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MODEL HD2055EM SYSTEM

MODULAR PHALANX® TYPE BARRICADE SYSTEM
PROGRAMMABLE ELECTRO-MECHANICAL DRIVE SYSTEM

This Procurement Specification defines a FULL SCALE CRASH TESTED AND CERTIFIED – PHALANX® TYPE COUNTER TERRORIST BARRIER SYSTEM - Model HD2055EM. Each System consists of an array of three Barrier Modules or more.

SYNOPSIS

SYNOPSIS OF FULL SCALE CRASH CERTIFICATION

FULL SCALE CRASH TEST CERTIFICATION, LIFE TEST AND IP67

- The HD2055EM Barricade System has been tested and certified to the highest United States Vehicle Barricade Standard.
- This barricade exceeds ASTM F 2656-07 M50 P1. Testing by an independent testing laboratory confirms that it will stop and destroy a heavily loaded truck moving at high speeds and remain standing for a second attack.
- This barricade has completed a one million cycle life test.

1.0 SCOPE

- This specification defines the procurement of a PHALANX™ SYSTEM, Model HD2055EM, consisting of (one, two, three or four) vehicle Barricade(s) operating (independently or in sets of two, three or four) Barricade(s), an independent Electromechanical actuator and proprietary counterbalance system is installed in each barricade.
- POWER SYSTEM, the CONTROLS AND LOGIC CIRCUITS, FEATURES and OPTIONS as defined herein.
- SAFETY AND ENVIRONMENTAL OPTIONS include signal lights, gate arm barriers; safety loops; IR beams, heaters and sump pumps.
- TOUCH SCREEN CONTROL PANELS or PUSH BUTTON CONTROL PANELS. Remotes and Masters.
- Test Certification

2.0 ROADWAY APPLICATION

2.1 The Barrier plate when installed shall provide a level or co-planar surface relative to surrounding roadways. (Ref. Std. Specifications for Construction of Roads and Bridges on Federal Highway Projects FP-96.)

2.2 The Barricade plate within itself shall be continuous with no welded joints, removable sections or bolted-in place road panels with the exception of a small access portal.

2.3 The Barricade shall safely handle heavy truck traffic with loads up to 66,000 lbs. per axle.

3.0 CERTIFICATION TESTS

3.1 Based upon the test performed on December 3, 2015 at KARCO Engineering, LLC., the Delta Scientific HD2055 has received an penetration rating of P1 at the M50 test level, based on the ASTM F 2656-07 standard test method. This test evaluated the HD2055 for an impact to the center wedge barrier unit. The M50 test level of the ASTM F 2656-07 is evaluated using a 6,800 kg test vehicle traveling at a nominal velocity of 80 km/h. The P1 penetration rating is given when penetration beyond the protected side of the barrier is less than 1.0 m at the lower leading edge of the test vehicle's cargo bed. Penetration was measured from the vertical plane created by the back (non- impacted) side of the wedge barrier where the blocking member meets the roadway level. The HD2055 completely disabled the test vehicle, causing severe damage to the engine, drivetrain, and occupant compartment. The engine and transmission was pushed downward and separated from the vehicle. The driveshaft was also broken and the vehicle was rendered inoperable. The maximum penetration recorded was -0.6 m measured on the passenger side of the vehicle.

3.2 One million cycle life test was supervised by an independent testing laboratory. This meets and exceeds the United States Department of State, Foreign Building Operations OB Standard Specifications Section 324007 Roadway Active Roadway Barrier Systems, Part D, A.

4.0 CONFIGURATION

4.1 The HD2055EM Basic Array consists of three Barrier Modules operated in unison or individually. The Basic Array will control a 12 ft. (3.7m) entrance.

4.2 For wider paths, multiple Modules can be employed to operate collectively or selectively to meet traffic demands. Control options include single or multiple stations, as well as master and slave combinations.

4.3 In the lowered, 'free passage' position, Barrier Modules are completely flush with the roadway. There are no buttresses, raised plates, counterweights, back braces or bolt heads that might trip pedestrians or impede authorized vehicular traffic.

4.4 The motor drives are 'field' serviceable with each component weighing less than 40 pounds (18Kg). All components field replaceable.

4.6 The Delta Proprietary Counterbalance shall serve multiple purposes; first to eliminate tension or compression springs in counter balancing the barrier plate, and second to reduce the load and wear on the electro-mechanical actuator. The Delta Proprietary Counterbalance shall, during normal operation provide a constant assist to deploy and retract the barrier.

4.7 Delta Proprietary Counterbalance shall be a self-contained and sealed device.

5.0 GENERAL

5.1 Barrier Modules are brought to a full guard position in **2.0 seconds**.

5.2 Fully assembled Individual Barrier Modules weigh 2,200 lbs. (997 kg). For 'manhandling' the Modules can be disassembled into two elements, the frame and plate assemblies weighing approximately 1650 lbs. (748 kg) and 550 lbs. (249 kg).

5.3 Barrier Modules do not have to be disassembled for interconnection, positioning or casting in place.

5.4 Complete Barrier Modules can be stacked three high for shipping and handling. Individual Modules are 65 in. long 43 in. wide and 66 in. high (1.65m X 1.09m X 0.46 m) weighing approximately 6,600 pounds (2993 kg).

5.5 In addition to the Electromechanical (EM) version a line of Hydraulic and Pneumatic Power Systems, Control Options, Interface Packages, Sensors, Signal Lights, Safety Provisions etc. are available.

6.0 SYSTEM

The barrier is supplied with a wash down rated motor to combat the elements in a below grade environment. While the motor is capable of being in contact with water, submersion should be avoided at all times. An adequate drainage system, based on site conditions, is required to ensure proper operation and service life.

6.1 BARRICADE(S):

6.1.1 Barricade Construction. Each Barricade Module shall be a shallow frame below grade assembly that can be cast in a foundation of 18 inches [457 mm] in depth. The assembly shall have a heavy steel ramp weldment capable of being rotated to an above grade position. The guard position shall present a formidable obstacle to approaching vehicles. Upon impact, forces shall be first absorbed by the Ramp weldment and then transmitted to the foundation of the unit.

6.1.2 Barricade Modules Height. In the full guard position the height of the Barricade Modules shall be approximately 36 inches [914mm] as measured from the top of the foundation frame to the top of the barrier Ramp.

6.1.3 Barricade Array Length. An array of three Barrier Modules shall have a length of 117 inches [2972 mm]. Individual Barrier Modules are 24 inches [609mm) long – the spacing between ramps will be 15 inches [381 mm].

6.1.4 Frame / Foundation Depth. The frame of the Barrier Module shall be 18 inches [457 mm] deep. The foundation depth is 18.0 inches [457 mm].

6.1.5 Safety / Visibility Panel. Descending from the front edge of the Barrier Ramp shall be a rigid panel containing a red reflective lens. (A red warning light may be specified) The height of the panel shall be 14 inches [355 mm].

6.1.6 The Safety/Visibility Panel shall have yellow/white (alternately yellow/black) diagonal stripes.

6.1.7 Serviceability of Safety / Visibility Panel. The panel and side skirts, mounted on the Ramp Weldment shall be readily removable to facilitate Barrier Maintenance and Service using standard hand tools.

6.1.8 Finish. The roadway plates shall have black/yellow (alternately white/yellow or white red) diagonal stripes and have a non-skid surface.

6.2 CONTROL CIRCUIT:

6.2.1 Main Power. The electric motor driving the actuator shall be fed from (specify actual site voltage, phase and frequency, i.e. 230/3/60). Motor shall be sufficiently sized for the expected number of Barricade operations.

6.2.2 Manual Operation. A manual brake release shall be furnished on the motor to allow the Barricades Array to be lowered manually in the event of a prolonged power interruption. The brake will be located in a vault adjacent to each Module.

6.2.3 Control Circuit. A control circuit shall be provided to interface between all Barricade control stations and the barricade. This circuit shall contain all relays, timers, logic circuits and other devices necessary for the Barricade operation.

6.2.4 Voltage. The control circuit shall operate from a 200-240 volt, 50/60 Hz, 10 amp supply. An internally mounted power supply shall converts this to 24 VDC for logic functions, all external control stations, indicator lights and valve actuation.

6.2.5 Construction. The control circuit shall be mounted in a general purpose enclosure, NEMA 1. A NEMA 4 or 4X enclosure may be optionally specified. All device interconnect lines shall be run to terminal strips.

6.2.6 (The following control station(s) can be specified).

6.2.6.1 Remote Control Panel (No Slave Panel). A remote control master panel shall be supplied to control Barricade functions. This panel shall have a key lockable main switch with "main power on" and "panel on" lights. Buttons to raise and lower each Barricade Array (or set[s]) shall be provided. Barricade Array "up" and "down" indicator lights shall be included for each Barricade Array (or set[s]). The emergency fast operate (EFO) feature shall be operated from a covered toggle switch (or optionally a large guard, large push button). The EFO shall also be furnished with EFO active light and reset button. The EFO circuit serves to as a ‘panic button with lock out features.

6.2.6.2 Remote Control Master Panel. (With Slave Panel[s]) A remote control master panel shall be supplied to control Barricade function. This panel shall have a key lockable main switch with "main power on" and "panel on" lights. Buttons to raise and lower each Barricade Array (or set[s]) shall be provided. Barricade "up" and "down" indicator lights shall be included for each Barricade Array (or set[s]). The emergency fast operate circuit (EFO) feature shall be operated from a covered toggle switch (or optionally a large guard, large push button). The EFO shall be furnished with EFO active light and reset button. The remote control master panel shall have a key lockable switch to arm or disarm the remote slave panel(s). An indicator light shall show if the slave panel is armed

6.2.6.3 Remote Control Slave Panel. A remote control slave panel shall also be supplied to control the Barricade operation. This panel shall have a "panel on" light that is lit when enabled by a switch on the remote control master panel. Buttons to raise or lower each Barricade Array (or set) shall be provided. Barricade "up" and "down" indicator lights shall be included for each Barricade Array (or set). The emergency fast operate (EFO) feature shall be operated from a covered toggle switch (or optionally a large guard, large push button). When the slave panel EFO is pushed, an EFO "active" lamp will light and operation of the Barricade(s) will not be possible until reset at the master panel.

6.2.6.4 Voltage. The remote control panel(s) shall operate on 24 VDC.

6.2.6.5 Construction. The remote control station(s) shall be housed in a standard 19 inch electronics rack type surface mount panel with all devices wired to a terminal strip on the back.

6.2.6.6 Panel(s) shall be equipped with a timer circuit to notify the operator via an annunciator "squealer" that the Barricade array(s) has been left in the down position for too long a time period. The alarm is reset when the Barricades are returned to the up position.

6.2.6.7 Touch Screen Panels. As an option Touch Panel controls can be provided. Touch Screens come in standard sizes from 8 to 15 inches in a rack mount or console configurations. The master and slave Touch Screens have all the standard functionality of the Remote panels in sections 6.2.6.1 to 6.2.6.3 with these additional features:

6.2.6.7.1 Data Logging – Records and maintains a time stamped record of all command signals issued from the Touch Panel and any Auxiliary Controls. This record log is easily exported into a spreadsheet on computers.

6.2.6.7.2 Layering – Locations with multiple barriers can be presented in a Layered fashion allowing control from one convenient panel oppose to multiple panels or one large pushbutton panel.

6.2.6.7.3 Customizable – Each location allows the end user to change the name of the location and barrier to correspond with the sites naming.

6.2.6.7.4 Cycle Count and Alarms – The Touch Screens monitor the number of cycles a barrier completes and will alert the operator when maintenance is due (based on cycles or days depending on site).

6.2.6.7.5 Passwords – The Touch Screens offer a standard 7 passwords that can be set up at different operating levels allowing access to differing functional configurations per user.

6.2.6.7.6 Video – Video Touch Screen models are available for control. Having a live feed of the barriers allows the operator to safely monitor and control the area from a distant remote location.

7.0 ACCESSORY EQUIPMENT (Any or all of the following may be selected):

7.1 Battery Backup System. A backup system that automatically transfers upon the loss of normal electrical power can be provided. The standard backup unit is sized to provide 25 normal operation cycles of a barrier (per requests Delta can customize larger backups). The backup unit is able to operate EFO, if required. The size of system depends directly on these parameters, most importantly the EFO functionality.

7.2 Electro-Mechanical Signal Gate. An electrically operated wood arm signal gate shall be supplied to alert vehicle drivers of the Barricade position. The gate operate shall interface with the Barricade Array(s) at the control circuit. The control circuit shall close the gate at the Barricade array "up" command and remain closed until the Barricade Array is fully lowered. The wood arm shall be ___ foot (6, 8, 10 or 12 foot can be specified) long and be striped with reflective yellow/black tape. The gate assembly shall be mountable directly to the roadway surface.

7.3 Stop/Go Traffic Lights. Red/Green 8 inch stand alone traffic lights shall be supplied to alert vehicle drivers of the Barricade position. The green light shall indicate that the Barricade is fully down. All other positions shall cause the light to show red. Brackets shall be supplied to allow light(s) to be located on a (3.5 inch OD post) (wall) (3.5 inch OD post - back to back). The light operating voltage shall be 120 Volt (alternately 240 Volt), power consumption 40 watts per incandescent light. (Alternatively, LED lights may be specified).

7.4 Sump Pump. A self priming sump pump shall be supplied to drain water collected in the Barricade foundation. The pump shall have the capacity to remove ____ inches per minute of rainfall a distance of _____ feet to customer supplied discharge drain. Pump operating voltage shall be 120/1/50-60 (alternately 240/1/50-60).

7.5 Safety Interlock Detector. A vehicle detector safety loop shall be supplied to prevent the Barricade from being accidentally raised under an authorized vehicle. The detector shall utilize digital logic with fully automatic tuning for stable and accurate long term reliability. The output of the detector shall delay any Barricade Array rise signal (except for EFO command) when a vehicle is over the loop.

7.6 Networking. The barrier and Control Panel can be set up to operate on a Local Area Network through Ethernet or Fiber Optic Cable. Networking simplifies the wire installation to plugging in an Ethernet jack. Interfacing using fiber optics will render the system immune to Electrical Noise and is highly recommended in areas susceptible to lightning strikes.

8.0 PERFORMANCE

8.1 Experience. Barricade Systems and auxiliaries shall be of proven design. Manufacturer shall have had 13,000 Phalanx type Barricade Systems in field operation for a minimum of 15 years with documented field experience for all major components and design features.

8.2 Qualification Test. Barricade System design shall have successfully passed an actual full scale crash test conducted by a qualified independent agency.

8.3 Performance Evaluation. The Barricade System shall have a performance evaluation per ASTM F2656-07 test level M50, penetration rating P1.

8.5 STOPPING CAPACITY:

8.5.1 Normal Operation. Barricade Array(s) shall provide excellent security and positive control of normal traffic in both directions by providing an almost insurmountable obstacle to non-armored or non-tracked vehicles. The Barricade System shall be designed to stop a vehicle attacking from the normal direction as shown in installation drawings.

8.5.2 High Energy Attack. A Barricade Array shall be designed to stop and immobilize non-armored or non-tracked vehicles with weight and velocity characteristics as defined in paragraph 8.5.3. The Barricade System shall be designed to destroy the front suspension system, steering linkage, engine crankcase and portions of the drive train. Significant damage to the Barricade System is probable at these levels.

8.5.3 The Barricade System shall be capable of stopping and destroying a vehicle weighing:

15,000 pounds at 50 mph [66.7 KN at 80 kph]
7.5 Tonne EU truck at 80 kph (PAS:68 2007 type test)
Single Module 5,500 pound pickup truck at 60 mph (ASTM PU60 type impact)

8.6 SPEED OF OPERATION:

8.6.1 Normal Operation. Each individual Module (or array) shall be capable of being raised or lowered in two (2) seconds. Other barrier rise time speeds faster or slower can be specified at the time of order. Barricade Ramp direction shall be instantly reversible at any point in its cycle from the control stations.

8.6.2 Emergency Fast Operation. Barricade Array(s) shall rise to the guard position from fully down in 2.0 seconds maximum when the emergency fast operate button is pushed. Barricade Array(s) shall remain in the up and locked position (normal up/down buttons inoperable) until the EFO condition is reset.

8.7 FREQUENCY OF OPERATION. Barricade Array(s) shall be capable of ____ (specify up to 120 cycles per hour) complete up/down cycles per hour.

9.0 ENVIRONMENTAL DATA (Please supply the following):
Barricade shall operate satisfactorily under the following environmental conditions:

9.1 Extremes in temperature:
Yearly maximum dry bulb temp _____ ºF/ºC.
Yearly minimum dry bulb temp _____ ºF/ºC.

9.2 Rainfall:
Yearly average _____inches
Maximum expected hourly rate _____ inches / hour

9.3 Snowfall:
Maximum expected hourly rate _____ inches/hour
Roadway will be (mechanically/manually/chemically) cleared _____.

10.0 QUALITY ASSURANCE PROVISIONS

10.1 Testing. Upon completion, the Barricade System will be fully tested in the manufacturer's shop. In addition to complete cycle testing to verify function and operating speeds, the following checks shall be made:

10.1.1 Identification. A nameplate with manufacturer's name, model number, serial number and year built shall be located within the maintenance access area.

10.1.2 Workmanship. The Barricade System and subsystems shall have a neat and workmanlike appearance.

10.1.3 Dimensions. Principal dimensions shall be checked against drawings and ordering information.

10.1.4 Finish. Coatings shall be checked against ordering information and shall be workmanlike in appearance.

11.0 PREPARATION FOR SHIPMENT

11.1 The Barricade System shall be crated or mounted on skids as necessary to prevent damage from handling. The shipping container(s) shall be of sufficient structural integrity to enable the assembly to be lifted and transported by overhead crane or forklift without failure.

12.0 MANUFACTURER'S DATA

12.1 Drawings and installation data. The Barricade System drawings and installation, maintenance and operating manuals shall be sent to purchaser within 4 weeks of order. ___ additional copies shall be supplied (1 copy supplied at no cost).

13.0 DISCLAIMER

Please note - careful consideration must be devoted to the selection, placement and design of a Barricade installation. Just as in the case of any Barricade system, perimeter security device or security gate that blocks a roadway or drive, care must be taken to ensure that approaching vehicles as well as pedestrians are fully aware of the Barricades and their operation. Proper illumination, clearly worded warning signs, auxiliary devices such as semaphore gates, stop-go signal lights, audible warning devices, speed bumps, flashing lights, beacons, etc. should be considered.

Delta has information available on many such auxiliary safety equipment not specifically listed herein. It is strongly recommended that an architect and or a traffic and or safety engineer be consulted prior to installation of a Barricade system. Delta will offer all possible assistance in designing the operating equipment, controls and the overall system but we are not qualified nor do we purport to offer either traffic or safety engineering information.

14.0 PROCUREMENT SOURCE

The **Model HD2055EM** Modular Phalanx ® Barricade System shall be purchased from:

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