HIGH RISE

* WHAT IS HIGH RISE?

→ THE NATIONAL BUILDING CODE (NBC) DEFINES A HIGH RISE BUILDING AS ONE WITH FOUR FLOORS OR MORE OR 15+ METER IN HEIGHT.

→ EMPORIS STANDARDS DEFINES A HIGH RISE AS A MULTI-STORY STRUCTURE BETWEEN 35-100 HEIGHT FROM 12-39 FLOORS.

→ MOST BUILDING ENGINEERS, INSPECTORS, ARCHITECTS, AND SIMILAR PROFESSIONALS DEFINS A HIGH RISE AS A BUILDING THAT IS AT LEAST 75 FEET (23m) TALL.

* FIRST TALL STRUCTURE

THE HOME INSURANCE BUILDING WAS A SKYSCRAPER THAT STOOD IN CHICAGO FROM (42.1m) TALL, WAS DESIGNED BY WILLIAM LE ~~NEXT~~ BARON JENNEY IN 1884 AND COMPLETED THE NEXT YEAR AND WAS DEMOLISHED 46 YEARS LATER IN 1931.

* WHAT GAVE RISE TO TALL STRUCTURES?

→ POPULATION GROWTH :- SCARCITY OF LAND IN URBAN AREAS.

→ INCREASING DEMAND FOR RESIDENTIAL AND BUSINESS SPACE.

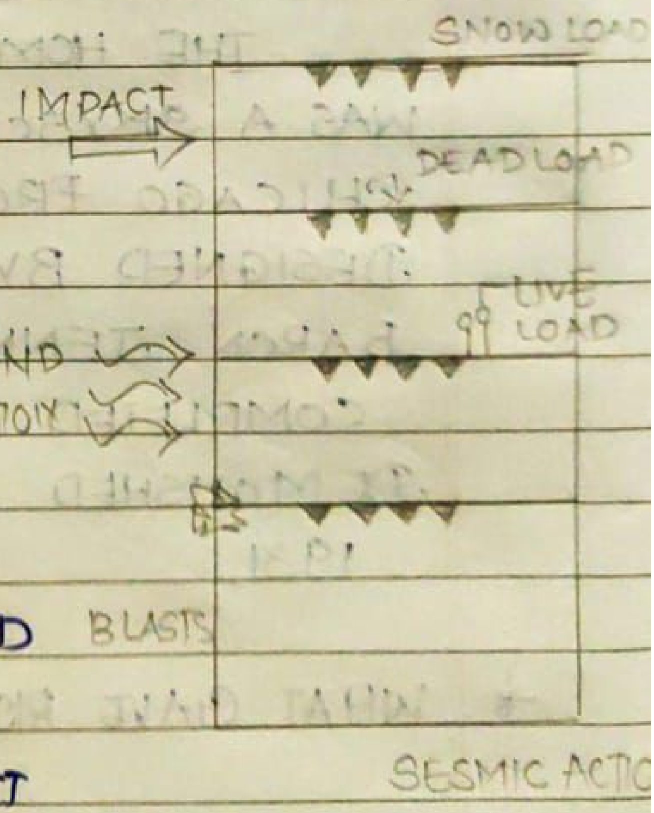
→ INDUSTRIAL REVOLUTION LEADING TO ECONOMIC GROWTH.

→ TECHNOLOGICAL ADVANCEMENTS IN TERMS OF VERTICAL TRANSPORTATION.

→ INNOVATION IN STRUCTURAL SYSTEM.

→ HUMAN ASPIRATION TO BUILD HIGHER.

* TYPES OF LOADS ACTING ON TALL STRUCTURES :-



→ DEAD LOAD

→ LIVE LOAD

→ SNOW LOAD

→ LATERAL LOAD - WIND LOAD EARTHQUAKE LOAD

→ DYNAMIC LOAD - IMPACT LOAD BLAST LOAD.

* TUBE SYSTEM :-

→ THE TUBE SYSTEM IS A STRUCTURAL ENGINEERING SYSTEM THAT IS USED IN HIGH RISE BUILDING ENABLING THEM TO RESIST LATERAL LOADS FROM WIND, SEISMIC PRESSURES AND SO ON. IT ACTS LIKE A HALLOW CYLINDER AND CANTILEVERED ~~LIKE~~ A PERPENICULAR TO THE GROUND.

→ THE FIRST BUILDING DESIGNED BY KHAN USING A TUBE FRAME WAS THE DEWITT-CHESTUN BUILDING, CHICAGO IN 1963

→ THE TUBE SYSTEM CAN BE CONSTRUCTED USING CONCRETE, STEEL OR A COMPOSITE OF BOTH

* TUBE IN TUBE :-

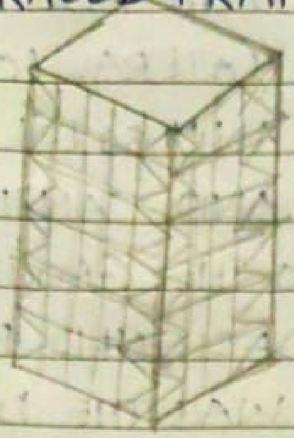
→ THIS SYSTEM IS ALSO KNOWN AS HULL & CORE & CONSIST OF A CORE TUBE INSIDE THE STRUCTUR WHICH HOLDS SERVICES SUCH AS UTILITIES AND LI AS WELL AS THE USUAL TUBE SYSTEM AND ON THE EXTERIOR WHICH TAKES THE MAJORITY OF THE GRAVITY AND LATERAL LOADS.

* BUNDLED TUBE :-

→ THE BUNDLED TUBE SYSTEM INVOLES INSTEA OF ONE TUBE, SEVERAL INDIVIDUAL TUBES INTER-CONNECTED TO FORM A MULTI-CELL TUBE. TOGETHE THEY WORK TO RESIST THE LATERAL LOADS AND OVERTURING MOMENTS. WHEN THE TUB FALLS WITHIN THE BUILDING ~~ENE~~ ENVELOPE INSTERIOR COLUMNS ARE POSITIONED ALONG THEIR PERIMETERS.

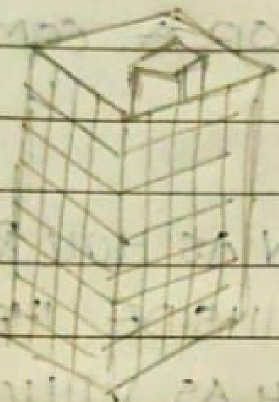
* TYPES OF STRUCTURE.

① BRACED FRAME

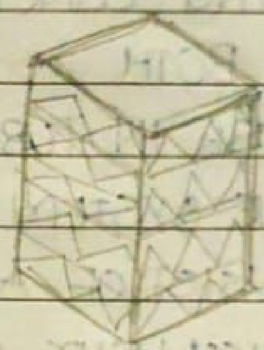


② RIGID TUBE

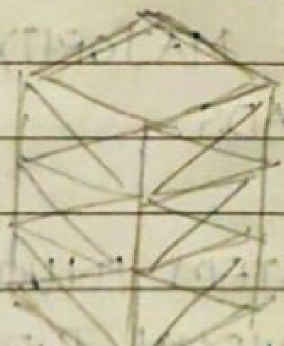
③ TUBE IN TUBE



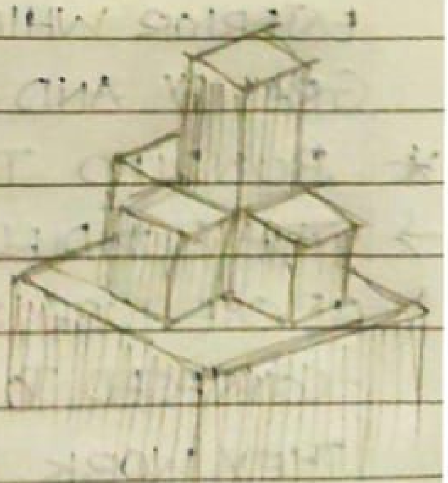
④ DIAGRID



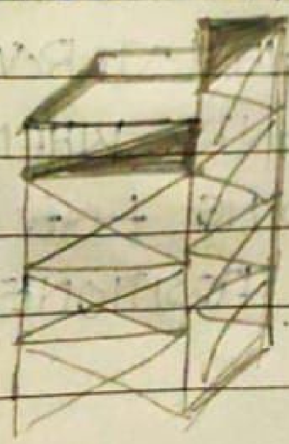
⑤ TRUSSED TUBES



⑥ BUNDLED TUB



⑦ SPACED FRAMES.



EXAMPLE - TAIPEL 101

TAIPEL 101 HAS A COMPLEX STRUCTURAL SYSTEM IT IS NEENED FOR THE BUILDING TO WITHSTAND ITS HARSH ENVIRONMENT AND THE POTENTIAL DANGERS - PAGODA STYLE PLAN AREA -50m x 50m, BUILDING USE - OFFICE COMPLEX + MALL, CONSTRUCTION TOOK 5 YEARS TO COMPLETE., DESIGNED TO BE FLEXIBLE WELL AS STRUCTURE.

* SEISMIC DESIGN.
  - CENTRAL CORE
  - TRUSSES AND BRACING
  - TRUNCATED PYRAMID BASE.
  - FLEXIBLE BUT STURDY MATERIAL
  - MASS DAMPER
  - MINI DAMPER ON SPIRE.

* BUILDING COMPONENTS & SYSTEM.
  - CENTRAL BRACED CORE· RESIST MOMENTS AND GRAVITY LOADS LARGE MEGA· COLUMNS CONCRETE FILLED STEEL BOXES, REFORCED BY MOMENTS FRAME OUTRIGGER.
  - TRUSSES 8 SEGEMENTS OF 8 INCLUDES A STORY FOR STRUCTURE DIAGONAL THROUGH OCCUPIED SPACE
  - MASS. DAMPER 18' DIA (LARGEST IN WORLD) 728 - TON TUNNER

SUSPENDEN FROM THE 92nd 87th FLOOR REDUCES OVERALL, BUILDING SWAG BY 40.