

BILL ROBINSON
TIMBER DESIGN SERVICES

**SPECIALISING IN TIMBER AND TIMBER FRAME
CONSTRUCTION**

**DESIGN
SPECIFICATIONS**

**SITE INSPECTIONS
TRAINING**

NSAI CONSULTANT

STANDARDS: EC5, IS 440, IS 444, IS 193

**TIMBER SCHEMES: TIMBER FRAME
MANUFACTURERS, LOCAL AUTHORITY SITES,
ERECTORS**

TEL: 01 4113522

EMAIL ROBINSONBILL@EIRCOM.NET

IS 440 - SCOPE

- HOUSING & APARTMENTS
- 4 STOREYS
- 10M MAXIMUM TOP FLOOR HEIGHT
- 60 MINUTES MAXIMUM FIRE RESISTANCE
- VENTILATED & DRAINED CAVITY

IS 440 - SCOPE

- MASONRY OR TIMBER CLADDING
- SINGLE SKIN AND NON-STANDARD EXTERNAL CLADDINGS REQUIRE APPROPRIATE CERTIFICATION
- APPROPRIATE CERTIFICATION MEANS A NOTIFIED BODY SUCH AS THE AGRÉMENT BOARD OR SIMILAR
- MUCH OF STANDARD IS APPLICABLE TO OTHER BUILDING TYPES

IS 440 - RESPONSIBILITIES

- SPECIFIES THE RESPONSIBILITIES BUT DOESN'T ALLOCATE THEM TO ANYONE
- SPECIFICATION OF BUILDING PERFORMANCE; SHOULDN'T BE TIMBER FRAME MANUFACTURER
- INSPECTION AND SUPERVISION IMPORTANT - ESPECIALLY FIRE RELATED AREAS

IS 440 - RESPONSIBILITIES

- **HIGHER DEGREE OF SITE CONTROL AND INSPECTION - ESPECIALLY FOR APARTMENTS**
- **DESIGN, MANUFACTURE, ERECTION AND 'FINISHING' OF THE BUILDING MUST BE SIGNED OFF AND CERTIFIED**
- **SITE FIXING SCHEDULES MUST BE SUPPLIED**

IS 440 - RESPONSIBILITIES

- EXTERNAL DESIGNS (E.G. STEEL WEB JOISTS, ROOF TRUSSES) SHOULDN'T TAKE PLACE IN ISOLATION FROM TIMBER FRAME DESIGNER.
- A CHECK ON THESE DESIGNS BY THE TIMBER FRAME DESIGNER IS REFERRED TO

IS 440 - MATERIALS

- FOR BOTH MANUFACTURE AND SITE
- APPROVAL CERTIFICATES REFERRED TO – I.E. EUROPEAN TECHNICAL APPROVAL, AGRÉMENT CERTIFICATION OR APPROVAL ISSUED BY A NOTIFIED BODY
- **READ FIRE TEST REPORTS AND ASSESSMENTS**

IS 440 - MATERIALS

- SOME MATERIAL REQUIREMENTS ARE SPECIFIED E.G, ANCHOR STRAPS, MINIMUM NAIL DIAMETER
- ONUS PUT ON PROPRIETARY MANUFACTURERS TO PROVIDE INFORMATION E.G. WALL TIES
- CAVITY BARRIERS AND FIRE STOPS HAVE REQUIREMENTS

IS 440 -DESIGN

- STRUCTURAL AND PANEL DESIGN**
- CALCULATIONS MUST BE CLEAR & COMPREHENSIVE**
- SUMMARY CALCULATIONS REQUIRED**
- EXPLANATORY DOCUMENT REQUIRED FOR SOFTWARE**

IS 440 -DESIGN

- DESIGNS TO BS AND EC5 ALLOWED
- SITE FIXING SCHEDULE HAS TO BE PROVIDED
- AIMED TO MAKE LIFE EASIER FOR THOSE CHECKING CALCULATIONS

- NOTE PLASTERBOARD THICKNESSES BS V EN

IS 440 -DESIGN

- MAIN DESIGN CHECKS
- RACKING (SHEAR) WALLS
- OVERTURNING
- SLIDING
- BEARING STRESSES
- MOST EXTERNAL STUDS 140mm DEEP; INTERNAL AND PARTY WALLS – 89mm

IS 440 -MANUFACTURE

- GIVE PANEL TOLERANCES (E.G. LENGTH, HEIGHT, OPENINGS) WHICH CAN BE USED ON SITE
- TOLERANCES ON BOW AND SPRING IN WALLS
- TOLERANCES ON NAILING TIGHT DEALS WITH EDGE DISTANCES SPACING AND OVER PUNCHING

IS 440 -MANUFACTURE

- PANELS MUST BE IDS FOR LOCATION IN BUILDING AND MARKED TOP OR BOTTOM
- MUST BE PRODUCED IN A FACTORY PRODUCTION CONTROL SYSTEM CERTIFIED BY A NOTIFIED BODY
- TAGS IMPORTANT – E.G. NSAI SCHEMES FOR TRUSSES AND TIMBER FRAME

IS 440 -CONSTRUCTION DETAILS

- TIMBER FRAME IS A SIMPLE SYSTEM AND PROBABLY 90% OF DETAILS COMMON OR VERY SIMILAR
- DETAILS NOT PRESCRIPTIVE BUT DO REPRESENT COMMON SOLUTIONS
- SOME DETAILS IN IRELAND ARE DIFFERENT TO UK

IS 440 -CONSTRUCTION DETAILS

- PARTICULAR ATTENTION HAS BEEN PAID TO THE FIXING OF INTERNAL LININGS
- DETAILS LARGELY GIVE PRINCIPLES BEHIND TIMBER FRAME; DETAILS CAN BE DIFFERENT AND DETAILS LEFT UP TO DESIGNERS AND MANUFACTURER

IS 440 – SITE WORK

- TOLERANCES GIVEN ON BASE, WALL PANEL ERECTION AND FLOOR PANELS
- STANDARD DETAILS SHOWN REALTED TO SITE WORK
- QUALITY CONTROL ON SITE; CHECKLISTS, SUPERVISION, INSPECTIONS

IS 440 - SERVICES

- CHIMNEYS SHOULD NOT BREACH PARTY WALL
- SYSTEM CHIMNEYS CAN BREACH PARTY WALL IF THEY HAVE APPROPRIATE CERTIFICATION
- BLOCKWORK SITE BUILT CHIMNEYS ESSENTIALLY BANNED
- VENT & FLUES MUST BE SEALED

IS 440 - SERVICES

- NOTCHING AND DRILLING LIMITS
- FIRE STOPPING ON ALL SERVICES WHERE WALLS HAVE A FIRE RESISTANCE (I.E. LOAD BEARING AND COMPARTMENT WALLS)
- SERVICES CAVITY FOR COMPARTMENT AND PARTY WALLS AND FOR COMPARTMENT FLOORS

IS 440 – ANNEX A

- **DIFFERENTIAL SETTLEMENT**
- **HOW TO CALCULATE DIFFERENTIAL MOVEMENT**
- **DIFFERENT APPROACH TO UK**
- **STANDARD FOLLOWS APPROACH IN OTHER STANDARDS**

INSPECTION INFORMATION

- SUMMARY CALCULATIONS
- FULL CALCULATIONS – FOR FILES
- TRUSS CALCULATIONS – SHOULD INCLUDE BRACING LAYOUT
- TRUSS SHOES MUST BE SPECIFIED
- SITE FIXING SCHEDULE

INSPECTION INFORMATION

- CONSTRUCTION DETAILS
- PANEL LAYOUT MAY BE NEEDED
- INFORMATION ON PROPRIETARY PRODUCTS MAY BE REQUIRED
- I JOISTS AND STEEL WEB JOISTS OFTEN HAVE THEIR OWN DETAILS SPECIFIC TO TIMBER FRAME. BUT BEWARE DIFFERENCES BETWEEN IRELAND AND UK

DESIGN INFORMATION

SUMMARY CALCULATIONS;

- ADDITION NAILING, SHEATHING IN WALL PANELS
- ADDITIONAL CRIPPLE STUDS
- ADDITIONAL STUDS UNDER POINT LOADS
- SPECIAL HOLDING DOWN DETAILS
- LINTEL/BEAM SIZES AND STRENGTH CLASS

DESIGN INFORMATION

TRUSS CALCULATIONS;

- MEMBER SIZE AND STRENGTH CLASSES
- BRACING
- GIRDER TRUSSES, FIXINGS, SHOES
- DETAILS/PROFILE AT PARTY WALLS
- METAL PLATES NOT USUALLY CHECKED

SITE INSPECTIONS

- CAN BE DIFFICULT DUE TO SPEED OF ERECTION
- PROBABLY BETTER NOT TO GIVE ADVICE – APPLIES TO SPECIALIST CONSULTANTS
- LOOK FOR NSAI TAGS ON PANELS AND TRUSSES
- SIMPLE CHECKLISTS CAN HELP AND ACT AS RECORD

INSPECTIONS - FIXINGS

- MAKE SURE THEY ARE INTO TIMBER
- RIGHT MATERIAL
- RIGHT SIZE, LENGTH AND NUMBER
- ANCHOR STRAPS – USE A MAGNET, SPECIFIED BY DESIGN?

INSPECTIONS - FIXINGS

- FIRST FLOOR CONNECTIONS;
- UPPER PANEL TO FLOOR STRUCTURE
- FLOOR STRUCTURE TO HEAD BINDER
- HEAD BINDER TO TOP RAIL OF LOWER PANEL

INSPECTIONS - FIXINGS

- ROOF AND WALLS ARE DIAPHRAGMS AND MUST MAKE CONTACT TO SHEAR (RACKING) WALLS
- ERECTORS WILL OFTEN FIX STRUCTURE TO THEIR OWN WAY
- USUALLY VERY SMALL RANGE OF SITE FIXINGS USED
- NSAI LAUNCHING APPROVED ERECTORS SCHEME

INSPECTIONS

- IN LOOKING AT A BUILDING THINK OF THE 'LOAD PATH' E.G.

IF THERE IS A GIRDER TRUSS, IS THERE TIMBER TO TAKE THE LARGE POINT LOAD RIGHT DOWN TO THE FOUNDATIONS. (STUDS LINE UP AND ADDITIONAL TIMBER IN THE FLOOR?)

INSPECTIONS

- PORTAL FRAMES – IF THEY ARE ONLY AT THE ENDS OF A BUILDING THEY ARE ALMOST CERTAINLY FOR WIND LOADS RATHER THAN VERTICAL LOAD
- DOES THE FLOOR MAKE A CONNECTION TO THE PORTALS, ARE THE PORTAL LOADS RESTING ON AN APPROPRIATE BASE, ARE ALL THE FIXINGS IN PLACE?

INSPECTIONS

- NO MEMBERS ALTERED,
EXCESSIVELY CUT, NOTCHED OR
DRILLED
- TIMBER FOR PLASTERBOARD
LININGS
- 15MM V 12.5MM WALLBOARD –
TIMBER SUPPORTS
- GAPS IN FRAMING OF PARTY WALLS
– BOW, SPRING

INSPECTIONS

- FIRE STOPS, CAVITY BARRIERS – WIDTH OF WALL CAVITYS (INCLUDING PARTY WALL) CRITICAL
- FLUES AND FRESH AIR WALL VENTS SEALED
- VCL & INSULATION – MAX 18% TIMBER MC. INSULATION SUPPORTED?
- AIR TIGHTNESS – GAPS (BOW) AT FLOORS/EXTERNAL WALLS?

INSPECTIONS

PARTY WALLS – PARTICULARLY
IMPORTANT. COMPARTMENT WALLS
SIMILAR

- NO GAPS
- FIRST LAYER FIXED,
- SECOND LAYER FIXED
- JOINTS STAGGERED
- JOINTS TIMBER BACKED

INSPECTIONS

**SEPARATING AND COMPARTMENT
WALLS – SERVICE CAVITY TO KEEP
FIRE AND ACOUSTIC LINING INTACT**

**COMPARTMENT FLOORS – SERVICE
CAVITY TO KEEP FIRE AND ACOUSTIC
LINING INTACT**

CHECK BATTENS OF SERVICE CAVITY