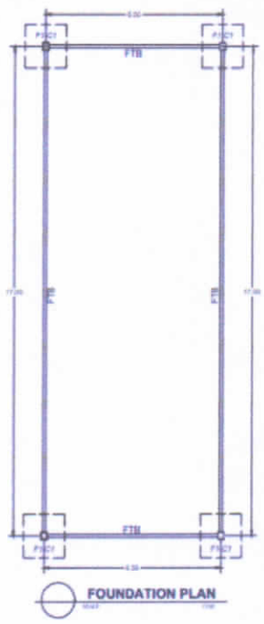
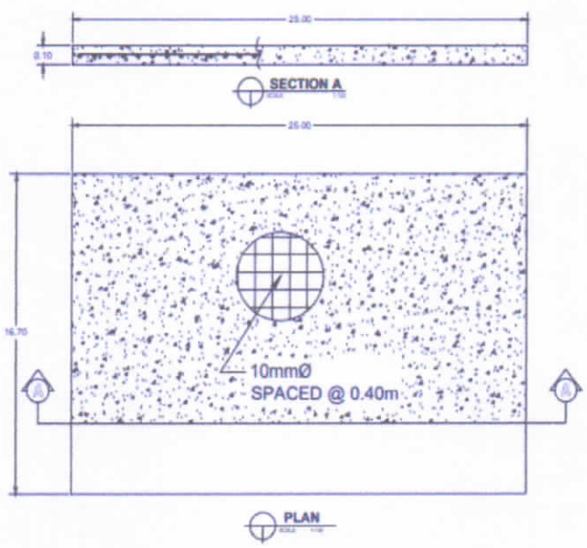


ROOF FRAMING PLAN
SCALE NTS

PROJECT TITLE:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED BY:	SHEET CONTENT	SHEET #
CONSTRUCTION OF MULTI-PURPOSE AUDITORIUM	JOHN BIENVENIDO V. CRUZ, JR. Civil Engineer CAD BY: ADRIAN JAN R. CEBUC	ROMEL I. MELENDEZ Civil Engineer	JOHN SILVESTER A. TAPIA Civil Engineer	HON. LEOPOLDO N. BATACIL MUNICIPAL MAYOR	STRUCTURAL PLAN	3/4
	MUNICIPAL ENGINEERING OFFICE					



FOUNDATION PLAN



SECTION A

PLAN

PROJECT TITLE:	PREPARED BY:	CHECKED BY:	RECOMMENDING APPROVAL:	APPROVED BY:	SHEET CONTENT	SHEET #
CONSTRUCTION OF MULTI-PURPOSE AUDITORIUM	JOHN BIENVENIDO V. CRUZ, JR. Civil Engineer CAD BY: ADRIAN JAN R. CEBUC	ROMEL I. MELENDEZ Civil Engineer	JOHN SILVESTER A. TAPIA Civil Engineer	HON. LEOPOLDO N. BATACIL MUNICIPAL MAYOR	STRUCTURAL PLAN	4/4
	MUNICIPAL ENGINEERING OFFICE					

Republic of the Philippines
MUNICIPALITY OF LINGAYEN
Province of Pangasinan

TO

Section VI. Specifications

Project : Construction of Multi-Purpose Auditorium
Location: Brgy. Namolan, Lingayen, Pangasinan

APPROVED TECHNICAL SPECIFICATION

ADDITIONAL SPAN OF THE EXISTING MULTI-PURPOSE AUDITORIUM
PART A – EARTHWORK
ITEM 102 – EXCAVATION

102.1 Description

This Item shall consist of roadway drainage and borrow excavation, and the disposal of material in accordance with this Specification and in conformity with the lines, grades and dimensions shown on the Plans or established by the Engineer.

102.2.6 Excavation of Ditches, Gutters, etc.

All materials excavated from side ditches and gutters, channel changes, irrigation ditches, inlet and outlet ditches, toe ditches, furrow ditches, and such other ditches as may be designated on the Plans or staked by the Engineer, shall be utilized as provided in Subsection 102.2.3.

Ditches shall conform to the slope, grade, and shape of the required cross section, with no projections of roots, stumps, rock, or similar matter. The Contractor shall maintain and keep open and free from leaves, sticks, and other debris all ditches dug by him until final acceptance of the work.

102.2.9 Removal of Unsuitable Material

Where the Plans show the top portion of the roadbed to be selected topping, all unsuitable materials shall be excavated to the depth necessary for replacement of the selected topping to the required compacted thickness.

Where excavation to the finished graded section results in a subgrade or slopes of unsuitable soil, the Engineer may require the Contractor to remove the unsuitable material and backfill to the finished graded section with approved material. The Contractor shall conduct his operations in such a way that the Engineer can take the necessary cross-sectional measurements before the backfill is placed.

102.3 Method of Measurement

The cost of excavation of material which is incorporated in the Works or in other areas of fill shall be deemed to be included in the Items of Work where the material is used.

Measurement of Unsuitable or Surplus Material shall be the net volume in its original position.

ITEM 405 – STRUCTURAL CONCRETE
405.1 Description
405.1.1 Scope

This Item shall consist of furnishing, placing and finishing concrete in all structures except pavements in accordance with this Specification and conforming to the lines, grades, and dimensions shown on the Plans. Concrete shall consist of a mixture of Portland Cement, fine aggregate, coarse aggregate, admixture when specified, and water mixed in the proportions specified or approved by the Engineer.

405.1.2 Classes and Uses of Concrete

Five classes of concrete are provided for in this Item, namely: A, B, C, P and Seal. Each class shall be used in that part of the structure as called for on the Plans.

The classes of concrete will generally be used as follows:

Class A – All superstructures and heavily reinforced substructures. The important parts of the structure included are slabs, beams, girders, columns, arch ribs, box culverts, reinforced abutments, retaining walls, and reinforced footings.

Class B – Footings, pedestals, massive pier shafts, pipe bedding, and gravity walls, unreinforced or with only a small amount of reinforcement.

Class C – Thin reinforced sections, railings, precast R.C. piles and cribbing and for filler in steel grid floors.

Class P – Prestressed concrete structures and members.

Seal – Concrete deposited in water.

405.2 Material Requirements

405.2.1 Portland Cement

It shall conform to all the requirements of Subsection 311.2.1.

405.2.2 Fine Aggregate

It shall conform to all the requirements of Subsection 311.2.2.

405.2.3 Coarse Aggregate

It shall conform all the requirements of Subsection 311.2.3 except that gradation shall conform to Table 405.1.

Table 405.1 – Grading Requirements for Coarse Aggregate

Sieve Designation		Mass Percent Passing				
Standard Mm	Alternate US Standard	Class A	Class B	Class C	Class P	Class Seal
63	2-1/2"					
50	2"	100	100			
37.5	1-1/2"	95 – 100	-			100
25	1"	-	35 – 70		100	95 – 100
19.0	¾"	35 – 70	-	100	-	-
12.5	½"	-	10 – 30	90 – 100	-	25 – 60
9.5	3/8"	10 – 30	-	40 – 70	20 – 55	-
4.75	No.4	0 – 5	0 - 5	0 – 15*	0 – 10*	0 – 10*

* The measured cement content shall be within plus (+) or minus (-) 2 mass percent of the design cement content.

405.2.4 Water

It shall conform to the requirements of Subsection 311.2.4.

405.2.5 Reinforcing Steel

It shall conform to the requirements of Item 710, Reinforcing Steel and Wire Rope.

405.2.6 Admixtures

Admixtures shall conform to the requirements of Subsection 311.2.7

405.2.7 Curing Materials

Curing materials shall conform to the requirements of Subsection 311.2.8.

405.2.8 Expansion Joint Materials

Expansion joint materials shall be:

1. Preformed Sponge Rubber and Cork, conforming to AASHTO M 153.
2. Hot-Poured Elastic Type, conforming to AASHTO M 173.
3. Preformed Fillers, conforming to AASHTO M 213.

405.2.9 Elastomeric Compression Joint Seals

These shall conform to AASHTO M 220.

405.2.10 Elastomeric Bearing Pads

These shall conform to AASHTO M 251 or Item 412 – Elastomeric Bearing Pads.

405.2.11 Storage of Cement and Aggregates

Storage of cement and aggregates shall conform to all the requirements of Subsection 311.2.10.

405.3 Sampling and Testing of Structural Concrete

As work progresses, at least one (1) sample consisting of three (3) concrete cylinder test specimens, 150 x 300 mm, shall be taken from each seventy five (75) cubic meters of each class of concrete or fraction thereof placed each day.Compliance with the requirements of this Section shall be determined in accordance with the following standard methods of AASHTO:

Sampling of fresh concrete	T 141
Weight per cubic metre and air content (gravi-metric) of concrete	T 121
Sieve analysis of fine and coarse aggregates	T 27
Slump of Portland Cement Concrete	T 119
Specific gravity and absorption of fine aggregate	T 84

Tests for strength shall be made in accordance with the following:

Making and curing concrete compressive and flexural tests specimens in the field	T 23
Compressive strength of molded concrete Cylinders	T 22

405.4 Production Requirements

405.4.1 Proportioning and Strength of Structural Concrete

The concrete materials shall be proportioned in accordance with the requirements for each class of concrete as specified in Table 405.2, using the absolute volume method as outlined in the American Concrete Institute (ACI) Standard 211.1. "Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete". Other

methods of proportioning may be employed in the mix design with prior approval of the Engineer. The mix shall either be designed or approved by the Engineer. A change in the source of materials during the progress of work may necessitate a new mix design.

The strength requirements for each class of concrete shall be as specified in Table 405.2.

Table 405.2 - Composition and Strength of Concrete for Use in Structures

Class of Concrete	Minimum Cement Content Per m^3 40kg/ (bag**)	Maximum Water/ Cement Ratio kg/kg	Consistency Range in Slump mm	Designated Size of Coarse Aggregate Square Opening Std. mm	Minimum Compressive Strength of 150x300 mm Concrete Cylinder Specimen at 28 days, MN/m^2
A	364 (9.1 bags)	0.53	50 – 100	37.5 – 4.75 (1-1/2" – No. 4)	20.7
B	320 (8 bags)	0.58	50 – 100	50 – 4.75 (2" – No. 4)	16.5
C	380 (9.5 bags)	0.55	50 – 100	12.5 – 4.75 (1/2" – No. 4)	20.7
P	440 (11 bags)	0.49	100 max.	19.0 – 4.75 (3/4" – No. 4)	37.7
Seal	380 (9.5 bags)	0.58	100 – 200	25 – 4.75 (1" – No. 4)	20.7

* The measured cement content shall be within plus or minus 2 mass percent of the design cement content.
** Based on 40 kg/bag

405.4.2 Consistency

Concrete shall have a consistency such that it will be workable in the required position. It shall be of such a consistency that it will flow around reinforcing steel but individual particles of the coarse aggregate when isolated shall show a coating of mortar containing its proportionate amount of sand. The consistency of concrete shall be gauged by the ability of the equipment to properly place it and not by the difficulty in mixing and transporting. The quantity of mixing water shall be determined by the Engineer and shall not be varied without his consent. Concrete as dry as it is practical to place with the equipment specified shall be used.

405.4.3 Batching

Measuring and batching of materials shall be done at a batching plant.

1. Portland Cement

Either sacked or bulk cement may be used. No fraction of a sack of cement shall be used in a batch of concrete unless the cement is weighed. All bulk cement shall be weighed on an approved weighing device. The bulk cement weighing hopper shall be properly sealed and vented to preclude dusting operation. The discharge chute shall not be suspended from the weighing hopper and shall be so arranged that cement will neither be lodged in it nor leak from it.

Accuracy of batching shall be within plus (+) or minus (-) 1 mass percent.

2. Water

Water may be measured either by volume or by weight. The accuracy of measuring the water shall be within a range of error of not more than 1 percent.

3. Aggregates

Stockpiling of aggregates shall be in accordance with Subsection 311.2.10. All aggregates whether produced or handled by hydraulic methods or washed, shall be stockpiled or binned for draining for at least 12 hours prior to batching. Rail shipment requiring more than 12 hours will be accepted as adequate binning only if the car bodies permit free drainage. If the aggregates contain high or non-uniform moisture content, storage or stockpile period in excess of 12 hours may be required by the Engineer.Batching shall be conducted as to result in a two (2) mass percent maximum tolerance for the required materials.

4. Bins and Scales

The batching plant shall include separate bins for bulk cement, fine aggregate and for each size of coarse aggregate, a weighing hopper, and scales capable of determining accurately the mass of each component of the batch.

Scales shall be accurate to one-half (0.5) percent throughout the range used.

5. Batching

When batches are hauled to the mixer, bulk cement shall be transported either in waterproof compartments or between the fine and coarse aggregate. When cement is placed in contact with moist aggregates, batches will be rejected unless mixed within 1-1/2 hours of such contact. Sacked cement may be transported on top of the aggregates.

Batches shall be delivered to the mixer separate and intact. Each batch shall be dumped cleanly into the mixer without loss, and, when more than one batch is carried on the truck, without spilling of material from one batch compartment into another.

6. Admixtures

The Contractor shall follow an approved procedure for adding the specified amount of admixture to each batch and will be responsible for its uniform operation during the progress of the work. He shall provide separate scales for the admixtures which are to be proportioned by weight, and accurate measures for those to be proportioned by volume. Admixtures shall be measured into the mixer with an accuracy of plus or minus three (3) percent.

The use of Calcium Chloride as an admixture will not be permitted.

405.4.4 Mixing and Delivery

Concrete may be mixed at the site of construction, at a central point or by a combination of central point and truck mixing or by a combination of central point mixing and truck agitating. Mixing and delivery of concrete shall be in accordance with the appropriate requirements of AASHTO M 157 except as modified in the following paragraphs of this section, for truck mixing or a combination of central point and truck mixing or truck agitating. Delivery of concrete shall be regulated so that placing is at a continuous rate unless delayed by the placing operations. The intervals between delivery of batches shall not be so great as to allow the concrete inplace to harden partially, and in no case shall such an interval exceed 30 minutes.

In exceptional cases and when volumetric measurements are authorized, for small project requiring less than 75 cu.m. per day of pouring, the weight proportions shall be converted to equivalent volumetric proportions. In such cases, suitable allowance shall be made for variations in the moisture condition of the aggregates, including the bulking effect in the fine aggregate. Batching and mixing shall be in accordance with ASTM C 685, Section 6 through 9.

Concrete mixing, by chute is allowed provided that a weighing scales for determining the batch weight will be used.

For batch mixing at the site of construction or at a central point, a batch mixer of an approved type shall be used. Mixer having a rated capacity of less than a one-bag batch shall not be used. The volume of concrete mixed per batch shall not exceed the mixer's nominal capacity as shown on the manufacturer's standard rating plate on the mixer except that an overload up to 10 percent above the mixer's nominal capacity may be permitted, provided concrete test data for strength, segregation, and uniform consistency are satisfactory and provided no spillage of concrete takes place. The batch shall be so charge into the drum that a portion of the water shall enter in advance of the cement and aggregates. The flow of water shall be uniform and all water shall be in the drum by the end of the first 15 seconds of the mixing period. Mixing time shall be measured from the time all materials, except water, are in the drum. Mixing time shall not be less than 60 seconds for mixers having a capacity of 1.5 m 3 or less. For mixers having a capacity greater than 1.5m3 , the mixing time shall not be less than 90 seconds. If timing starts, the instant the skip reaches its maximum raised position, 4 seconds shall be added to the specified mixing time. Mixing time ends when the discharge chute opens.

The mixer shall be operated at the drum speed as shown on the manufacturer's name plate on the mixer. Any concrete mixed less than the specified time shall be discarded and disposed off by the Contractor at his own expenses.

The timing device on stationary mixers shall be equipped with a bell or other suitable warning device adjusted to give a clearly audible signal each time the lock is released. In case of failure of the timing device, the Contractor will be permitted to continue operations while it is being repaired, provided he furnishes an approved timepiece equipped with minute and second hands. If the timing device is not placed in good working order within 24 hours, further use of the mixer will be prohibited until repairs are made.

Retempering concrete will not be permitted. Admixtures for increasing the workability, for retarding the set, or for accelerating the set or improving the pumping characteristics of the concrete will be permitted only when specifically provided for in the Contract, or authorized in writing by the Engineer.

1. Mixing Concrete:

General Concrete shall be thoroughly mixed in a mixer of an approved size and type that will insure a uniform distribution of the materials throughout the mass.

All concrete shall be mixed in mechanically operated mixers. Mixing plant and equipment for transporting and placing concrete shall be arranged with an ample auxiliary installation to provide a minimum supply of concrete in case of breakdown of machinery or in case the normal supply of concrete is disrupted. The auxiliary supply of concrete shall be sufficient to complete the casting of a section up to a construction joint that will meet the approval of the Engineer.

Equipment having components made of aluminum or magnesium alloys, which would have contact with plastic concrete during mixing, transporting or pumping of Portland Cement concrete, shall not be used.

Concrete mixers shall be equipped with adequate water storage and a device of accurately measuring and automatically controlling the amount of water used.

Materials shall be measured by weighing. The apparatus provided for weighing the aggregates and cement shall be suitably designed and constructed for this purpose. The accuracy of all weighing devices except that for water shall be such that successive quantities can be measured to within one (1) percent of the desired amounts. The water measuring device shall be accurate to plus or minus 0.5 mass percent. All measuring devices shall be subject to the approval of the Engineer. Scales and measuring devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to insure their accuracy.

Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the entire plant is running, the scale reading at cut-off shall not vary from the weight designated by the Engineer more than one (1) mass percent for cement, one and a half (1-1/2) mass percent for any size of aggregate, or one (1) mass percent for the total aggregate in any batch.

2. Mixing Concrete at Site

Concrete mixers may be of the revolving drum or the revolving blade type and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer. The pick-up and throw-over blades of mixers shall be restored or replaced when any part or section is worn 20 mm or more below the original height of the manufacturer's design. Mixers and agitators which have an accumulation of hard concrete or mortar shall not be used.

When bulk cement is used and volume of the batch is 0.5 m 3 or more, the scale and weigh hopper for Portland Cement shall be separate and distinct from the aggregate hopper or hoppers. The discharge mechanism of the bulk cement weigh hopper shall be interlocked against opening before the full amount of cement is in the hopper. The discharging mechanism shall also be interlocked against opening when the amount of cement in the hopper is underweight by more than one (1) mass percent or overweight by more than three (3) mass percent of the amount specified.

When the aggregate contains more water than the quantity necessary to produce a saturated surface dry condition, representative samples shall be taken and the moisture content determined for each kind of aggregate.

The batch shall be so charged into the mixer that some water will enter in advance of cement and aggregate. All water shall be in the drum by the end of the first quarter of the specified mixing time.

Cement shall be batched and charged into the mixer so that it will not result in loss of cement due to the effect of wind, or in accumulation of cement on surface of conveyors or hoppers, or in other conditions which reduce or vary the required quantity of cement in the concrete mixture.

The entire content of a batch mixer shall be removed from the drum before materials for a succeeding batch are placed therein. The materials composing a batch except water shall be deposited simultaneously into the mixer.

All concrete shall be mixed for a period of not less than 1-1/2 minutes after all materials, including water, are in the mixer. During the period of mixing, the mixer shall operate at the speed for which it has been designed.

Mixers shall be operated with an automatic timing device that can be locked by the Engineer. The time device and discharge mechanics shall be so interlocked that during normal operation no part of the batch will be charged until the specified mixing time has elapsed.

The first batch of concrete materials placed in the mixer shall contain a sufficient excess of cement, sand, and water to coat inside of the drum without reducing the required mortar content of the mix. When mixing is
to cease for a period of one hour or more, the mixer shall be thoroughly cleaned.

3. Mixing Concrete at Central Plant

Mixing at central plant shall conform to the requirements for mixing at the site.

4. Mixing Concrete in Truck

Truck mixers, unless otherwise authorized by the Engineer, shall be of the revolving drum type, water-tight, and so constructed that the concrete can be mixed to insure a uniform distribution of materials throughout the mass. All solid materials for the concrete shall be accurately measured and charged into the drum at the proportioning plant. Except as subsequently provided, the truck mixer shall be equipped with a device by which the quantity of water added can be readily verified. The mixing water may be added directly to the batch, in which case a tank is not required. Truck mixers may be required to be provided with a means of which the mixing time can be readily verified by the Engineer.

The maximum size of batch in truck mixers shall not exceed the minimum rated capacity of the mixer as stated by the manufacturer and stamped in metal on the mixer. Truck mixing, shall, unless otherwise

directed be continued for not less than 100 revolutions after all ingredients, including water, are in the drum. The mixing speed shall not be less than 4 rpm, nor more than 6 rpm.

Mixing shall begin within 30 minutes after the cement has been added either to the water or aggregate, but when cement is charged into a mixer drum containing water or surface wet aggregate and when the temperature is above 32oC, this limit shall be reduced to 15 minutes. The limitation in time between the introduction of the cement to the aggregate and the beginning of the mixing may be waived when, in the judgement of the Engineer, the aggregate is sufficiently free from moisture, so that there will be no harmful effects on the cement.

When a truck mixer is used for transportation, the mixing time specified in Subsection 405.4.4 (3) at a stationary mixer may be reduced to 30 seconds and the mixing completed in a truck mixer. The mixing time in the truck mixer shall be as specified for truck mixing.

5. Transporting Mixed Concrete

Mixed concrete may only be transported to the delivery point in truck agitators or truck mixers operating at the speed designated by the manufacturers of the equipment as agitating speed, or in non-agitating hauling equipment, provided the consistency and workability of the mixed concrete upon discharge at the delivery point is suitable point for adequate placement and consolidation in place.

Truck agitators shall be loaded not to exceed the manufacturer's guaranteed capacity. They shall maintain the mixed concrete in a thoroughly mixed and uniform mass during hauling.

No additional mixing water shall be incorporated into the concrete during hauling or after arrival at the delivery point.

The rate of discharge of mixed concrete from truck mixers or agitators shall be controlled by the speed of rotation of the drum in the discharge direction with the discharge gate fully open.

When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within one hour, or before 250 revolutions of the drum or blades, whichever comes first, after the introduction of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete or when the temperature of the concrete is 30oC, or above, a time less than one hour will be required.

6. Delivery of Mixed Concrete

The Contractor shall have sufficient plant capacity and transportation apparatus to insure continuous delivery at the rate required. The rate of delivery of concrete during concreting operations shall be such as to provide for the proper handling, placing and finishing of the concrete. The rate shall be such that the interval between batches shall not exceed 20 minutes. The methods of delivering and handling the concrete shall be such as will facilitate placing of the minimum handling.

405.5 Method of Measurement

The quantity of structural concrete to be paid for will be the final quantity placed and accepted in the completed structure. No deduction will be made for the volume occupied by pipe less than 100 mm in diameter or by reinforcing steel, anchors, conduits, weep holes or expansion joint materials.

ITEM 404 – REINFORCING STEEL

404.1 Description

This Item shall consist of furnishing, bending, fabricating and placing of steel reinforcement of the type, size, shape and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the Engineer.

404.2 Material Requirements

Reinforcing steel shall meet the requirements of Item 710, Reinforcing Steel and Wire Rope.

404.3 Construction Requirements

404.3.1 Order Lists

Before materials are ordered, all order lists and bending diagrams shall be furnished by the Contractor, for approval of the Engineer. The approval of order lists and bending diagrams by the Engineer shall in no way relieve the Contractor of responsibility for the correctness of such lists and diagrams. Any expense incident to the revisions of materials furnished in accordance with such lists and diagrams to make them comply with the Plans shall be borne by the Contractor.

404.3.3 Bending

All reinforcing bars requiring bending shall be cold-bent to the shapes shown on the Plans or as required by the Engineer. Bars shall be bent around a circular pin having the following diameters (D) in relation to the nominal diameter of the bar (d):

Nominal diameter, d, mm	Pin diameter (D)
10 to 20	6d
25 to 28	8d
32 and greater	10d

404.3.4 Placing and Fastening

All steel reinforcement shall be accurately placed in the position shown on the Plans or as required by the Engineer and firmly held there during the placing and setting of the concrete. Bars shall be tied at all intersections except where spacing is less than 300 mm in each directions, in which case, alternate intersections shall be tied. Ties shall be fastened on the inside.

404.3.5 Splicing

All reinforcement shall be furnished in the full lengths indicated on the Plans. Splicing of bars, except where shown on the Plans, will not be permitted without the written approval of the Engineer. Splices shall be staggered as far as possible and with a minimum separation of not less than 40 bar diameters. Not more than one-third of the bars may be spliced in the same cross-section, except where shown on the Plans.

Unless otherwise shown on the Plans, bars shall be lapped a minimum distance of:

Splice Type	Grade 280 (40)	Grade 420 (60)	But not less than
Tension	24 bar dia	36 bar dia	300 mm
Compression	20 bar dia	24 bar dia	300 mm

404.5 Basis of Payment

The accepted quantity, measured as prescribed in Section 404.4, shall be paid for at the contract unit price for Reinforcing Steel which price and payment shall be full compensation for furnishing and placing all materials, including all labor, equipment, tools and incidentals necessary to complete the work prescribed in this Item.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
404	Reinforcing Steel	Kilogram

ITEM 414 - Forms and Falseworks

414.1 Description

This Item shall consist of designing, constructing and removing forms and falsework to temporarily support concrete, girders and other structural elements until the structure is completed to the point it can support itself.

414.2 Material Requirements

414.2.1 Formwork

The materials used for smooth form finish shall be plywood, tempered concrete-form-grade hardboard, metal, plastic, paper or other acceptable materials capable of producing the desired finish for form-facing materials. Form facing materials shall produce a smooth, uniform texture on the concrete. Form facing materials with raised grain, torn surfaces, worn edges, patches, dents, or other defects that will impair the texture of concrete surfaces shall not be permitted. No form-facing material shall be specified for rough form finish.

414.2.1.1 Formwork Accessories

Formwork accessories that are partially or wholly embedded in concrete, including ties and hangers shall be commercially manufactured. The use of non fabricated wire form ties shall not be permitted. Where indicated in the Contract, use form ties with integral water barrier plates in walls.

414.2.1.2 Formwork Release Agents

Commercially manufactured formwork release agents shall be used to prevent formwork absorption of moisture, prevent bond with concrete, and not stain the concrete surfaces.

414.2.2 Falsework

The materials to be used in the falsework construction shall be of the quantity and quality necessary to withstand the stresses imposed; it may be timber or steel or a combination of both. The workmanship shall be of such quality that the falsework will support the loads imposed on it without excessive settlement or take-up beyond as shown on the falsework drawings.

414.3. Construction Requirements

414.3.1 Design

Falsework and Formworks design and drawings shall be in accordance, with Item 407, Concrete Structures, Subsection 407.3.9 and 407.3.12, respectively.

414.3.1.1 Formwork and Falsework Drawings

When complete details for forms and falseworks are not shown, prepare and submit drawings to the Engineer showing the following:

1. Details for constructing safe and adequate forms and falsework that provide the necessary rigidity, support the loads imposed, and produce in the finished structure the required lines and grades. See subsection 414.3.1.2 for design loads. See Subsection 414.3.1.3 for design stresses, loadings and deflections. See Subsection 414.3.2 for manufactured assemblies.
2. The maximum applied structural load on the foundation material. Include a drainage plan or description of how foundations will be protected from saturation, erosion, and/or scour see Subsection 414.3.3.1.
3. The description of all proposed material. Describe the material that is not describable by standard nomenclature (such as AASHTO or ASTM specified) based on manufacturer's test and recommended

working loads. Provide evaluation data for falsework material showing that the physical properties and conditions of the material can support the loads assumed in the design.

ITEM 409 – WELDED STRUCTURAL STEEL

409.1 Description

This work shall consist of the joining of structural steel members with welds of the type, dimensions, and design shown on the Plans and in accordance with the Specifications.

It is the intent of this Specification to provide for work of a quality comparable to that required under the Standard Specifications for Welded Highway and Railway Bridges of the American Welding Society. In case of dispute or for situations not adequately provided for in this Specification, those designated Standard Specifications shall be considered as the final authority and shall govern except as amended by the Special Provisions.

Welding of Structural Steel shall be done only when shown on the Plans or authorized in writing by the Engineer.

409.2 Materials Requirements

Steel base metal to be welded shall be open-hearth or electric furnace steel conforming to AASHTO M 183.

All arc-welding electrodes shall conform to the requirements of American Welding Society Specifications. Electrodes shall be of classification numbers E7016, E7018 or E7028 as required for the positions, type of current and polarity, and other conditions of intended use, and to conform to any special requirements indicated on the Plans.

Filler material to be used in the repair or strengthening of old structures or for joining new parts to existing steel members, shall be adopted to the material to be welded and may depart from the foregoing requirements only if agreed by the Engineer.

409.3 Construction Requirements

409.3.1 Equipment

409.3.1.1 General

All items of equipment for welding and gas cutting shall be so designed and manufactured and in such condition as to enable qualified welders to follow the procedures and attain the results prescribed in this Specification.

409.3.1.2 Arc-Welding Equipment

Welding generators and transformers shall be designed expressly for welding. They shall be capable of delivering steady currents adjustable through a range ample for the work requirements. They shall respond automatically and quickly to changes in power requirements due to variations in arc length and shall deliver full current promptly on striking an arc.

Welding cable shall have sufficient conductivity to avoid overheating and inadequate current at the arc and shall be effectively insulated against welding circuit voltage. Earth or ground connections and circuits shall be secured and adequate to carry the welding currents.

Electrode holders shall grip the electrode firmly and with good electrical contact.

Approved automatic welding heads may be used, with suitable auxiliary handling equipment to provide automatic instead of manual control of electrode and welding arc.

409.3.1.3 Gas-Cutting Equipment

Torches and tips shall be of proper size and type of the work at hand. Suitable regulators shall afford the welder complete control over the pressure and rate of flow of each gas.

409.3.1.4 Protective Equipment

All personnel protective equipment shall conform to the American Standard Association Code for such equipment.

The Contractor shall enforce the use of approved accessories necessary for the protection and convenience of the welders and for the proper and efficient execution of the work.

Suitable protection against the light of the arc shall be maintained by the Contractor when arc-welding operation might be viewed within harmful range by persons other than the actual welders and inspectors.

409.3.2 Welding

409.3.2.1 General

Welding shall be performed by the metal-arc process, using the electrodes specified with either direct or alternating current.

Surfaces to be welded shall be smooth, uniform and free from fins, tears, and other defects which would adversely affect the quality of the weld. Edges of material shall be trimmed by machining, chipping, grinding, or machine gas-cutting to produce a satisfactory welding edge wherever such edge is thicker than: 13 mm for sheared edge of material; 16 mm for toes of angles or rolled shapes (other than wide flange sections); 25 mm for universal mill plate or edges of flange sections.

The width of root face used, shall be not more than 1.5 mm for parts less than 10 mm in thickness nor more than 3 mm for parts 10 mm or more in thickness.

Butt welds shall be proportioned so that their surface contours will lie in gradual transition curves. For butt welded joints between base metal parts of unequal thickness, a transition shall be provided on a slope or level not greater than 1 in 2.5 to join the offset surfaces. This transition may be provided by sloping the surface of the weld metal or by bevelling the thicker part or by combination of these two methods.

Surfaces to be welded shall be free from loose scale, slag, rust, grease or other material that will prevent proper welding. Mill scale that withstands vigorous wire brushing or a light film of drying oil or rust inhibitive coating may remain. Surfaces within 50 mm of any weld location shall be free of any paint or other material that would prevent proper welding or produce objectionable fumes while welding.

No operation or actual welding or gas-cutting shall be performed on a member while it is carrying live load stress or while subject to shock and vibration and from moving loads. Welding and gas-cutting shall cease in advance of the application of such loads.

409.3.2.2 Welders

All welding shall be done by approved competent and experienced and fully qualified welders.

409.3.2.3 Preparation of Materials for Welding

Dimensional tolerance, straightness and flatness of the structural shapes and plates shall be within the limits prescribed in this Specification.

Structural steel which is to be welded shall preferably not be painted until all welding is completed.

Preparation of edges by gas-cutting shall, wherever practicable, be done by machine gas-cutting. Machine gas-cutting edges shall be substantially as smooth and regular as those produced by edge planing and shall be left free of slag. Manual gas cutting shall be permitted only where machine gas-cutting is not practicable and with the approval of the Engineer. The edge resulting from manual gas-cutting shall be inspected and smoothed with special care. All reentrant corners shall be filleted to a radius at least 19 mm. The cut lines shall not extend beyond the fillet and all cutting shall follow closely the line prescribed.

409.3.2.4 Assembly

The parts to be joined by fillet welds shall be brought into a close contact as practicable, and no event shall be separated more than 5 mm. If the separation is 1.5 mm or greater, the leg of the fillet weld shall be increased by the amount of separation. The separation between faying surfaces of lap joints and of butt joints landing on a backing structure shall not exceed 1.5 mm. The fit of joints which are not sealed by welds throughout their length shall be sufficiently close to exclude water after painting. Where irregularities in rolled shape or plates, after straightening, do not permit contact within the above limits, the procedure necessary to bring the material within these limits shall be subject to the approval of the Engineer.

The minimum center spacing of plug welds shall be four times the diameter of the hole.

The length of the slot for a slot weld shall not exceed ten times the thickness of the weld. The width of the slot shall not be less than the thickness of the part containing it plus 8 mm nor shall it be greater than 2.25 times the thickness of the weld.

The ends of the slot shall be semicircular or shall have the corners rounded to a radius not less than the thickness of the part containing it, except those ends which extend to the edge of the part.

The minimum spacing of lines of slot welds in a direction transverse to their length shall be 4 times the width of the slot. The minimum center to center spacing in a longitudinal direction on any line shall be 2 times the length of the slot.

Members or component parts of structures shall be assembled and matchmarked prior to erection to insure accurate assembly and adjustment of position on final erection. Painted assembly marks shall be removed from any surface to be welded.

409.3.2.6 Technique of Arch-Welding

The welding current shall conform with respect to voltage and current (and polarity, of direct current is used) to the recommendations of the manufacturer of the electrode being used, as indicated in the instructions that are included with each container of electrodes.

Arc lengths and electrical potential and current shall be suited to the thickness of material, type of groove and other circumstances attendant to the work.

The electrode manipulation during welding shall insure that:

1. Complete fusion between the base metal and the deposited weld metal is obtained.

2. The melted base metal is replaced by weld metal so that no undercut remains along the edges of the finished weld.

3. The molten weld metal floats all slag, oxide and gases to the surface behind the advancing arc.

Each time the arc is started, either to begin a weld or to continue partly completed weld, the arch shall be manipulated to obtain complete fusion of the deposited weld metal with the base metal and with any previously deposited weld metal, before any progression of the arc along the joint.

At the completion of a pass or weld, the arc shall be manipulated so as to fill the crater with sound metal.

In making plug welds the following techniques shall be used:

1. For flat welds, the arc shall be carried around the root of the joint and then weaved along a spiral path to the center of the hole, fusing and depositing a layer of weld metal in the root and bottom of the joint. The arc shall then be carried to the periphery of the hole, and the procedure repeated, fusing and depositing successive layers to fill the hole to the depth required. The slag covering the weld metal shall be kept molten, or nearly so, until the weld is finished. If the arc is broken, except briefly for changing electrodes, the slag must be allowed to cool and shall be completely removed before restarting the weld.

2. For vertical welds, the arc shall be started at the root of the joint, at the lower side of the hole and carried upward on the zigzag path, depositing a layer about 5 mm thick on the exposed face at the thinner plate and fused to it and to the side of the hole. After cleaning the slag from the weld, other layers shall be similarly deposited to fill the hole to the required depth.

3. For overhead welds, the procedure shall be the same as for flat welds except that the slag shall be allowed to cool and shall be completely removed after depositing each successive layer until the hole is filled to the required depth.

Slot welds shall be made with a technique similar to that specified above for plug welds, except that if the length of the slot exceeds three times the width, or if the slot extends to the edges of the part of the technique specified above for making plug welds shall be followed for the type of flat position welds.

409.3.2.7 Details of Welds

The following tabulation shows that the relation between weld size and the maximum thickness of material on which various sizes of fillet welds may be used:

Size of Fillet Weld	Maximum Thickness of Part
5 mm	13 mm
6 mm	19 mm
8 mm	32 mm
10 mm	51 mm
13 mm	152 mm
16 mm over	152 mm

The maximum size of fillet weld that may be used along the edge of material 6 mm or more in thickness shall be 1.5 mm less than the thickness of the material.

The minimum effective length of fillet weld shall be four times its size and in no case less than 38 mm.

Fillet welds terminating at the corners of parts or members shall, wherever practicable, be turned continuously full size around the corners for a distance not less than twice the nominal size of the weld.

Intermittent fillet welds, preferably, shall not be used. They shall be permitted only where the required weld area is less than that of a continuous fillet weld of the minimum size. If used on main members, they shall be chain intermittent welds. In all other cases, chain intermittent welding is preferable to staggered intermittent welding.

409.3.2.8 Quality of Welds

Weld metal shall be solid throughout except that very small gas pockets and small inclusions of oxide or slag may be accepted if well dispersed and if none exceeds 1.5 mm in greatest dimension, and if the sum of the greatest dimensions of all such defects of weld metal area does not exceed 15 mm in an area of 10 cm2 .

There shall be complete fusion between the weld metal and the base metal and between successive passes throughout the joint.

Welds shall be free from overlap and the base metal free from undercutting. All craters shall be filled to the full cross-section of the welds

ITEM 403 – METAL STRUCTURES

403.1 Description

This work shall consist of steel structures and the steel structure portions of composite structures, constructed in reasonably close conformity with the lines, grades and dimensions shown on the Plans or established by the Engineer. The work will include the furnishing, fabricating, hauling, erecting, welding and painting of structural metals called for in the Special Provision or shown on the Plans. Structural metals will include structural steel, rivet, welding, special and alloy steels, steel forgings and castings and iron castings. This work will also include any incidental metal construction not otherwise provided for, all in accordance with these Specifications, Plans and Special Provisions.

403.2 Material Requirements

Materials shall meet the requirements of Item 712, Structural Metal; Item 409, Welded Structural Steel, and Item 709, Paints.

403.3 Construction Requirements

403.3.1 Inspection

The Contractor shall give the Engineer at least fifteen (15) days notice prior to the beginning of work at the mill or shop, so that the required inspection may be made. The term "mill" means any rolling mill, shop or foundry where material for the work is to be manufactured or fabricated. No material shall be rolled or fabricated until said inspection has been provided.

The Contractor shall furnish the Engineer with copies of the certified mill reports of the structural steel, preferably before but not later than the delivery of the steel to the job site.

The Contractor shall furnish all facilities for inspection and the Engineer shall be allowed free access to the mill or shop and premises at all times. The
Contractor shall furnish, without charge, all labor, machinery, material and tools necessary to prepare test specimens.

Inspection at the mill or shop is intended as a means of facilitating the work and avoiding errors. It is expressly understood that it will not relieve the Contractor from any responsibility for imperfect material or workmanship and the necessity for replacing same. The acceptance of any material or finished member at the mill or shop by the Engineer shall not preclude their subsequent rejection if found defective before final acceptance of the work. Inspection of welding will be in accordance with the provision of Section 5 of the "Standard Code for Arc and Gas Welding in Building Construction" of the American Welding Society.

403.3.2 Stock Material Control

When so specified in the Contract, stock material shall be segregated into classes designated as "identified" or "unidentified". Identified material is material which can be positively identified as having been rolled from a given heat for which certified mill test can be produced. Unidentified material shall include all other general stock materials. When it is proposed to use unidentified material, the Engineer shall be notified of such intention at least fifteen (15) days in advance of commencing fabrication to permit sampling and testing. When so indicated or directed, the Contractor shall select such material as he wishes to use from stock, and place it in such position that it will be accessible for inspection and sampling. The Contractor shall select identified material from as few heat numbers as possible, and furnish the certified mill test reports on each of such heat numbers. Two samples shall be taken from each heat number as directed, one for a tension test and one for a bend test.

In the case of unidentified stock, the Engineer may, at his discretion, select any number of random test specimens.

Each bin from which rivets or bolts are taken shall subject to random test. Five rivets or bolts may be selected by the Engineer from each bin for test purposes.

Structural material, either plain or fabricated, shall be stored above the ground upon platforms, skids, or other supports. It shall be kept free from dirt, grease, or other foreign matter, and shall be protected as far as practicable from corrosion.

403.3.3 Fabrication

These Specifications apply to riveted, bolted and welded construction. The Contractor may, however, with approval of the Engineer, substitute high tensile strength steel bolts equivalent to the rivets in any connection.

Workmanship and finish shall be in accordance with the best general practice in modern bridge shops. Portions of the work exposed to view shall be finished neatly. Shearing, flame cutting, and chipping shall be done carefully and accurately.

Structural material, either plain or fabricated, shall be stored above the ground upon platforms, skids or other supports. It shall be kept free from dirt, grease or other foreign matter, and shall be protected as far as practicable from corrosion.

Rolled material before being laid off or worked must be straight. If straightening is necessary, it shall be done by methods that will not injure the metal. Sharp kinks and bends will be cause for rejection of the material.

Preparation of material shall be in accordance with AWS (American Welding Society) D 1.1, paragraph 3.2 as modified by AASHTO Standard Specification for Welding of Structural Steel Highway Bridges.

403.3.4 Finishing and Shaping

Finished members shall be true to line and free from twists, bends and open joints.

1. Edge Planing

   Sheared edges of plates more than 15.9 mm in thickness and carrying calculated stresses shall be planed to a depth of 6.3 mm. Re-entrant cuts shall be filleted before cutting.

2. Facing of Bearing Surfaces

   The surface finish of bearing and based plates and other bearing surfaces that are to come in contact with each other or with concrete shall meet the American National Standards Institute surface roughness requirements as defined in ANSI B-46.1-47, Surface Roughness Waviness and Lay, Part I:

Steel slabs	ANSI 2,000
Heavy plates in contact in shoes to be welded	ANSI 1,000
Milled ends of compression members,	ANSI 500

stiffeners and fillers	
Bridge rollers and rockers	ANSI 250
Pins and pin holes	ANSI 125
Sliding bearings	ANSI 125

3. Abutting Joints

   Abutting joints in compression members and girders flanges, and in tension members where so specified on the drawings, shall be faced and brought to an even bearing. Where joints are not faced, the opening shall not exceed 6.3 mm.

4. End Connection Angles

   Floor beams, stringers and girders having end connection angles shall be built to plan length back to back of connection angles with a permissible tolerance of 0 mm to minus 1.6 mm. If end connections are faced, the finished thickness of the angles shall not be less than that shown on the detail drawings, but in no case less than 9.5 mm.

5. Lacing Bars

   The ends of lacing bars shall be neatly rounded unless another form is required.

6. Fabrication of Members

Unless otherwise shown on the Plans, steel plates for main members and splice plates for flanges and main tension members, not secondary members, shall be cut and fabricated so that the primary direction of rolling is parallel to the direction of the main tensile and/or compressive stresses.

Fabricated members shall be true to line and free from twists, bends and open joints.

7. Web Plates (Riveted or Bolted)

In girders having no cover plates and not to be encased in concrete, the top edges of the web shall not extend above the backs of the flange angles and shall not be more than 3.2 mm below at any point. Any portion of the plate projection beyond the angles shall be chipped flush with the backs of the angles.

Web plates of girders having cover plates may not be more than 12.7 mm less in width than the distance back to back of flange angles. Splices in webs of girders without cover plates shall be sealed on top with red lead paste prior to painting.

At web splices, the clearance between the ends of the plates shall not exceed 9.5 mm. The clearance at the top and bottom ends of the web slice plates shall not exceed 6.3 mm.

8. Bent Plates

Cold-bent load-carrying rolled-steel plates shall conform to the following:

a. They shall be so taken from the stock plates that the bendline will be at right angles to the direction of rolling, except that cold-bent ribs for orthotropic deck bridges may be bent in the direction of rolling if permitted by the Engineer.

b. The radius of bends shall be such that no cracking of the plate occurs. Minimum bend radii, measured to the concave face of the metal, are shown in the following table:

ASTM DESIGNATION		THICKNESS, t in mm				
		Up to 6.3	Over 6.3 to 12.7	Over 12.7 to 25.4	Over 25.4 to 38.1	Over 38.1 to 50.08
A 36		1.5t	1.5t	2t	3t	4t
A 242		2t	3t	5t	a---	a---
A 440		2.5t	3.5t	6t	a---	a---
A 441		2t	3t	5t	a---	a---
A 529		2t	2t	----	----	----
A 572	Gr.42	2t	2t	3t	4t	5t
	Gr.45	2t	2t	3t	4t	----
	Gr.50	2.5t	2.5t	4t	a---	----
	Gr.55	3t	3t	5t	a---	----
	Gr.60	3.5t	3.5t	6t	----	----
	Gr.65	4t	4t	----	----	----
A 588		2t	3t	5t	a----	a----
A 514[b]		2t	2t	2t	3t	3t

a. It is recommended that steel in this thickness range be bent hot. Hot bending however, may result in a slight decrease in the as-rolled mechanical properties.

b. The mechanical properties of ASTM A 514 steel results from a quench-andtemper-operation. Hot bending may adversely affect these mechanical properties. If necessary to hotbend, fabricator should discuss procedure with steel supplier.

c. Before bending, the corners of the plate be rounded to a radius of 1.6 mm throughout that portion of the plate where the bending is to occur.

9. Fit of Stiffeners

End stiffeners of girders and stiffeners intended as supports for concentrated loads shall have full bearing (either milled, ground or on weldable steel in compression areas of flanges, welded as shown on the Plans or specified) on the flanges to which they transmit load or from which they receive load. Stiffeners not intended to support concentrated loads shall, unless shown or specified otherwise, fit sufficiently tight to exclude water after being painted, except that for welded flexural members, the ends of stiffeners adjacent to the tension flanges shall be cut back as shown on the Plans. Fillers under stiffeners shall fit within 6.3 mm at each end.

Welding will be permitted in lieu of milling or grinding if noted on the Plans or in the Special Provisions. Brackets, clips, gussets, stiffeners, and other detail material shall not be welded to members or parts subjected to tensile stress unless approved by the Engineer.

PROJECT BILLBOARD

2.2.3 For infrastructure projects, a tarpaulin signboard must be suitably framed for outdoor display at the project location, and shall be posted as soon as the award has been made. The design and format of the tarpaulin, as shown in Annex "A," shall have the following specifications:

Tarpaulin, white, 8 ft x 8 ft
Resolution: 70 dpi
Font : Helvetica
Font Size: Main Information – 3"
Sub-Information -1"
Font Color: Black

Tarpaulin, white, 4 ft x 8 ft
Resolution: 70 dpi
Font : Helvetica
Font Size: Main Information – 3"
Sub-Information -1"
Font Color: Black

Republic of the Philippines
MUNICIPALITY OF LINGAYEN
Province of Pangasinan

CONSTRUCTION SAFETY & HEALTH PROGRAM

B.2 MEDICAL ROOM AND FIRST AID FACILITIES

1. The Contractor shall provide and maintain throughout the duration of the Contract a medical room together with all necessary supplies to be sited in the Contractor's main area. The medical room shall be waterproof; it could be a building or room designated and used exclusively for the purpose. It shall have a floor area of at least 15 square meters and a glazed window area of at least 2 square meters.
2. The Contractor shall employ permanently on the site a fully trained Medical Aide, who shall be engaged solely on medical duties.
3. The location of the medical room and any other arrangements shall be made known to all employees by posting on prominent locations suitable notices in the Site.
4. The Contractor's arrangement to comply with this Section shall be subject to the approval of the Engineer and also to the approval of any qualified Medical Officer designated by the Government to supervise medical arrangements on the Site.

Issued this 10th day of February 2022 at Lingayen, Pangasinan.

Prepared by:

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