GDP

Appendix 8

Damage Category Charts

Deflection Ratio Calculation

Historic Heave Values

| Category of damage | Description of typical damage | Approximate crack width (mm) | Limiting tensile strain $\varepsilon_{lim}$ (per cent) |
|---|---|---|---|
| 0 Negligible | Hairline cracks of less than about 0.1 mm are classed as negligible | <0.1 | 0.0-0.05 |
| 1 Very slight | Fine cracks that can easily be treated during normal decoration. Perhaps isolated slight fracture in building. Cracks in external brickwork visible on inspection | <1 | 0.05-0.075 |
| 2 Slight | Cracks easily filled. Redecoration probably required. Several slight fractures showing inside of building. Cracks are visible externally and some repointing may be required externally to ensure weathertightness. Doors and windows may stick slightly. | <5 | 0.075-0.15 |
| 3 Moderate | The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable lining. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. Doors and windows sticking. Service pipes may fracture. Weathertightness often impaired. | 5-15 or a number of cracks > 3 | 0.15-0.3 |
| 4 Severe | Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Windows and frames distorted, floor sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Service pipes disrupted. | 15-25 but also depends on number of cracks | >0.3 |
| 5 Very severe | This requires a major repair involving partial or complete rebuilding. Beams lose bearings, walls lean badly and require shoring. Windows broken with distortion, Danger of instability. | Usually > 25 but depends on number of cracks | |

Damage Category Chart (CIRIA C580)

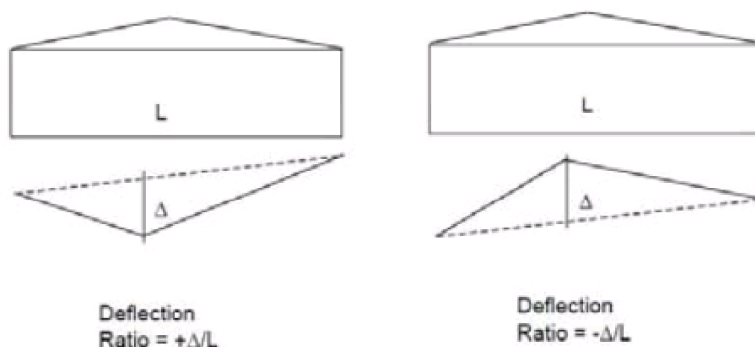# DETERMINATION OF HORIZONTAL TENSILE STRAINS AND DEFLECTION RATIOS

- Horizontal Tensile Strain ht

  To determine the resulting horizontal tensile strain that will develop in the adjacent properties, the lateral displacement to the rear of the property ( hb) is subtracted from the lateral displacement at the front of the property ( hf). The resulting differential lateral displacement is then divided by the length of the property perpendicular to the basement wall to determine the horizontal tensile strain. Where the lateral displacement is zero at the rear of the property the lateral displacement at the front of the property is divided by the distance from the front of the property to the point of zero lateral displacement to determine the lateral strain. This approach is illustrated below and has been adopted for both the lateral displacements caused by wall installation and excavation.
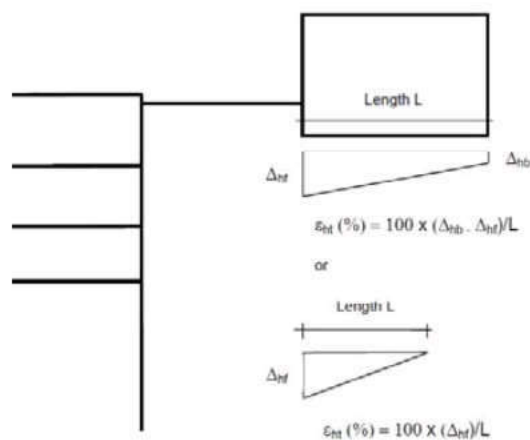


- Deflection Ratio /L

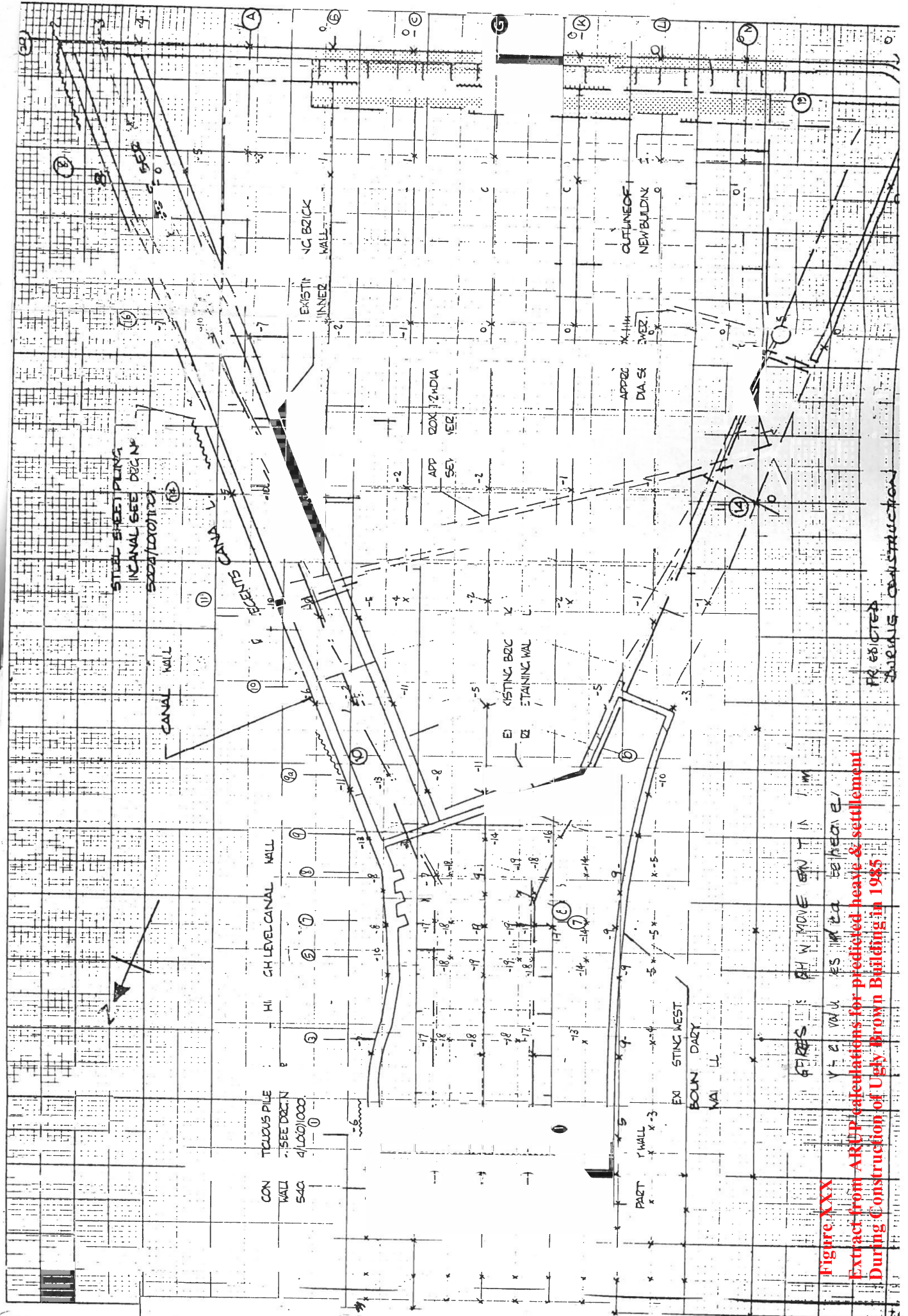  The deflection ratio is defined as the off linear vertical displacement across a structure as illustrated below.