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
• CAUTY 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 AS 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
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 RELATED 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 CAVITIES (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