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KEY WORD : BUILDING CONSERVATION / ENVELOPE REDESIGN / ENERGY EFFICIENCY

JARUWAN PRAPASONGSIT : BUILDING ENVELOPE IMPROVEMENT FOR ENERGY EFFICIENCY OF EXISTING BUILDING, CASE STUDY : THAI MILITARY BANK (HEAD OFFICE), BANGKOK. THESIS ADVISOR : ASSIST. PROF. THANITCHINDAVANIG, THESIS COADVISER : ASSOC. PROF. SOMSIT NITTAYA, 230 pp. ISBN 974 – 03 – 0786 – 8

With an initial design that led to higher energy consumption, particularly because of the building envelope, changes to the current structure were needed to solve this problem and, thus, improve the energy use efficiency. Case study is Thai military bank (Head office), Bangkok. The saving potential estimation was must be only considered in appropriated techniques and cost – effectiveness, By study the energy used data of the building and simulating the conditions affecting energy consumption with computer simulation model by program DOE – 2 in each techniques.

63% off all energy consumption can be accounted to air conditioning system, 18% can be accounted to lighting system and 19% can be accounted to other. Cooling load from building envelope when broken down, this includes a transparent wall 34.75, solid wall, 12.76% and roof, 2.25% as well as from sunlight 18%. Possible adjustments to the building envelope including adjustments to the transparent wall, or reducing window to wall ratio that is reducing the amount of area that allows sunlight to penetrate as well as using the sunlight to providing natural lighting.

The study revealed that the best way to improve the building envelope when considering technique and economics to achieve top energy consumption efficiency in a high rise was to reduce the window to wall ratio of the entire building. This led to a reduction of 13.40% in air conditioning when compared to the previous year. For the building envelope itself, the reduction was as high as 23.87%. There was a 10.17% reduction in energy consumption when compared to the previous year and reduction in heat transfer of as much as 43.47 W/sq. meter. Total investment amounted to 739,504.29 baht and the changes took 1.1 year to complete. Other adjustments required low investment.

When a building envelope has been adjusted by integration with factors affect energy use and comparisons are made to the original structure, it has been proven that by reducing the area of transparency, energy consumption can be reduced as well in both building systems and lighting by 36.67% and 11.05%, respectively. Thus, adjustments of these types do give positive results in this and buildings of similar design.