ASSESMENT OF A RISK FROM EXPOSED ACID SULFATE SOILS IN THE SOUTHERN HIGHWAY FROM KOTTAWA TO DODANGODA

A PROJECT REPORT PRESENTED BY

I.M.A. JAYASINGHE

(PGIS/EN/M.Sc./ENS/06/125)

to the Board of Study in Environmental Science of the

POSTGRADUATE INSTITUTE OF SCIENCE

in partial fulfillment of the requirement

for the award of the Degree of

MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCE

of the

UNIVERSITY OF PERADENIYA

PERADENIYA

SRI LANKA

2009

ASSESMENT OF A RISK FROM EXPOSED ACID SULFATE SOILS IN THE SOUTHERN HIGHWAY FROM KOTTAWA TO DODANGODA

I.M.A. Jayasinghe
Postgraduate Institute of Science
University of Peradeniya
Peradeniya
Sri Lanka

Acid sulfate soils suffer extreme acidity as a result of oxidation of pyrite and other sulfidic minerals. Often they are also unripe, sometimes also saline. Some occur naturally but most have developed as a result of drainage of previously waterlogged coastal alluvium and peat. Acid sulfate soils pose a range of problems for communities dependent on the reclaimed land - including low crop yields, a restricted range of alternative uses, soil engineering hazards, water pollution, and other environmental risks. These difficulties are not always anticipated, or recognized when they occur, or tackled with up-to-date information. Drawing together this information can be of useful to many people, specially in the developing countries of the tropics like Sri Lanka.

When exposed to air, as a result of drainage or disturbance, acid sulfate soils (ASS) produce sulfuric acid, and often release toxic quantities of iron, aluminium and heavy metals. This can have major environmental, health, engineering, and economic impacts.

The area where the study was carried on is Bandragama to Dodangoda in the newly construction site of Southern development highway project. Identification of acid sulfate soil were done using field indicators (Geo morphologic) along with chemical and physical, onsite and laboratory measurements such as actual acidity , potential acidity, pH and conductivity as per the requirement for both soil and water samples. High potential acidity was observed in the study area of 39km than the actual acidity. Maximum potential acidity was 342.88 H^+/ton and minimum was 54.11 H^+/ton. With respect to that the actual acidity, it ranges from 0.00 H^+/ton to

45.20 H^+/ton. Iron concentration of water in the site was fluctuated according to the source of water in stagnant bodies and it has shown considerably high concentrations where as surface flowing waters showing low iron concentrations. Concentration of aluminium was in high compared to the human consumption thresholds. Peat layer was extended to a considerable area as per the observations of borehole logs which could make the environment affected. According to the distribution of the peat layer, plenty of local damages were observed in the selected area. Proper management practices and geotechnical engineering techniques could remedy the problem with minor consequences. Ordinary engineering process and absence of proper management will be detrimental to the surrounding environment and existing life forms is the estimation of this study.