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Dipole magnets wound using YBCO cables - FEM stability issues modeling

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Quench and protection in magnets wound with coated conductors is of great interest for many applications, including those of high energy physics accelerators. The relatively large slow normal zone propagation and large MQE of coated conductors and the potential of burn out in well insulated coils has led to an interest in non-insulation coils. A stability of block type dipole magnets wound using non-insulated YBCO Roebel and CORC cables has been modeled by FEM method. Critical currents of the magnets have been calculated using a self-consistent method based on anisotropic $I_c(B)$ curves of the cables. Advantages and disadvantages of using the Roebel and CORC cables in dipole magnet windings have been discussed. Heat disturbances of different size, intensity and duration have been analyzed from the viewpoint of the magnet quench and stability.

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