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Acoustic modeling for designing sonic logging tools

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Formation acoustic properties such as velocity and attenuation provide useful information regarding rock type and formation fluid. Sonic logging is one of the principal measurements to evaluate the presence of hydrocarbons in the well and to enable an efficient and safe production of oil. Unfortunately the sonic measurement is affected by the tool itself. Suppressing or attenuating the tool wave, which propagates along the logging tool and is received by the sensors, is directly related to the accuracy of the answer products. In order to improve the measurement quality and to increase the efficiency of logging operations, the structure of sonic logging tools must be well understood. A sonic tool with known effects is decidedly more complex and acoustic modeling incorporating the tool structure details is becoming essential to better sonic tool design. The methodology of numerical modeling used to predict the response of a sonic tool is to be presented.