

DEFENCE RESEARCH ESTABLISHMENT SUDBURY
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MEASUREMENT OF LETHALITY OF TOXIC MATERIALS:

GENERAL DESCRIPTION OF THE LD₅₀

The lethality of a toxic material is usually determined by administering the material to several groups of uniform animals of a single species. The groups usually contain from 5 to 50 individuals, the number depending on the degree of accuracy required, and on the availability of suitable animals. An accurate measurement of LD₅₀ requires the use of from 30 to 100 animals; tests using groups of animals smaller than 5 individuals yield only approximate results. Within each group, the animals are equally exposed to the same toxic material: in the case of injected toxic substances, each animal receives an amount proportional to his body weight; in the case of inhaled gases, each animal is exposed to the same concentration of the gas diluted in air for the same length of time. At a selected time after the end of the exposure (from a few hours to several days, depending on the nature of the effects of the poison,) the number of dead animals in the group is counted.

Each of the several groups of animals is given a different dosage level, beginning with a dosage which kills few or none of the animals in the group, and increasing for each group until a dosage is reached which kills all or nearly all the animals in the group. The stepwise increases in dosage are chosen to be sufficiently small to result in two or three of the groups having killing ratios between 20% and 80%.

A set of data obtained in this way is then subjected to a mathematical process which estimates the dose which would be expected to kill 50% of a large population of similar animals. The resulting figure is the dose for 50% kill or LD₅₀ and is usually expressed as milligrams of toxic material per kilogram of body weight.