Solid timber products, containing both heartwood and sapwood, often have a high tendency to crack during the drying process. This can cause severe loss of material for the saw-mills, especially for products with large cross sectional dimensions. The cracks (e.g. end-cracks) arise, in some cases, early in the drying process and close again later in the process. It can be difficult to see the closed cracks with visual grading. This may result in too high grading of the damaged material which may cause problems for customers such as building and furniture industries. Moisture content (MC) in green wood varies within the cross section of a timber log. The MC of heartwood, for example, is considerably lower than the MC of sapwood. Shrinkage starts at different times within different parts of the cross section, which results in a complex state of strains and stresses. The moisture related crack pattern in wood often becomes quite complex because of the annual ring structure and the different MC levels within heartwood and sapwood. The focus of this work represents the cross sectional behaviour of a timber log. The main aim is to accumulate experimental results and data for the development of a finite element model to evaluate the various couplings in the hygro-mechanical problem that govern moisture driven cracking in wood.