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Conventional steel coiled tubing cannot reach along the entire length of very long horizontal oil wells. A lighter and more buoyant coiled tube is made possible using composite materials. The high stiffness to weight ratio of fiber reinforced polymers, coupled with a lower coefficient of friction, has the potential of greatly extending the reach in horizontal oil wells. This study shows how to design composite coiled tubing and gives a comprehensive discussion about the most influential parameters. Several solutions, using glass-fiber and carbon are considered. Finite element models are used to calculate the buckling loads and the corresponding interlaminar stresses. The very positive results obtained during this study show that composite coiled tubing systems are vastly superior to their steel counterparts, and that in the future, these will become the new industry standard.