The recommended approach would use the annual equivalence of difference in life cycle costs for commonly used material. Annual equivalence would be calculated in a two step procedure (Maler and Wyzga 1976). The first step estimates the present value of the difference in the stream of current replacement costs before and after acidic deposition. The second step calculates the annual equivalent flow of the present value of the reduction in damages.

Benefit estimation for commonly used materials requires information about changes in rates of deterioration (dose-response) or maintenance, and distribution of susceptible materials. Thus, information is essential to the determination of the value of benefits.

While the life cycle cost approach values the benefits of reduced repair and replacement costs, it does not capture the historical value of buildings and monuments. This is an intangible, nonmonetary value, which can best be determined by a willingness-to-pay survey of viewers for the aesthetics of less damaged structures and statues. However, this method will result in an underestimate of total value in that it fails to capture option and legacy values. A second and important limitation of the contingent valuation method is due to the lack of a proven approach. Although surveys have been tested and validated in other areas (e.g., recreation and visibility), additional research would be required prior to their application to derive historical values.

7.3.5 Human Health

7.3.5.1 Mortality

An understanding of the dose-response relationship between air pollutants and mortality and morbidity is needed to value changes. Animal and clinical studies provide a basis for confirming a relationship between air pollution and health. Some epidemiological studies estimate a dose-response between air pollutants and mortality and morbidity. Epidemiological and clinical studies can therefore be used to indicate the probability or risk of mortality or morbidity under different environmental conditions. These types of data must also be matched with changes in population exposed to determine changes in mortality or morbidity.

The amount that an individual must be paid to accept additional risk is conceptually the correct procedure for estimating the value of human life. When aggregated over many individuals, this willingness-to-pay, is usually referred to as the value of statistical life, or the value of a statistical death avoided. It is simply a shorthand way to represent the total amount of benefits enjoyed by all the population which benefits from risk reduction.