

SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH
MASONRY STRUCTURES - with SuperStrongBloks

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Applications No. 60/854,913 filed October 27, 2006 and No. 60/925,302 filed April 19, 2007. Both provisional applications were filed by Roger Marsh and Patricia Marsh and titled "SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES - with SuperStrongBloks. It is believed that the first teaching of the post tensioning system was by the Bolt-A-Block system which was filed November 10, 2005 by Roger Marsh et al (the same inventors for this application) with U.S. Application No. 11/271,703. The inventors provided another improved configuration of the unitized post tension system on February 13, 2006 with U.S. Application No. 11/353253 entitled UNITIZED POST TENSION BLOCK SYSTEM FOR MASONRY STRUCTURES. This application entails significantly new improvements and features to the block system and features of assembly not shown or present in the Bolt-A-Blok or Unitized Post tension systems of the previous applications. This new application shows and demonstrates additional configurations and methodology with significant improvements and features. This application shows a unique, novel super block with higher structural strength and characteristics differing from any earlier prior art.

FIELD OF INVENTION

[0002] This new building and construction system relates to a unitized masonry structure, particularly structures with post tensioned reinforcement and a super heavy duty strength capabilities. The new building system is called **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES (SUPER UPT BLOCK SYSTEM with SuperStrongBloks)**. The present

invention relates generally to all types of construction where either reinforced concrete or alternatively structures with a mortar and block or brick combinations are utilized for constructing high strength structures.

BACKGROUND-FIELD OF INVENTION

[0003] The new unitized masonry structure described in this specification, called a **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES (SUPER UPT BLOCK SYSTEM)**, is a construction system that is designed to easily and quickly install in any location without the need for mortar, water, or power. The super, heavy duty configuration anticipates usage in many venues and arenas. These include military and defense applications, governmental uses, homeland security, and heavy duty/high strength applications for bridges, dams, levees and the like.

A. INTRODUCTION OF THE PROBLEMS ADDRESSED

[0004] In prior art when a reinforcement means have been used with block, it is typically accomplished with either long rebars, long steel rods, threaded rods such as all-thread, and/or stranded cables. The common referral to "reinforced concrete" normally is *without any tensioning* of the steel reinforcement. The strength of this reinforced concrete is often dependent on the delivery and quality control by the providers of the concrete. In a few configurations, a construction design will call for or specify either pre-tensioning or post tensioning of the structure. The pre and post tensioning process, as one well skilled in the art of construction engineering and techniques knows, may increase the overall strength of the concrete structure but is still dependent on the quality of the delivered concrete. Until recently, post tensioning has normally only been used with a complete stack of blocks in conjunction with the placement of mortar between each layer. Until now, most specialty block

systems with rods and plates have required very complex design and high levels of skill by construction designers and engineers. Heavy and super heavy construction has not been anticipated except as described basically in U.S. Application No. 11/353253 entitled UNITIZED POST TENSION BLOCK SYSTEM FOR MASONRY STRUCTURES submitted February 13, 2006.

B. PRIOR ART

[0005] In the last months of 2005, a newer technique of a bolt, block and bar system - called Bolt-A-Blok - introduced a basic unitized post tensioning where a loose bar was utilized as an anchor across the hollow cavity (or duct) of a concrete masonry unit (CMU) or block. The bar (anchor) had apertures with and without threads which were then individually connected by a fastener (a threaded through bolt) which is essentially the tendon. The combination bolt (tendon) and bar (anchor) network required some care in the placement of the bar to assure uniformity of the reinforcement web of the tendons and anchors. An improved method and system was developed called a UNITIZED POST TENSION BLOCK SYSTEM FOR MASONRY STRUCTURES which was devised that essentially "located" the bars uniformly in a recessed cavity or in a pocket of the concrete masonry unit (CMU). This application showed the basics of an alternative configuration with a full plate and duct system for possible use in military and possibly some structural works such as bridges, piers, levees, dams and the like. The anticipation of the original heavier block was a basic system without developed interconnects and methods to accomplish the more developed structural needs. The present new **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES with SuperStrongBlok**s provides significantly improved configurations, assembly methods, and attachment means over all the previous art.

[0006] Historically, few patented devices have attempted to use mechanical means to join concrete masonry units. Prior to

the Marsh efforts stated above, none used unitized post tensioning. This latest unique configuration stresses the high strength configuration and unique derivative of unitized post tensioning systems. As stated, the building industry has made little progress for a unitized, post tension system. Even so, blocks have required very special and often complex configurations to even handle rods and plates and then the have taught only limit rods in special blocks. One such device is described in U.S. Pat. No. 5,511,902 (1996) issued to Center which teaches an Instant levy block system. This is a complex, specially made block for constructing a levy, comprising a plurality of blocks, a plurality of connecting pegs, and a plurality of stakes. Each part is uniquely designed and made whereas the new **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES with SuperStrongBlocs** as described here utilizes a uniform, readily configured block design for a concrete masonry unit (CMU). It may be adapted and made at various strengths from 2000 PSI to 14000 PSI strengths in compression by varying the type of aggregate, the cement and the mix ratio of the two.

[0007] Another block device is described in U.S. Pat. No. 5,809,732 which was issued to Farmer, Sr. et al (1998) which teaches a masonry block with an embedded plate. The concrete masonry block has an external plate or plates that are anchored through the concrete masonry block. The external plates are cast into the concrete masonry block in the mold during casting. These plates and metal pieces are not taught as being part of the **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES with SuperStrongBlocs**.

[0008] Another device for construction is taught by U.S. Pat. No. 6,098,357 issued to Franklin et al. (2000). This art discloses a modular pre-cast construction block system with a wall subsystem and a foundation subsystem. The wall subsystem has a number of wall units having cavities and pre-stressed

tension cables are cast therein the cavity. This device teaches pre-cast walls and pass through cable which are specially made, require water, and are not readily re-useable like the **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES with SuperStrongBlocs**. Also, the tensioning system is not unitized or placed throughout the entire structure.

[0009] A somewhat re-useable system is taught in the U.S. Pat. No. 6,178,714 issued to Carney, Jr. (2001). The long rods go through apertures in the specially cast block and the pre-cast structures. No description of pre or post tensioning is taught or claimed. The configuration of special length rods, special blocks, special plates and a complex system that requires powered equipment to construct is unlike the simple components of the **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES with SuperStrongBlocs**.

[0010] A mortar less wall structure is taught in U.S. Pat. No. 6,691,471 issued to Price (2004). Here a wall structure comprising of columns of preformed, lightweight, stacked blocks, with the columns of blocks connected to each other by elongated, vertically oriented, support beams. Preferably, the wall structure is operatively connected to a structure by one or more brackets. The beams and blocks are special configuration, not readily available and with limited uses.

[0011] A pre-cast, modular spar system having a cylindrical open-ended spar of relatively uniform cross section is taught in U.S. Pat. No. 6,244,785 issued to Richter, et al (2001). The spar sections are formed by joining arcuate segments and stacking the sections. No design is shown that anticipates this **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES with SuperStrongBlocs**.

[0012] An interlocking, mortar less system is accomplished by some other devices. However, none of them are found to show a structural unitized post tensioning system as described

for the **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES with SuperStrongBloks** in the materials below. An example of one such interlocking device is taught by U.S. Pat. No. 4,640,071 issued to Haener (1987). The device provided includes a spaced parallel pair of upright sidewalls having flat bottoms and tops and bearing integral block interlocking connectors and various configurations on their opposite ends. The sidewalls are integrally connected by means of these configurations. This is not the configuration taught by the **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES with SuperStrongBloks**. Likewise, no post tensioning is taught to increase the structural integrity and strength.

[0013] None of the prior art nor the referenced previous applications by the inventors teaches all the features and capabilities of the **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES (SUPER UPT BLOCK SYSTEM)**. As far as known, there are no systems at the present time which fully meet the need for a unitized, post-tensioned super heavy masonry block structure known as the **SUPER UPT BLOCK SYSTEM**. It is believed that this super system is made with simple, yet strong component parts; may be built with simple tools; needs no mortar or water; provides a much stronger structure than mortar structures and most reinforced concrete structures; and, is ready for immediate use and occupation upon completion of the construction. The combination of devices and the multiple new uses are unique to the **SUPER UPT BLOCK SYSTEM**.

SUMMARY OF THE INVENTION

[0014] A **SUPER UPT BLOCK SYSTEM** has been developed for use in constructing various types of heavy duty structures to replace masonry and reinforced concrete systems as the construction means. The **SUPER UPT BLOCK SYSTEM** is a building

system that demountably couples each individual hollow cored block by use of a plate and bolt system. This coupling results in much stronger, faster, and less expensive construction of buildings when compared to standard block or reinforced concrete alternative systems. While the three main components - a plate, a bolt and a block - are securely connected, the means of attachment is capable of full disassembly if desired. The **SUPER UPT BLOCK SYSTEM** can be accomplished by persons with simple tools and instructions. There is no need for water, no special tools (a simple wrench will suffice), no bracing, and the structure constructed of the **SUPER UPT BLOCK SYSTEM** is ready for immediate use. The improved **SUPER UPT BLOCK SYSTEM** is comprised of masonry units (concrete masonry units) featuring hollow cores (small though cavities or ducts), a high strength fastener bolt (tendon) and a plate (anchor). The new features also teach a strong and durable full plate and bolt which may be placed in various positions and which may be treated for corrosion resistance.

[0014a] According to a first aspect of the present invention, there is provided a system for a high strength masonry structure with post tensioning reinforcement, the system comprising:

- a first masonry unit, the first masonry unit being made of concrete and comprising:

- a first masonry longitudinal length,
 - a first masonry width measured perpendicularly to the first masonry longitudinal length, wherein the first masonry width is substantially uniform along the first masonry longitudinal length,

a first top surface, the first top surface being substantially planar,
a first bottom surface, the first bottom surface being substantially planar,
a first masonry height measured between the first top and first bottom surfaces, the first masonry height being substantially uniform along the first masonry longitudinal length, and
a first through-cavity and a second through-cavity formed through the first masonry unit from the first top surface to the first bottom surface;

a second masonry unit substantially the same as the first masonry unit, the second masonry unit comprising:

a second masonry longitudinal length substantially the same as the first masonry longitudinal length,
a second masonry width substantially the same as the first masonry width,
a second top surface being substantially planar,
a second bottom surface being substantially planar,
a second masonry height substantially the same as the first masonry height, and
a third through-cavity and a fourth through-cavity formed through the second masonry unit from the second top surface to the second bottom surface;

an anchor plate, the anchor plate comprising:

an anchor plate length substantially the same as the
first masonry longitudinal length,
an anchor plate width substantially the same as the
first masonry width,
a first set of apertures, the first set of apertures
comprising a first non-threaded aperture and a
first threaded aperture,
a second set of apertures, the second set of
apertures comprising a second non-threaded
aperture that is substantially the same as the
first non-threaded aperture, and a second
threaded aperture that is substantially the
same as the first threaded aperture,
wherein the first set of apertures is aligned with
the first through-cavity and the second set of
apertures is aligned with the second through-
cavity when the anchor plate is placed onto the
first top surface, and wherein the first set of
apertures is aligned with the second through-
cavity and the second set of apertures is
aligned with the third through-cavity when the
first and second masonry units are positioned
abutting one another and aligned along their
respective longitudinal lengths and the anchor
plate is placed onto the first and second top
surfaces;

a fastener, the fastener comprising:

a first fastener end and a second fastener end,
a head portion at the first fastener end,

a stem portion rigidly affixed to the head portion,
the stem portion comprising a threaded portion
at the second fastener end, wherein an overall
length of the stem portion is greater than the
first masonry height,
wherein the head portion does not fit through the
first non-threaded aperture,
wherein the stem portion slides freely through the
first non-threaded aperture, and
wherein the threaded portion is configured to
threadably engage the first threaded aperture.

[0014b] According to a second aspect of the present invention, there is provided a system for constructing masonry structures, the system comprising:

a masonry unit having a top surface, a bottom surface, a first cavity formed between the top surface and the bottom surface, and a second cavity formed between the top surface and the bottom surface, wherein the top surface has a surface width and a surface length;

a first plate having a first threaded aperture, a first other aperture, a second threaded aperture, and a second other aperture, the first plate configured for placement against the top surface, wherein the first plate has a first plate width substantially the same as the surface width and a first plate

length substantially the same as the surface length, and wherein when an outer perimeter of the first plate is aligned with an outer perimeter of the top surface and the first plate is placed against the top surface, the first threaded aperture and the first other aperture are aligned with the first cavity and the second threaded aperture and the second other aperture are aligned with the second cavity;

a second plate having a third threaded aperture, a third other aperture, a fourth threaded aperture, and a fourth other aperture, the second plate configured for placement against the bottom surface, wherein the second plate has substantially the same dimensions, shape, and aperture locations as the first plate;

a first fastener bolt comprised of a head portion and a stem portion, the head portion rigidly and integrally affixed to the stem portion, the stem portion comprising a threaded end, the first fastener bolt configured for insertion by the threaded end through the first other aperture, through the first cavity, and into threadable engagement with the third threaded aperture; and

a second fastener bolt comprised of a head portion and a stem portion, the head portion rigidly and integrally affixed to the stem portion, the stem portion comprising a threaded end, the second

fastener bolt configured for insertion by the threaded end through the second other aperture, through the second cavity, and into threadable engagement with the fourth threaded aperture,

wherein the stem portion of the first fastener bolt spans an entire height of the first cavity when the first fastener bolt is inserted through the first other aperture, through the first cavity, and into threadable engagement with the third threaded aperture, and

wherein the stem portion of the second fastener bolt spans an entire height of the second cavity when the second fastener bolt is inserted through the second other aperture, through the second cavity, and into threadable engagement with the fourth threaded aperture.

OBJECTS, ADVANTAGES AND BENEFITS

[0015] There are many, many benefits and advantages of the **SUPER UPT BLOCK SYSTEM** just as there are with the Unitized Post Tensioning prior art described above. There currently exist no construction systems, heavy or light duty, which use readily available parts and are so easy to assemble. However, by having the unitized post tensioning technology, the structure is a far stronger unit than one built by traditional mortar-using techniques and reinforced concrete. **TABLE A** shows a list of new and distinct advantages and benefits of the **SUPER UPT BLOCK SYSTEM** over the prior art of the original Bolt-A-Block system (U.S. Application No. 11/271,703) and the Unitized Post Tensioning Systems (U.S. Application No. 11/353253). **TABLE B** shows the list of advantages and benefits that **SUPER UPT BLOCK SYSTEM** has which

are similar to the Bolt-A-Block and Unitized Post Tensioning Systems over traditional mortar and block and reinforced concrete systems. These advantages shown "carryover" to the new **SUPER UPT BLOCK SYSTEM**. **TABLE C** shows the list of advantages and benefits similar to the Unitized Post Tensioning Systems which were advantages over the original Bolt-A-Block system. These advantages in **TABLE C** also "carry over" to the new **SUPER UPT BLOCK SYSTEM**.

[0016] **TABLE A - DISTINCT ADVANTAGES AND BENEFITS of SUPER UPT BLOCK SYSTEM OVER A BOLT-A-BLOK SYSTEM AND OTHER UPT SYSTEMS**

ITEM	DESCRIPTION
1	Provides a special template on plates for ease and speed of assembly - a carpet or grid for assembly of the SUPER UPT BLOCK SYSTEM
2	Provides precise placement of the anchor plates onto the CMU
3	May retrofit to damaged or deteriorated structures such as bridge columns, beams,
4	May retrofit to multi story buildings such as barracks for seismic and wind resistance
5	May place plates in vertical or horizontal planes or both
6	Provides high strength CMU with small duct
7	Assures a predictable concrete strength over poured reinforced alternative systems
8	Eliminates need for cooling pipes or means of exothermic cure in large reinforced pours such as large dams or levees
9	May be configured in multiple layers for anti-terrorist and personnel retention and deterrent walls
10	May be configured with open center areas for utilities, other materials or insulative means
11	Can be pre-assembled and assembly can be interrupted and restarted at any time without compromising quality.
12	Is useful with or without footer.

[0017] TABLE B ADVANTAGES SIMILAR TO BOLT-A-BLOK AND OTHER
Unitized Post Tensioning SYSTEMS

ITEM	DESCRIPTION
1	Is Waterless
2	Requires no wait time to get structural strength
3	Requires no temporary support while mortar cures and gains strength
4	Uses simple hand tools
5	Is Useful with/ without footer
6	Has greater final tensile and compressive strength than mortar construction - is much stronger
7	Is Environmental friendly - Uses less wood, hence there is less deforestation required to support construction
8	Has a competitive total cost - material and labor
9	Permits rapid build.
10	Can be disassembled and components re-used.
11	Does not require skilled labor
-12	Has Global/worldwide/universal applications
13	Can be built on soil or standard foundation
14	Spans greater distances between vertical double blocks
15	Is easy to learn the build concept and start building with non-skilled workers. With this easy learning curve, it is simple to learn and simple to use. So simple that multiple workers may be in the same area - not "laying" block but assembling a structure
16	Provides perfect spacing which means more attractive walls. Blocks have perfect alignment and correct placement before tightening
17	May provide Electrical grounding through metal bars
18	Is an all weather construction. All kinds of weather, rain, snow, wind, cold, hot, underwater, even in a diving bell or caisson
19	Is a Unitized construction. If one stops or anything interrupts the build at any point, one can resume immediately without the former problems of mortar drying out and the other messy problems.
20	May build a wall by working from either side. Inside or outside.
21	Works with one or more core block, brick, and other building units
22	Requires less scaffolding, ladder jacks and walk boards because the walls are immediately at full strength.
23	Can pour concrete in cores and even add vertical rebars.

ITEM	DESCRIPTION
24	Can pour insulation or spray foam in cores.
25	Resists flying debris.
26	Resists Earthquake and Hurricane/ tornado.
27	Is fire resistant.
28	Is not dependent on mortar strength
29	Requires no power or gasoline to build
30	Is useable with other construction techniques - door and window frames, roof and ceiling joists and trusses; metal and asphalt/fiber/ rubber roofing;
31	Is useable with standard plumbing, electrical, communications and lighting packages
32	Has the ability to construct several block layers at one time - speeds overall construction
33	Adapts to regular interior (plaster, boars, panel, paint) and exterior wall surfaces (siding, brick, stucco, etc)
34	Provides perfect plumb and level alignment
35	Does not require poured foundations
36	Is a Unit by unit construction
37	Is possible for the builder to leave out a small portion of the foundation wall so that trucks and backhoes can easily cross into the structure to grade, spread stone, unload concrete or do whatever is necessary. As soon as the heavy inside work is completed, the wall is quickly bolted into place and is ready to go, at full strength.
38	Is termite and carpenter ant proof.

[0019] TABLE C ADVANTAGES SIMILAR TO UNITIZED POST TENSIONING SYSTEMS AND OVER BOLT-A-BLOCK SYSTEMS

ITEM	DESCRIPTION
1	elimination of any gap between the CMUs. No filling or caulking of the space is required.
2	precise placement of the anchor bar
3	faster build time with the recessed channels or the embedded bars
4	stronger military/defense use and anti-blast applications
5	features for easier, faster build with placement aids

[0020] For one skilled in the art of construction of structures (especially masonry, concrete, and steel structures) it is readily understood that the features, advantages and benefits shown in the examples with this system are readily adapted to other types of construction improvements.

DESCRIPTION OF THE DRAWINGS - FIGURES

[0021] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate an embodiment of the **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES (SUPER UPT BLOCK SYSTEM)** that is preferred. The drawings together with the summary description given above and a detailed description given below serve to explain the principles of the **SUPER UPT BLOCK SYSTEM**. It is understood, however, that the **SUPER UPT BLOCK SYSTEM** is not limited to only the precise arrangements and instrumentalities shown.

[0022] **FIG. 1** shows a sketch of the configuration for a **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES;**
FIG. 2 shows a sketch of the configuration for a **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES** with the component features delineated;
FIGS. 3 are sketches of prior art for the heavy duty Unitized Post tension system of previous applications;
FIG. 4 is a general wall assembly of the **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES;**
FIGS. 5A to 5F are sketches of prototypes and of the components of the assembly of the **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES;**

FIGS. 6 are various configurations of the new **SUPER UPT BLOCK SYSTEM** with the post tensioned reinforcement and super heavy duty strength capabilities;

FIGS. 7A through 7D show the details of the main plate or anchor device complete with location markings for ease and speed of assembly;

FIGS. 8A through 8C are sketches of the grid alignment provided by the delineated and specially marked plates or anchors in the **SUPER UPT BLOCK SYSTEM**;

FIG. 9 is further details of the grid alignment plates for the **SUPER UPT BLOCK SYSTEM**;

FIGS. 10A through 10E provide prototype sketches of the **SUPER UPT BLOCK SYSTEM** with the strength plates in various horizontal configurations. FIG. 10F is a sketch of the **SUPER UPT BLOCK SYSTEM** used for a sign post installation;

FIGS. 11A through 11E provide prototype sketches of the **SUPER UPT BLOCK SYSTEM** with the strength plates in various vertical configurations;

FIG. 12 shows sketches of examples of the **SUPER UPT BLOCK SYSTEM** in various protective wall configurations;

FIGS. 13A through 13F show sketches of various reinforced columns and beams in typical structural systems which are potential applications for the **SUPER UPT BLOCK SYSTEM**;

FIGS. 14A through 14C show sketches of columns and beams for both new structures and examples of retrofitting deteriorating or damaged structures with the **SUPER UPT BLOCK SYSTEM**;

FIGS. 15A through 15E show various auxiliary connection means and auxiliary block configurations for the **SUPER UPT BLOCK SYSTEM**;

FIG. 16 shows a transition and comparison sketch for various shelters over the ages; and

FIG. 17 shows a comparison table of features and functions for various building systems used in modern times.

DESCRIPTION OF THE DRAWINGS - REFERENCE NUMERALS

- [0023]** The following list refers to the drawings:
- 48 hollow cavity in a CMU
 - 87 general parts for high strength (military defense or anti-terrorism) configuration of the **UNITIZED POST TENSION BLOCK SYSTEM**
 - 87A assembly of the high strength (military defense or anti-terrorism) configuration of the **UNITIZED POST TENSION BLOCK SYSTEM**
 - 88 full coverage CMU surface plate anchor for post tensioning
 - 89 high density CMU with relatively small cavity
 - 90 high strength tendons such as #5 or #8 grade steel or equal
 - 91 miscellaneous anchors for attachment to foundation or mounted structure
 - 98 through hole aperture in anchor(bar) for post tensioning
 - 99 threaded hole aperture in anchor(bar) for post Tensioning
 - 101 General high strength super block configuration
 - 101A Assembly of several high strength super block Configurations(CMU, Plate and Bolts)
 - 101B One-half block configuration(CMU, Plate and Bolts)
 - 102 Concrete Masonry unit with minimal cavity and maximum concrete
 - 102B One-half block configuration of Concrete Masonry unit with minimal cavity and maximum concrete
 - 103 Minimum cavity (duct)
 - 103A Minimum cavity (duct)essentially vertical

- 103B Minimum cavity (duct)essentially vertical
- 104 High Strength, corrosion resistant plate
- 104B High Strength, corrosion resistant plate for a
Half Block
- 105 High strength corrosion resistant fastening means
such as bolts or the like
- 106 Through hole
- 107 Threaded Hole
- 108 Means to turn the fastener such as a hex head or
the like
- 109 Tapered thread
- 110 Impact testing means
- 111 stack(soldier) bond
- 111A horizontal stack bond
- 112 running bond
- 113 miscellaneous random configuration
- 114 alignment demarcation means (paint, color coded or
other)
- 114B alignment demarcation means - geometric marks
- 115 match-up grid
- 116-1 Horizontal Plate - Zero Position
- 116-2 Horizontal Plate - 180 degree position
- 116-3 Horizontal Plate - Zero Flipped to reverse
- 116-4 Horizontal Plate - Flipped to reverse - 180 degree
position
- 116-5 Horizontal Plate - 270 degree position
- 116-6 Horizontal Plate - 90 degree position
- 116-7 Horizontal Plate - Flipped to reverse - 90 degree
position
- 116-8 Horizontal Plate - Flipped to reverse - 270 degree
position
- 117 aperture/opening between block
- 118 stack or soldier bond (vertical or horizontal
plates)

- 119 multiple (two or more) wall structures (vertical or horizontal plates)
- 120 filled wall structures (vertical or horizontal plates)
- 121 spaced wall structures (with open air between structures- vertical or horizontal plates)
- 122 structural beams (reinforced concrete or the like)
- 123 structural columns (reinforced concrete or the like)
- 123A Corroding reinforced concrete columns
- 123B Displaced reinforced concrete columns
- 124 Chart of shelter building types
- 125 Comparison Chart of modern building techniques
- 126 Fill material (indigenous stone, earthen materials, or the like)
- 127 Vertical plates - same as horizontal plates 116 as described above, including demarcations 114, 114B
- 128 tee plate structural member - two vertical plates 127 and one horizontal plate 116 configured and securely attached by a means (integral forming, welding or the like)
- 129 tee structural member which attaches to horizontal plates 116 and 127 by a secure means (removable - under bolts or fixed - welded or the like) means to attach the horizontal and vertical walls
- 130 ell or angle plate structural member - one vertical plate 127 and one horizontal plate 116 configured and securely attached by a means (integral forming, welding or the like)
- 131 ell or angle structural member which attaches to plates 116 and 127 by a means to secure the horizontal and vertical walls
- 132 Block with two way duct (103A and 103B in same block)

- 133 Structural member for vertical support - I beam, H beam, C channel, square, rectangular or round tubes, or the like - for use with embedded items such as, for example, sign posts
- 134 existing damaged or deteriorated column
- 135 existing beam
- 136 retrofitting **SUPER UPT BLOCK SYSTEM** column in a surrounding configuration
- 137 new **SUPER UPT BLOCK SYSTEM** column with an open center
- 137A new, smaller cross-section **SUPER UPT BLOCK SYSTEM** column with an open center
- 138 center area of a new **SUPER UPT BLOCK SYSTEM** column
- 139 new **SUPER UPT BLOCK SYSTEM** column with a solid center
- 139A new, smaller cross-section **SUPER UPT BLOCK SYSTEM** column with a solid center
- 140 soldier type **SUPER UPT BLOCK SYSTEM** beam
- 141 new **SUPER UPT BLOCK SYSTEM** structure with an open center

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

[0024] The present invention is a construction system called a **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES (SUPER UPT BLOCK SYSTEM 101)**.

This post tensioning system is comprised of only a few different types of components - masonry units (concrete masonry units) featuring hollow cores (small though cavities or ducts), a high strength fastener bolt (tendon) and a plate (anchor). The new features also teach a strong and durable full plate and bolt which may be treated for corrosion resistance. A super heavy duty hollow core block **102** (and others) in which the hollow cavity **103** is the duct, a series of tendons (such as a through bolt) **105**, and a plurality of

anchors (such as the a plate) **104** with some additional features. The system **101** is configured with the plurality of adjacent blocks **102** contiguous and touching one another and demountably coupled to each other by means of the tendons **105** and anchors **103**. This new coupling with **SUPER UPT BLOCK SYSTEM** results in a structure that is formed from a plurality of unitized, post tensioned concrete masonry units that collectively are far stronger than an ordinary block structure built with mortar and standard reinforcing. **SUPER UPT BLOCK SYSTEM** has more predictable and controlled strength to be overall a stronger system than most reinforced concrete systems. A person having ordinary skill in the field of construction, especially with reinforced concrete and masonry structures, appreciates the various parts that may be used to physically permit this **SUPER UPT BLOCK SYSTEM 101** to be produced and utilized. The improvement over the existing art provides a construction system that has many advantages and benefits as stated in the previous section entitled "Objects, Advantages, and Benefits", above. The advantage over the newer Bolt-A-Blok and UNITIZED POST TENSION BLOCK SYSTEM FOR MASONRY STRUCTURES includes the much higher strength capabilities for military, government and various structure such as bridges, dams levees and the like.

[0025] There is shown in FIGS. **1** through **17** a complete operative embodiment of the **SUPER UPT BLOCK SYSTEM 101**, prior art, and many uses and applications for the **SUPER UPT BLOCK SYSTEM**. In the drawings and illustrations, one notes well that drawings and sketches demonstrate the general configuration of this invention and its uses. The preferred embodiment of the system is comprised of only a few parts as shown. Various important features of these components are also delineated and are described below in appropriate detail for one that is skilled in the art to appreciate the

importance and functionality of the **SUPER UPT BLOCK SYSTEM 101**.

[0026] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the **SUPER UPT BLOCK SYSTEM 101** that are preferred. The drawings together with the summary description given above and a detailed description given below serve to explain the principles of the **SUPER UPT BLOCK SYSTEM 101**. It is understood, however, that the **SUPER UPT BLOCK SYSTEM 101** is not limited to only the precise arrangements and instrumentalities shown.

[0027] **FIG. 1** shows a sketch of the configuration for a **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES or SUPER UPT BLOCK SYSTEM 101**. The improved **SUPER UPT BLOCK SYSTEM 101** is comprised of masonry units **102** (concrete masonry units) featuring hollow cores (small though cavities or ducts) **103**, a high strength fastener bolt (tendon)**105** and a plate (anchor)**104**. The new features also teach that the plate **104** is strong and durable and the plate **103** and bolt **105** may be placed in various positions. Each (the plate **104** and bolt **105**) may be treated for corrosion resistance.

[0028] **FIG. 2** shows a sketch of the configuration for a **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES or SUPER UPT BLOCK SYSTEM 101** with the component features delineated. These SuperStrong Components include the SuperStrongBlokks **102**, SuperStrong Plates **104** and SuperStrong Bolts **105**. The overall configuration of the **SUPER UPT BLOCK SYSTEM 101** will also employ and utilize an occasional half block **102B** and half plate **104B** to complete the structure **101B**. In addition to the block **102** and half block **102B**, the plate configuration **104** also has features built in for connecting the bolt or tendon **105** to the plate or anchor **104**. The example employed is a through hole **106** and a

threaded hole 107. The bolt 105 passes through the open, non-threaded through hole 106, down through the cavity 103, and engages the lower plate 104 in the threaded aperture 107. One skilled in the art appreciates that there are many fastening means to equally accomplish this connection. However the open aperture 106 and the threaded aperture 107 in conjunction with the threaded through bolt 105 is the means of the preferred embodiment. These simple components are all that is needed to permit one to build the largest, strongest structure that one might visualize. These components, the SuperStrongBlok 102, SuperStrong Plates 104 and SuperStrong Bolts 105 are all Post-Tensioned, adding literally tons of extra strength to each unit. (Empirical tests may support this conclusion). As one visualizes the structure, the SuperStrong Components (102, 104, and 105) can be made in any relative size for the desired structure.

[0029] As an example, and not as a limitation, one might use a **SuperStrongBlok 102** whose outer dimensions are 7.625 x 7.625 x 15.25 inches. Importantly, the ratio of the dimensions is 1 x 1 x 2. This is different than a standard concrete block, which has a ratio of 1 x 1 x 2.05. Note the **SuperStrongBlok 102** is nearly solid, leaving only enough room for the tendons (bolts) 105 to go through the precast ducts (cores) 103. As a further explanation of the example (and not limiting the concept), the **SuperStrongBlok 102** could have a 12,000 PSI compressive strength (or more) of concrete. This would permit each **SuperStrongBlok 102** to support 1.4 million pounds because of the increased surface area over a similar standard concrete masonry unit. If needed, the 12,000 PSI strength could be controlled and confirmed by tests at the point of manufacturing in the block fabrication plant. The predictable strength of the concrete block in the **SUPER UPT BLOCK SYSTEM** is a significant advantage over reinforced concrete. Confirmation of the actual strengths may be made

through destructive or non-destructive tests of a sample of the blocks manufactured.

[0030] FIGS. 3 are sketches of prior art for the heavy duty Unitized Post tension system 87 of previous applications. It is a simple heavy duty option. The overall CMU 89 is still connected to anchor plates 88 and bolt/tendons 90 through the hollow cavities 48. The anchors 88 are full plates. This eliminates any gap as shown in the Bolt-A-Blok prior art. These plates 88 are made of metal such as steel. FIG. 3A shows a tendon 90 for each cavity that is connected to the plates 88 by the threaded apertures 98 in the plate 88. The unthreaded through hole 99 is the location to place the next tendon for connection to the lower plate. FIG. 3B shows that a plurality of tendons 90 may be used to create even greater post tensioning if desired. Additional tendons 90 require correspondingly additional apertures 98, 99 in the anchor plates 88. FIG. 3C shows an application for the heavy duty application 87A. In this example, a series of the heavy duty CMUs 89 are placed and assembled. However the anchors are now full surface plates 88. The tendons 90 are high strength through bolts or other strong, durable tendons. Also, the initial base anchors may be of various configurations 91 for attachment into a concrete pad, direct to compacted stone, or directly into the earth. These various configurations 91 may be of varying lengths to accommodate the construction needs.

[0031] FIG. 4 is a general wall assembly of the **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES 101A**. Here the wall configuration with the blocks 102 plates 104 are lineal and horizontal although it will be shown that the plates 104 and blocks 102 can be placed in virtually any direction. As described above, the configuration such as this example will use full blocks 102 and half blocks 102B as well as whole plates 104 and half plates 104B. In all cases the tendons or bolts 105 are

utilized as the preferred means to connect the plates (anchors) **104**, **104B** on each side of the blocks **102**, **102B**. This placement facilitates the post tensioning of the configuration **101A**. The final tensioning torque (and resulting pressure) may vary from application to application. Empirical testing will reveal the appropriate tensioning for the required application. For example, a common wall or blast barrier may perform best at on proscribed torque whereas a hurricane or seismic-resistant (earthquake) systems may require other sets of torques and resultant tensions. This is all well understood by those skilled in the art of structural systems and may be demonstrated and confirmed by a variety of empirical testing. The features of the open aperture **106** and the threaded aperture **107** are also shown in this figure. Finally, attachment anchors **91** are employed to attach the system **101A** to the supporting surface as described with the prior art in **FIG. 3**, above.

[0032] **FIGS. 5A to 5F** are sketches of prototypes and of the components of the assembly of the **SUPER UNITIZED POST TENSION BLOCK SYSTEM FOR HIGH STRENGTH MASONRY STRUCTURES (SUPER UPT BLOCK SYSTEM 101)**. The components of the **SUPER UPT BLOCK SYSTEM 101** are shown to complement the above **FIG. 4** as to how all the components are assembled together. The **SUPER UPT BLOCK SYSTEM 101A** is an integrated building system that uses just 3 parts - SuperStrong Components (**102**, **104**, and **105**). The uniquely shaped blocks **102** are designed to nest next to each other in any configuration and pattern, leaving no joining voids or gaps. Each full super block **102** has two core holes **103** to serve as ducts for the tendons **105**. **FIG. 5A** shows a SuperStrongBlok **102**. **FIG. 5B** show the SuperStrongBlok **102** with the ducts **103**. The SuperStrongBlok **102** potentially supports 1.4 Million Pounds. The SuperStrongBlok **102** prototype weighs only approximately 68 pounds. A Superblok **102** example would use a 3/8" thick

SuperStrongPlate **104** with outer dimensions are 7.5 x 7.5 inches. The example SuperStrongBolts **105** are 1/2 diameter x 8 1/2 inches long, 13 threads. This bolt **105** has a clamping capacity of about 13,000 pounds. The two bolts **105** together provide about 13 tons of Post-Tensioning. National Fine threads would be about 10% stronger, and of course larger bolts **105** could certainly be used for even more Unitized Post-Tensioning.

[0033] In **FIG. 5C**, the SuperStrongPlates **104** is shown. The through hole **106** and the threaded aperture **107** is also displayed. For coordinating and placing the plates **104** onto the configurations **101**, alignment demarcations **114** are shown. The method of use is described below. **FIG. 5D** shows several SuperStrongBolts **105**. **FIG. 5E** is a sketch of a super bolt **105** which has at one end a means to turn **108** and at the opposite end a tapered thread **109**. The taper **109** permits and improves the assembly process by locating the through bolt **105** into the threaded aperture **107**.

[0034] Protecting SuperStrong plates **104** and bolts **105** from the elements may be important. The Bolt-A-Blok standard bars, touchr bars, and bolts, are normally protected from the elements by being contained within the wall or structure. In the SuperStrong Blok assembly **101A**, the plates **104** and bolts **105** may be exposed to the elements and may need to be protected from rusting and other corrosion. There are several ways to protect the bolts **105** and plates **104**. For example, the bolts **105** may be zinc chromated (preferred). The plates **104** can be zinc chromated, galvanized, or painted with one of more than a hundred rust inhibiting paints. Another choice may be to use self limiting rusting steel such as Cor-Ten™, manufactured by US Steel. One skilled in the art of plates and fasteners well appreciates that stainless steel or high strength composite materials could be used for the bolts and plates. Finally, in **FIG. 5F**, a simple impact test using a

Sledge Hammer or impact testing means **110** is demonstrated. The **SUPER UPT BLOCK SYSTEM 101** resists the effects of the block **102** fragmenting from detonation or explosions near or at the surface of the face of the block **102**.

[0035] **FIGS. 6** are various configurations of the new **SUPER UPT BLOCK SYSTEM 101** with the post tensioned reinforcement and super heavy duty strength capabilities. Typical block patterns may be: horizontal running bond, vertical running bond, stack bond, soldiers course bond, and herringbone both horizontal and vertical. In **FIG. 6A** a Stack Bond **111** is shown with the block **102** and the plates **104**. In **FIG. 6B** a SuperStrongBlok bridge assembly or horizontal stack assembly **111A** is demonstrated. The blocks **102** are bolted together with tons of pressure. At the same time, the blocks **102** are being post-tensioned by the plates **104** and bolts **105**, further increasing the strength of the block. The blocks are bolted together into one solid mass of concrete and steel - becoming essentially a monolith. The wall is instantly at full strength since there is no "wait" time for the mortar (block and mortar) or concrete (reinforced cast in place concrete) to cure. It may be manufactured so that typical concrete block strength is twice the strength of cast in place, reinforced concrete. **FIG. 6C** shows a Running Bond **112**. For these types of pier and wall configurations, the structure can have any thicknesses and can be built in all three directional planes. Any configuration may have pockets or recesses of any desired shape. The configurations can include beams, columns and cantilevered structures as desired for a plethora of applications in various structures in building and construction. The three dimensional variations is exemplified in the random configuration **113** in **FIG. 6D**.

[0036] **FIGS. 7A** through **7D** show the details of the main plate or anchor device **104** complete with location markings **114** for ease and speed of assembly. Also shown are the through

holes **106** and threaded holes **107** for each plate **104**. Of note is that the plates **104** are in a perfect, multiple ratio of 2 to 1 (width to length). This is a precise and calculated ratio to coordinate and complement the block ratios of 1:1:2 as for width: height: and length. Note here that the half blocks **102B** are 1:1:1 ratios to supplement the assembly configuration and process. As shown in the Figures below, the demarcations (color **114** or geometric **114B**) are aligned, and the entire structure **101** fits and aligns properly. Whether using the geometric **114B** or color coded **114**, the alignment demarcations provide a significant alignment method for the **SUPER UPT BLOCK SYSTEM 101**.

[0037] Each preferred plate has four holes (**106,107**) for tendons, in a special 45 degree angle pattern. All holes must be in correct alignment for connecting and also to attain Unitized Post Tensioning. The hole configurations are designed so that connecting and aligning can be achieved by positioning the plate in any of 8 positions (**FIGS. 8 and 9**). Since the pattern and system is complex, a person assembling the system would have difficulty assembling the plates in proper order. Therefore the **SUPER UPT BLOCK SYSTEM 101** includes a specially conceived and developed demarcations **114**, **114B** that makes it immediately apparent how to assemble the plate pattern and layout. This color coded system is apparent in the sketches.

[0038] **FIGS. 8A** through **8 C** are sketches of the grid alignment provided by the delineated and specially marked plates or anchors in the **SUPER UPT BLOCK SYSTEM 101**. The plates have specific colored marks **114** and/or geometric marks **114B** that permit the plates **104** to be placed precisely and quickly on the blocks **102** of the **SUPER UPT BLOCK SYSTEM 101**. The aligned plates **115** create a carpet of steel plates wherein the Carpet colors match for perfect hole **106**, **107** alignments. The though holes **106** and the threaded holes **107** are on a

perfect 45 degree position and each set is opposite of the adjacent set (see the illustration). The Carpet connector pattern, angle holes (4 holes - 2 threaded, 2 smooth) Half plates **102B**, etc. permit the configuration shown in **FIG. 8**. In the operation discussion below, the **FIG. 9** is described for the match-up grid **115**. The individual configurations **116-1** through **116-8** show the various angular positions afforded by the special demarked **114** plates **104** on the alignment grid **115**.

[0039] **FIGS 10 A** through **10 E** provide prototype sketches of the **SUPER UPT BLOCK SYSTEM 101** with the strength plates **104** in various horizontal configurations. In these sketches, one should note the plate **104** patterns and markings **114**. The high strength bolts **105** of the **SUPER UPT BLOCK SYSTEM 101** are designed to connect it all together with high strength and Post Tensioning. These sketches are various views Looking down on a pier or base configuration of the **SUPER UPT BLOCK SYSTEM 101** with the plates **104** in a horizontal position. The various views show the interconnection of full **SUPER UPT BLOCK SYSTEM 101** and half block assemblies **101B** to complete the configurations. One also notes how in each case for each layer of the contiguous block, the demarcations **114** on the plates **104** "match-up" to the contiguous plate of the system.

[0040] Added explanations for the Block and Plate patterns shown in **FIGS. 10A** through **10E** include the description of the three level pier with SuperStrongBlok. A hand wrench, an air impact wrench or a battery powered impact wrench could be used for assembly. One may note the battery powered impact wrench in **FIG. 10D**. The plates and blocks can be placed in any direction. The demarked **114** plates are designed to fit together in a "carpet" (horizontal) or "wallpaper" (vertical) configuration or shape. The patterns of the blocks and the patterns of each layer or level of the steel do not have to be concurrent. In fact, for highest strength, the patterns should be different for different layers.

[0041] FIG. 10F is a sketch of the **SUPER UPT BLOCK SYSTEM 101** used for a sign post or similar installations. The block system **101** is built in a configuration to leave an aperture or opening **117** interior to the total configuration. This permits a structural member **133** to be placed interior and secured by some means such as grout or concrete. The grout would be fast drying and high strength to permit immediate use of the sign post or other such device.

[0042] FIGS 11 A through 11 E provide prototype sketches of the **SUPER UPT BLOCK SYSTEM** with the strength plates in various vertical configurations. In these sketches, the wall configurations have the vertical plates **127**. Plates and blocks can be placed in any direction. A single block thickness of a wall with vertical plates contains 3/4 inches of steel plus a **SuperStrongBlok**. In this configuration the steel may easily be positioned to limit flying debris from an explosive event and also to limit damage in the event of a light arms fire strike. This configuration limits fragmentation of the materials and protects nearby personnel, materials or equipment.

[0043] FIGS. 12, 13 and 14 show applications of the **SUPER UPT BLOCK SYSTEM 101** and are described in the operations, below.

[0044] FIGS. 15A through 15E show various auxiliary connection means and auxiliary block configurations for the **SUPER UPT BLOCK SYSTEM 101**. In FIGS. 15A and 15C, full block systems **101** and half block systems **101B** have blocks that are molded and cast with right angle holes **103A** and **103B** so bolts go two ways. This permits horizontal and vertical sections of **SUPER UPT BLOCK SYSTEM 101** to be fastened to each other and for configurations to "change planes". A Section View FIG. 15B shows the two ducts **103A** and **103B** in the same block. While this will take special manufacturing techniques and possibly secondary operations, this configuration with perpendicular ducts is anticipated. In FIGS. 15D and 15E,

more traditional joining methods are shown. The horizontal plates 116 and vertical plates 127 are on typical **SUPER UPT BLOCK SYSTEMS 101**. Full plates (116, 127) may be fastened together or configured as a full coverage ell device 130 or shorter legged ells 131 may be placed and fastened to the plates 116 and 127 at their respective joining planes. Likewise **FIG. 15E** demonstrates that full plates 116 and 127 might be configured into full tees 128 or shorter legged tees 129 for joining the horizontal and vertical members of the **SUPER UPT BLOCK SYSTEMS 101**.

[0045] **FIG. 16** shows a transition and comparison sketch for various shelters over the ages. In the chart 124, the various types of shelters and buildings are compared. The high strength **SUPER UPT BLOCK SYSTEMS 101** show the marked change and superiority over the tents, wood, block and even reinforced concrete systems. The reinforced system is overcome since the **SUPER UPT BLOCK SYSTEMS 101** utilized unitized post tensioning of a steel network and predictable, controllable batches of concrete when the blocks are produced. The additional steel and concrete combined also is superior to pre-cast walls (not shown in the table) due to the steel reinforcing web. Plus, the **SUPER UPT BLOCK SYSTEMS 101** need not have special lifting equipment required for setting pre-cast configurations. The **SUPER UPT BLOCK SYSTEMS 101** can be done one unit at a time. One skilled in the art knows that obviously, if desired, the **SUPER UPT BLOCK SYSTEMS 101** can conceivably be made in large sections and then transported and set in place similar to pre-cast.

[0046] **FIG. 17** shows a comparison table 125 of features and functions for various building systems used in modern times. The chart is self explained and easy to empirically confirm. However, a skilled build or structural engineer realizes that features and functionality of the **SUPER UPT BLOCK SYSTEMS 101** over other systems is also largely intuitive.

[0047] For the overall **SUPER UPT BLOCK SYSTEMS 101**, there are several ways to Strengthen the SuperStrongBlok or Military blocks. One skilled in construction techniques appreciates that tendons (bolts) **105** could be added [a plurality of bolts **105** in a single cavity or duct **103**]. This would mean that additional apertures **106**, **107** would be needed in the plates **104**. For the plates **104**, one could specify and use cold roll or other stronger alloys. For the bolt **105** and plate **104** connection, the threaded connection might be with SAE Nat'l Fine threads to add for example as much as 10% strength or weld a nut on the plate for added strength or even specify thicker plates. A slightly smaller block core **103** is possible. And as one versed in concrete appreciates, use of stronger concrete mix (aggregate type and cement concentration) will result in a stronger system.

[0048] For the overall **SUPER UPT BLOCK SYSTEMS 101**, there are also several materials and featured structural configurations that may feasibly be used to manufacture the plates/anchors **104** and the bolt/tendons **105**. Various metals, alloys, composite materials and the like are being improved and invented on a continual basis. Various fasteners and connection devices and means may be use to interconnect the **SUPER UPT BLOCK SYSTEMS 101**. Clearly the preferred embodiment is the steel plates **104** and threaded bolt **105** for the anchors and tendons. However, alternative materials and means to connect are within the scope and spirit demonstrate herein for the **SUPER UPT BLOCK SYSTEMS 101**.

[0049] The details mentioned here are exemplary and not limiting. **SUPER UPT BLOCK SYSTEMS 101** may have SuperStrongBlok that are made in various sizes and thicknesses. Any desired combination, shape or pattern can be assembled. Also, well appreciated by one skilled in the art of construction materials, all the examples of the materials

may be substituted with other plastics and composite materials that have similar properties and still be within the scope and spirit of this **SUPER UPT BLOCK SYSTEM 101**. Other components specific to describing a **SUPER UPT BLOCK SYSTEM 101** may be added as a person having ordinary skill in the field of construction as being obvious from the above described embodiment.

OPERATION OF THE PREFERRED EMBODIMENT

[0050] The new **SUPER UPT BLOCK SYSTEM 101** has been described in the above embodiment. The manner of how the device operates is described below. One notes well that the description above and the operation described here must be taken together to fully illustrate the concept of the **SUPER UPT BLOCK SYSTEM 101**.

[0051] **FIGS. 7, 8 and 9** are further details of the grid alignment plates **115** for the **SUPER UPT BLOCK SYSTEM 101**. **FIG. 7** shows the plates have specific colored marks **114** and/or geometric marks **114B** that permit the plates **104** to be placed precisely and quickly on the blocks **102** of the **SUPER UPT BLOCK SYSTEM 101**. The various alignments are shown in **FIGS. 8 and 9** by the sketches **116-1** through **116-8**. These eight (8) configurations coupled with the demarcations **114**, permit one to build quickly and precisely since the hole alignment with the threads of the bolt **105** into the plates **104** are "automatically provided". **FIG. 9** is a group of sketches that further details the match-up grid **115** alignment of the plates for the **SUPER UPT BLOCK SYSTEM 101**. The individual configurations **116-1** through **116-8** show the various angular positions afforded by the special demarked **114** plates **104** on the alignment grid **115**. The aligned plates **115** create a "carpet of steel plates" wherein the Carpet colors match for perfect hole **106**, **107** alignment. The though holes **106** and the threaded holes **107** are on a perfect 45 degree position and

each set is opposite of the adjacent set (see the illustration). The Carpet connector pattern, angle holes (4 holes - 2 threaded, 2 smooth), half plates 102B, etc. permit the configurations shown in **FIGS 10 A** through **10 E** prototype sketches of the **SUPER UPT BLOCK SYSTEM 101**. This same match-up system permits the **SUPER UPT BLOCK SYSTEM 101** to be configured in an operation with vertical plates 104. These configurations are shown in **FIGS 11 A** through **11 E** prototype sketches of the **SUPER UPT BLOCK SYSTEM** with the strength plates in various vertical configurations.

[0052] **FIG. 12** shows sketches of various examples of the **SUPER UPT BLOCK SYSTEM 101** in protective or strong wall configurations. A standard configuration is a running bond 101A. A soldier bond 118 stacks the block vertically but the plates 104 may be used to easily tie the contiguous block together. Dual running walls 119 may be configured with the single walls 101A contiguous and virtually touching. These same single walls 101A may be separated and have end walls 120. This configuration may be left open interiorly or filled with material 126. Multiple walls 121 would include two or more single walls 101A. These might be built along a specified perimeter or even along a boundary or border. There "plurality" of walls are separated by an open area. **FIGS 13** and **14** show additional operation.

[0053] **FIGS 13 A** through **13 F** show sketches of various reinforced columns and beams in typical structural systems which are potential applications for the **SUPER UPT BLOCK SYSTEM**. In **FIGS. 13A** and **13B**, a horizontal beam structure 122, such as for bridges, over passes and the like, is supported by a vertical column structure 123. **FIGS. 13C** through **13F** show beams and columns that have deteriorated through corrosion or other outside forces. The deteriorated beam structures 122A and the deteriorated columns 123A pose undefined risks since the extent of deterioration and

remaining structural strength is unknown. This causes original designs to have higher safety factors built-in. This drives construction costs higher due to added materials, labor and time. Structures **122A** and **122B** are often condemned and removed due to the unknown structural condition and fear for public safety. **SUPER UPT BLOCK SYSTEMS 101** can help address this as shown below.

[0054] **FIGS. 14A** through **14C** show sketches of columns and beams for both new structures and examples of retrofitting deteriorating or damaged structures, as just described above, with the **SUPER UPT BLOCK SYSTEM 101**. The **SUPER UPT BLOCK SYSTEM** provides great support for a new or retrofitted structure. To support the weight of a dam, pier, or building, the weight must be spread over a large area. The **SUPER UPT BLOCK SYSTEM** is specially designed with a completely level and flat bottom. In addition, all blocks are locked together to essentially form a monolith. As an example, the prototype **SuperStrongBlok** has 120 square inches of flat surface - nearly a square foot. To continue an example, for soil that is load-rated at 4,000 pounds for each square foot, then each **SuperStrongBlok** would support 3,333 pounds of weight ($4000 \times 83\%$). If the structure's base had 300 **SuperStrongBlocs**, then the structure would support one million pounds, which is 500 Tons. This example shows that the load bearing capacity of **SUPER UPT BLOCK SYSTEMS 101** with **SuperStrongBlocs** is extremely high.

[0055] Specifically in **FIGS. 14A** through **14C** there are examples of uses for the new and retrofitted columns and beams. **FIG. 14A** shows a small cross-section of a **SUPER UPT BLOCK SYSTEM 101** that uses one and one-half blocks per side. This smaller column **137A, 139A** has a center that is either open [column **137A**] (the opening may be for a chase or other uses) or filled [column **139A**], with block or other material **138**. The **SUPER UPT BLOCK SYSTEM 101** is still used as the base system

and method of construction. The top structure might be another **SUPER UPT BLOCK SYSTEM** such as a soldier stack 140 or other horizontal structural members supported by the column 137A, 139A. FIG. 14B shows a larger cross-section of a **SUPER UPT BLOCK SYSTEM** 101 that uses a plurality of blocks per side. This column 137,139 has a center that is either open [column 137] (the opening may be for other structural members, a chase or other fillings 138 uses) or block filled [column 139]. The **SUPER UPT BLOCK SYSTEM** 101 is still used as the base system and method of larger structures in construction. The top structure might be another **SUPER UPT BLOCK SYSTEM** such as a horizontal structural beam or the like supported by the column 137,139. FIG. 14C shows a simple retrofit of a deteriorated column 134 with a surrounding configuration by the **SUPER UPT BLOCK SYSTEM** 101. Here the **SUPER UPT BLOCK SYSTEM** encircles the deteriorated member 134 and gives new strength to the overall structure. Near the horizontal beam or structure 135 there would be a means to connect or support from the new, revitalized vertical structure to the horizontal structure 135. There are many means to interconnect or have a movable (rolling, sliding, or the like) support from the retrofitted vertical structure and the horizontal structure being supported. Each application may be very specific to the retrofitted structure, yet the use of the **SUPER UPT BLOCK SYSTEM** still applies.

[0056] TABLE D - A FEW EXAMPLES OF SPECIAL USES for SUPER UPT BLOCK SYSTEMS - as New or Retrofit Construction

ITEM	DESCRIPTION
1	piers
2	dams
3	floors
4	walls
5	double walls
6	levees
7	tower bases
8	barricades
9	vehicle control points
10	anti-terror barricades at public buildings
11	armories
12	bridge piers
13	border patrol facilities
14	protection of cargo and flammable tanks
15	buildings that need to be quickly moved
17	Safe rooms
18	Retaining walls
19	Earthquake and/or hurricane prevention
20	Structural columns and beams
21	

[0057] With this description of the detailed parts and operation it is to be understood that the **SUPER UPT BLOCK SYSTEM 101** is not to be limited to the disclosed embodiment. The features of the **SUPER UPT BLOCK SYSTEM 101** are intended to cover various modifications and equivalent arrangements included within the spirit and scope of the description.

CLAIMS

What is claimed is:

1. A system for a high strength masonry structure with post tensioning reinforcement, the system comprising:

a first masonry unit, the first masonry unit being made of concrete and comprising:

a first masonry longitudinal length,

a first masonry width measured perpendicularly to the first masonry longitudinal length, wherein the first masonry width is substantially uniform along the first masonry longitudinal length,

a first top surface, the first top surface being substantially planar,

a first bottom surface, the first bottom surface being substantially planar,

a first masonry height measured between the first top and first bottom surfaces, the first masonry height being substantially uniform along the first masonry longitudinal length, and

a first through-cavity and a second through-cavity formed through the first masonry unit from the first top surface to the first bottom surface;

a second masonry unit substantially the same as the first masonry unit, the second masonry unit comprising:

a second masonry longitudinal length substantially the same as the first masonry longitudinal length,

a second masonry width substantially the same as the
first masonry width,
a second top surface being substantially planar,
a second bottom surface being substantially planar,
a second masonry height substantially the same as
the first masonry height, and
a third through-cavity and a fourth through-cavity
formed through the second masonry unit from the
second top surface to the second bottom
surface;

an anchor plate, the anchor plate comprising:

an anchor plate length substantially the same as the
first masonry longitudinal length,
an anchor plate width substantially the same as the
first masonry width,
a first set of apertures, the first set of apertures
comprising a first non-threaded aperture and a
first threaded aperture,
a second set of apertures, the second set of
apertures comprising a second non-threaded
aperture that is substantially the same as the
first non-threaded aperture, and a second
threaded aperture that is substantially the
same as the first threaded aperture,
wherein the first set of apertures is aligned with
the first through-cavity and the second set of
apertures is aligned with the second through-
cavity when the anchor plate is placed onto the
first top surface, and wherein the first set of
apertures is aligned with the second through-
cavity and the second set of apertures is
aligned with the third through-cavity when the

first and second masonry units are positioned abutting one another and aligned along their respective longitudinal lengths and the anchor plate is placed onto the first and second top surfaces;

a fastener, the fastener comprising:

a first fastener end and a second fastener end,
a head portion at the first fastener end,
a stem portion rigidly affixed to the head portion,
the stem portion comprising a threaded portion
at the second fastener end, wherein an overall
length of the stem portion is greater than the
first masonry height,
wherein the head portion does not fit through the
first non-threaded aperture,
wherein the stem portion slides freely through the
first non-threaded aperture, and
wherein the threaded portion is configured to
threadably engage the first threaded aperture.

2. The system of claim 1, wherein the anchor plate is a first anchor plate, the system further comprising:

a second anchor plate substantially identical to the first anchor plate;

the first masonry unit stacked on the second anchor plate such that the first bottom surface abuts the second anchor plate, the first anchor plate stacked on the first top surface, the stem portion extending through the second non-threaded aperture of the first anchor plate, through the second through-

cavity, and threadably engaged with the first non-threaded aperture of the second anchor plate, such that tightening the fastener compresses the first masonry unit between the first and second anchor plates.

3. The system of claim 2, wherein the second anchor plate is offset from the first anchor plate along the first masonry longitudinal length by a distance that is substantially half of the first masonry longitudinal length.

4. The system of claim 1, wherein the anchor plate comprises a top plate surface and a bottom plate surface, and wherein the top plate surface comprises a marking to visually distinguish the top plate surface from the bottom plate surface.

5. The system of claim 1, wherein the anchor plate comprises a top plate surface and a bottom plate surface, and wherein the bottom plate surface comprises a marking to visually distinguish the top plate surface from the bottom plate surface.

6. The system of claim 4, wherein the anchor plate is rectangular and the first masonry longitudinal length is twice the first masonry width.

7. The system of claim 6, wherein a line intersecting:
a) a longest edge of the top plate surface at a forty-five degree angle, and
b) a corner of the top plate surface
also intersects the first threaded aperture and the first non-threaded aperture.

8 The system of claim 7, wherein the longest edge is a first edge, wherein one of the first threaded aperture and the first non-threaded aperture is located closer to the first edge, and wherein the top plate surface includes additional marking to visually distinguish the first edge from a second edge opposite the first edge.

9. The system of claim 8, wherein the bottom plate surface includes the additional marking to visually distinguish the first edge from the second edge.

10. The system of claim 1, wherein the anchor plate includes a top plate surface, a bottom plate surface, a first edge, and a second edge opposite the first edge, and wherein the anchor plate includes a marking to visually distinguish the top plate surface from the bottom plate surface and the first edge from the second edge to facilitate proper placement of the anchor plate.

11. The system of claim 10, wherein the anchor plate is one of a multiplicity of plates, wherein each of the multiplicity of plates is substantially the same as the anchor plate, wherein each of the multiplicity of plates includes the marking, and wherein the marking forms a pattern among the multiplicity of plates when each of the multiplicity of plates is properly oriented and positioned for installation.

12. The system of claim 1, wherein the fastener is comprised of a material selected from the group consisting of: metal alloy, steel, stainless steel, and composite.

13. The system of claim 1, wherein the anchor plate is comprised of a material selected from the group consisting of: metal alloy, steel, stainless steel, and composite.

14. The system of claim 1, wherein the fastener is coated.

15. The system of claim 1, wherein the anchor plate is coated.

16. The system of claim 1, wherein the anchor plate is a first anchor plate, the system further comprising a second anchor plate, the second anchor plate comprising two anchor plates substantially the same as the first anchor plate and joined along their long edges at a substantially ninety degree angle.

17. The system of claim 1, wherein the anchor plate is a first anchor plate, the system further comprising a second anchor plate, the second anchor plate comprising three anchor plates substantially the same as the first anchor plate and joined along their long edges at substantially ninety degree angles, such that the second anchor plate has a T-shaped cross section.

18. A system for constructing masonry structures, the system comprising:

a masonry unit having a top surface, a bottom surface, a first cavity formed between the top surface and the bottom surface, and a second cavity formed between the top surface and the bottom surface, wherein the top surface has a surface width and a surface length;

a first plate having a first threaded aperture, a first other aperture, a second threaded aperture, and a second other aperture, the first plate configured

for placement against the top surface, wherein the first plate has a first plate width substantially the same as the surface width and a first plate length substantially the same as the surface length, and wherein when an outer perimeter of the first plate is aligned with an outer perimeter of the top surface and the first plate is placed against the top surface, the first threaded aperture and the first other aperture are aligned with the first cavity and the second threaded aperture and the second other aperture are aligned with the second cavity;

a second plate having a third threaded aperture, a third other aperture, a fourth threaded aperture, and a fourth other aperture, the second plate configured for placement against the bottom surface, wherein the second plate has substantially the same dimensions, shape, and aperture locations as the first plate;

a first fastener bolt comprised of a head portion and a stem portion, the head portion rigidly and integrally affixed to the stem portion, the stem portion comprising a threaded end, the first fastener bolt configured for insertion by the threaded end through the first other aperture, through the first cavity, and into threadable engagement with the third threaded aperture; and

a second fastener bolt comprised of a head portion and a stem portion, the head portion rigidly and integrally affixed to the stem portion, the stem portion comprising a threaded end, the second

fastener bolt configured for insertion by the threaded end through the second other aperture, through the second cavity, and into threadable engagement with the fourth threaded aperture,

wherein the stem portion of the first fastener bolt spans an entire height of the first cavity when the first fastener bolt is inserted through the first other aperture, through the first cavity, and into threadable engagement with the third threaded aperture, and

wherein the stem portion of the second fastener bolt spans an entire height of the second cavity when the second fastener bolt is inserted through the second other aperture, through the second cavity, and into threadable engagement with the fourth threaded aperture.

19. The system of claim 18, wherein when the first fastener bolt is inserted through the first other aperture, through the first cavity, and into threadable engagement with the third threaded aperture, tightening the first fastener bolt into the third threaded aperture applies a compression force against the masonry unit between the first plate and the second plate.

20. The system of claim 18, wherein the first and second fastener bolts are comprised of a material selected from the group consisting of: metal alloy, steel, stainless steel, and composite.

21. The system of claim 18, wherein the first and second plates are comprised of a material selected from the group

consisting of: metal alloy, steel, stainless steel, and composite.

22. The system of claim 18, wherein the first and second fastener bolts are coated.

23. The system of claim 18, wherein the first and second plates are coated.

24. The system of claim 18, wherein the first plate includes a top plate surface and a bottom plate surface, and wherein the top plate surface includes a marking to visually distinguish the top plate surface from the bottom plate surface.

25. The system of claim 24, wherein the first plate is rectangular and the first plate length is twice the first plate width.

26. The system of claim 25, wherein a line intersecting:
a) a longest edge of the top plate surface at a forty-five degree angle, and
b) a corner of the top plate surface
also intersects the first threaded aperture and the first other aperture.

27. The system of claim 26, wherein the longest edge is a first edge, wherein one of the first threaded aperture and the first other aperture is located closer to the first edge, and wherein the top plate surface includes additional marking to visually distinguish the first edge from a second edge opposite the first edge.

28. The system of claim 27, wherein the bottom plate surface includes the additional marking to visually distinguish the first edge from the second edge.

29. The system of claim 18, wherein the first plate includes a top plate surface, a bottom plate surface, a first edge, and a second edge opposite the first edge, and wherein the first plate includes a marking to visually distinguish the top plate surface from the bottom plate surface and the first edge from the second edge to facilitate proper placement of the first plate.

30. The system of claim 29, wherein the first and second plates are two of a multiplicity of plates, wherein each of the multiplicity of plates includes the marking, and wherein the marking forms a pattern among the multiplicity of plates when each of the multiplicity of plates is properly oriented and positioned for installation.