

Solution college essay



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Let's consider the first option. If the pressing operation is modified so that the solids content of the paper entering the drying operation is increased from 45% to 50% the total efficiency of the paper making process will increase by such a part that equals 5% ($50\% - 45\% = 5\%$) of 45%, that is by $5/45$, or approximately by 0.111. It is 11.

1% in percentage correlation. Thus after such modernization has been made the overall efficiency of the production process is 111.1% ($100\% + 11.1\%$), at fixed energy consumption.

Now let's consider the second option. The use of newly developed additive which will increase the sheet strength and allow the same product to be made using 10% less fiber will cause the general increase of process efficiency, which is to be calculated. Let's suppose that it was produced Z kg of paper and a content of fiber equaled x . The total weight of fiber is $x \cdot Z$ kg.

Let's denote the quantity of the paper which was produced after modernization and at the same energy consumption as Z_1 . The content of fiber after modernization is $0.9x$. The total weight of fiber now is $0.9x \cdot Z_1$ kg.

However, the weight of fiber before and after the modernization remained unchanged while the energy consumption was the same. Thus we can write: $x \cdot Z = 0.9x \cdot Z_1$ Hence, $Z_1 = (10/9)Z$ or $Z_1 = 1.111 \cdot Z$. In other words, at the same energy consumption the efficiency of production increased and is 111.1%. However, the first option presents additional way of energy saving: when the solids content of the paper entering the drying operation is increased from 45% to 50%, then the drying operation needs less energy

(the raw material contain less moisture, that must be dried). As one can see the first options provides better energy savings.