**Title:** Optimisation of Weld-Metal Chemical Composition from Welding-Flux Ingredients: A Non-Pre-Emptive Goal Programming Approach.

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**Abstract:** A non-pre-emptive goal programming (NGP) model for weld-metal chemical composition optimisation from welding flux ingredients is proposed. The proposed model which is the first multi-objective mathematical programming approach to welding flux formulation provides increased flexibility to the welding flux formulator in several ways: (1) several conflicting objectives can be simultaneously considered. (2) the best compromise for welding flux formulation can be achieved with minimal expenditure of resources and experimental efforts, (3) the welding flux designer can explore various trade-off options and (4) the lead time and cost of developing welding consumables can be drastically reduced. This paper has extended the work of Kanjilal and co-investigators by coupling it with the NGP optimisation technique so as to prescribe the welding flux ingredient levels that will achieve optimum performance for the flux at minimum experimental efforts and cost. The feasibility and suitability of the model is illustrated with data from the literature.