

Optimizing Cost of Operation and Extension Accelerator Facility Exploitation Period

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More than 1500 electron accelerators have been used as intense source of ionizing radiation for implementation in industry a number of radiation technologies, like modification of polymers, semiconductors, radiation sterilization as well as for environmental protection. Cost reduction is one of the key factors of successful radiation technology implementation. Annual cash flow projections based on annual fixed and variable costs evaluation is very useful to recognize accelerator facility economical condition.

Capital costs including site preparation and accelerator installation should be accounted for assuming a fixed interest rate and amortization the capital cost for the life time of the facility. Annual fixed cost related to accelerator facility exploitation should be evaluated just after formulation radiation process parameters including physical parameters of irradiated object (dimensions, density), dose rate and process capacity. Accelerator selection (price vs. performance) can be performed only when required electron energy and beam power is established. Additionally part of variable cost related to spare parts cost necessary for certain accelerator construction should be taken into account as well. Expenses related to the spare parts could be significant component annual variable cost of facility operation. The cost of single microwave device like klystron or magnetron could be the best example.

Possible choice of modulator design is related to decision which pulse power switch technology will be used: thyatron or modern semiconductor switch. In general well establish technology or new development which offers better performances. The second selection is usually connected with much higher risk of failure in longer exploitation period. It refers to not only certain accelerator components but also to new accelerator design which has not been proved during intense exploitation. When accelerator is use continuously as industrial source of ionizing radiation the regular maintenance procedures are necessary and very well qualified service personnel. The facility personnel or outside service, performed usually by accelerator manufacturer, should be evaluated regarding effectiveness and money involved.

Upgrading existing accelerator facility could be performed due to maximizing its capacity, elimination weak components or systems or replacing not more available spare parts to prolong accelerator exploitation period. All these activity should be carefully evaluated due to technical feasibility and economical effectiveness regarding cost - performance relation.

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