Enhanced reference picture selection in H.264 enables increasing compression efficiency at the expense of increasing complexity, in other words encoding time. We search how we can select the best multiple reference pictures by a fast, computationally efficient method. We propose a simple histogram–similarity based method for selecting the best set of multiple reference pictures. Out–of–order coding of these frames is implemented by means of pyramid encoding. Experimental results show that the proposed approach can provide encoding time saving up to 22% with similar picture quality and bitrate for selected video sequences.