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THE "CASL" SYSTEM

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Abstract

The CASL, [1] is an earthquake proof structural column for buildings. The CASL or Columnic Actuated Spring Loader promotes the safe occupancy of buildings and promotes the non – destruction of the buildings themselves. Evidence of seismic destruction around the world are proof of what earthquakes can do.

New theory on seismic design emphasizes that increased vibration leads to less acceleration and stepping of the structure. In turn this leads to less damage and destruction from the resultant forces of the earthquake. Byssus steel cables at the base of the CASL anchor the structure to the ground and its surroundings.

Earthquakes are the result of natural, tectonic changes in the solid crust of the earth and as such are not inherently catastrophic. Their bad reputation comes from the destruction to human settlements that accompany them, when buildings collapse under the stress of forces produced by earthquakes. This destruction is not the fault of earthquakes, but rather of the buildings, which, even in regions regularly visited by earthquakes are not designed to work harmoniously with the violent forces periodically released.

Vertical rods and diagonal bracing anchor springs situated along the length of the vertical axis of the column. Beams bear on wooden slip plates which act to pass the vertical forces of the beam to the steel springs. Wooden supports held in place by diagonal steel bracing support the springs on 2 vertical rods.

The base is made from steel and comprises an abstract shape of the bivalve mollusk. Strategically placed byssus thread steel cables reach upward from the horizontal rod. Each cable has an attachment CAM which can be used to anchor to a wall, ceiling, or horizontal surface.

Wooden arms at the base horizontal rod hold the steel cables in place before the steel rods bend vertical at each side of the base to the top of the column.

The CASL has higher ductility and would perform better than less ductile systems during an earthquake. The building codes characterize different lateral force resisting systems by their ability to yield, deform, and absorb energy under load. The ductility factor or "R" factor, is critical in determining design loads and in understanding the response a structure may go through during ground shaking.

The CASL System adheres to current seismological architectural – structural thinking and would ultimately save lives and buildings in the event of a major earthquake in urban regions of the world.

1. Introduction

Wooden arms at the base horizontal rod hold the steel cables in place before the steel rods bend vertical at each side of the base to the top of the column. Wooden plate vertebrae anchor the building façade in a flexible position. Structural beams or supports can be placed at intermediate or lower wooden plates providing for a more expressive structure. The first top plate sits on springs allowing the 3 steel rods to penetrate and extend through the plate projecting above the surface into the floor joist cavity.

The human spine as shown in reveals a triangular division of vertical cylindrical penetrations that proceed to rise upwardly. The CASL System contains wood plate vertebrae that flex with the springs containing the forces of the earthquake from the beam. The wood plates act to stiffen the vertical structure and prevent collapse.

Attendees perspectives will be challenged by questioning the presenters claims and learning from the presentation. Philosophy of ecology and evolution are part of the ideas presented. A Case Study as in by means of an absorptive assembly of components would resolve the breakage of the structure.

The application of the CASL System is varied and can be used for low or high – rise developments. The project could be residential, commercial, retail, hospitality, or hospital.

Limitations of the CASL System involve the need for expansive adjacency of neighboring structures. Since the CASL flexes dimensionally a buffer zone would need to be resolved for the building envelope to avoid knocking.

New theory on seismic design emphasizes that increased vibration leads to less acceleration and stepping of the structure. In turn this leads to less damage and destruction from the resultant forces of the earthquake. Byssus steel cables (Fig.1) at the base of the CASL anchor the structure to the ground and its surroundings.

Fig.1 - Mussel

Fig.2 - Lobster

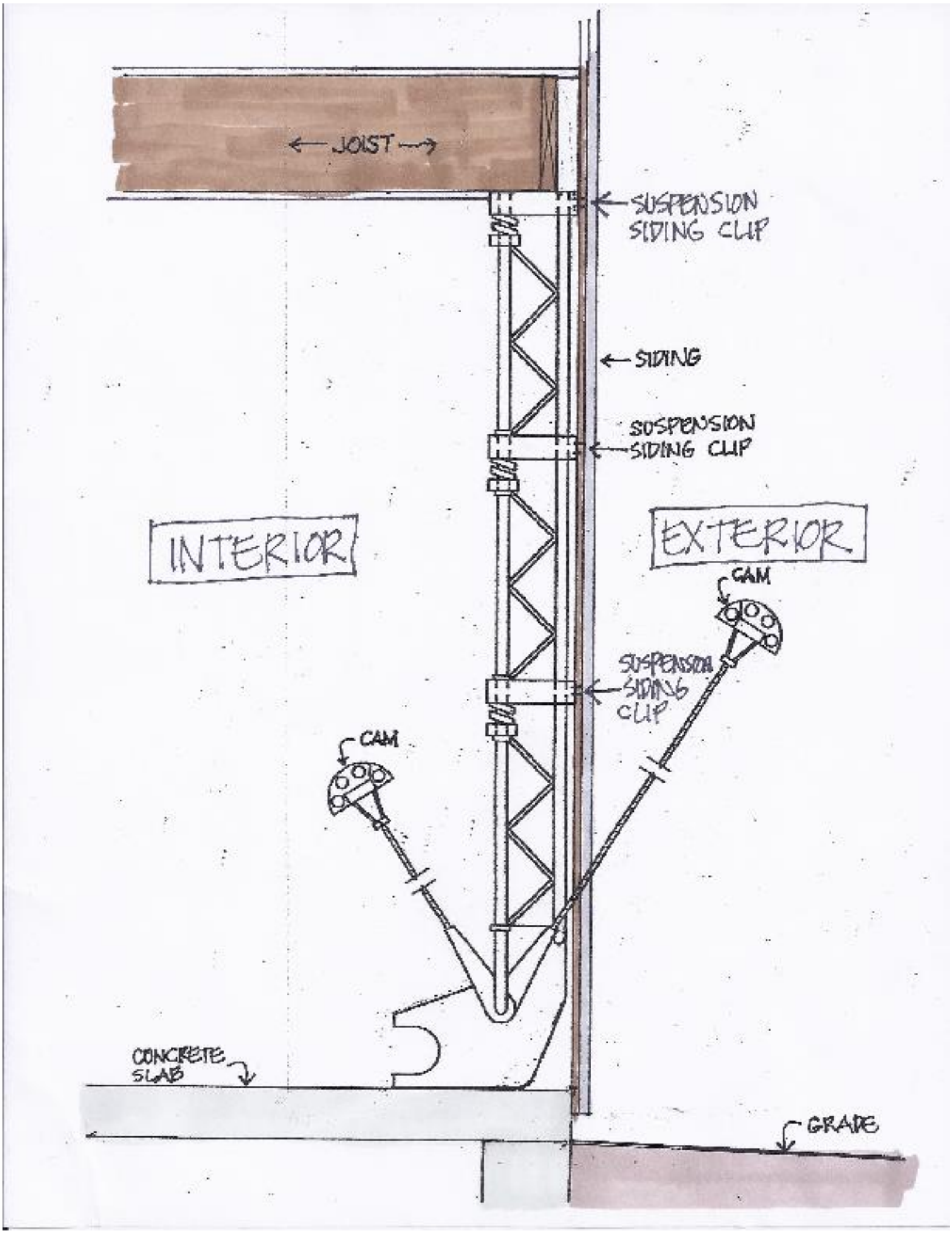

Fig.3 – Integrated CASL Building System

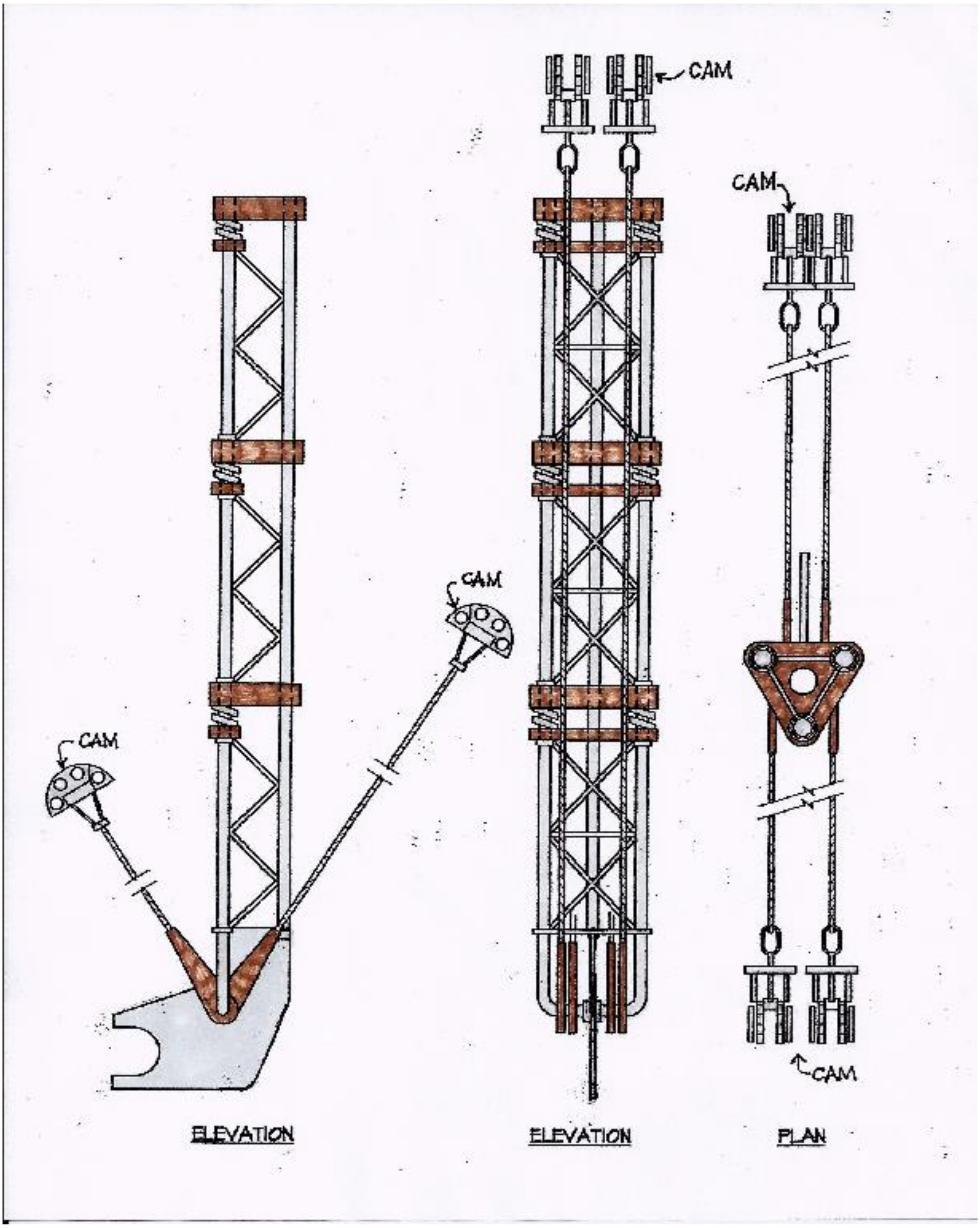

Fig.4 – CASL Elevation & Plan

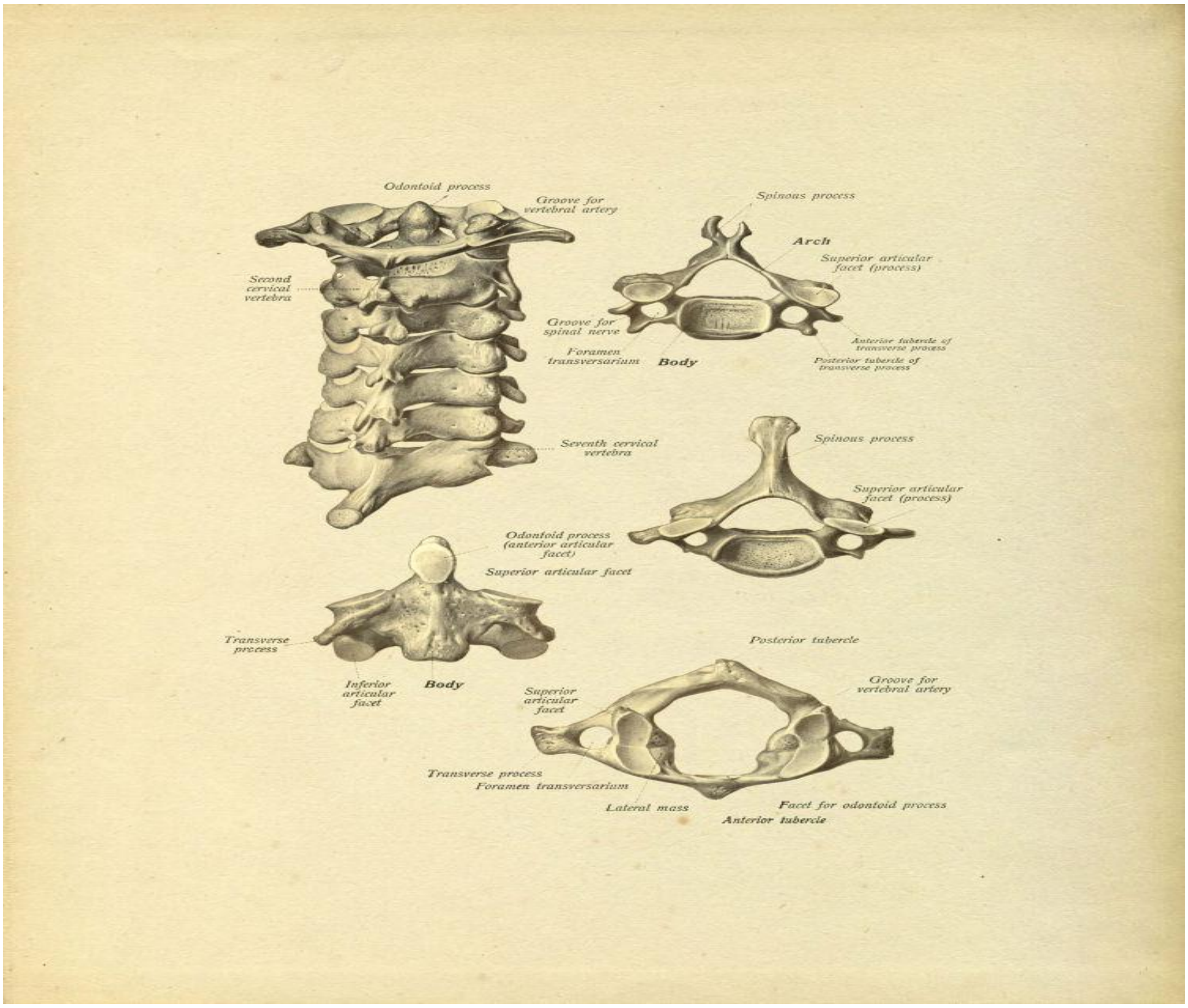

Fig.5 – Vertebrae

Fig.6 – Chilean Earthquake Damage

3. Conclusion

The significance of this research shows that in current seismic building design circles the creation of solutions for building collapse and loss of life must be re-evaluated. Current solutions such as rigid connections and fixed in place framing do not work and a high performance solution such as the CASL are needed.

Present day society no matter what city you live in races out to nature on the weekends after their busy life during the week in the concrete jungle. This is done to satiate the human inner working of when we once lived in an organic environment.

The CASL System challenges the current status quo by visualizing and showing that architecture and structure can be combined for a single aesthetic look, living more harmoniously with nature.

4. References

[1] McDermott, D. *Washington D.C, USA. 1.12.18 : NIBS - National Institute of Building Science,*