



Vibration Technology Frees Differentially Stuck Tubulars in Eagle Ford, Permian & Haynesville Formations

DIFFERENTIALLY STUCK CASING & DRILL PIPE IN EAGLE FORD, PERMIAN & HAYNESVILLE WELLS

West and South Texas and N. Louisiana

SITUATION:

If the mud pressure which acts on the outside wall of the pipe is greater than the formation-fluid pressure, which generally is the case with the exception of underbalanced drilling, then the pipe is said to be differentially stuck. The pull force required to free the stuck pipe is a function of the differential pressure, the coefficient of friction between the pipe and the mud filter cake, and the area of contact, between the pipe and mud filter cake surfaces. The pull force should not exceed the yield point of the stuck work string.

SOLUTION:

The methodology of acoustically resonating differentially stuck pipe from the surface relies on the steel pipe's Poisson's Ratio, which is the ratio of the lateral strain to the longitudinal strain when axially stretched. When pipe undergoes resonant vibration while undergoing axial pull, the diameter of the steel pipe constricts while the length of the pipe elongates at the given Poisson's Ratio. This diametral reduction occurs at the speed of the inverse of the frequency of vibration, e.g. at 15 Hertz it occurs repetitively every 0.066 seconds. In this case, every 0.066 seconds a bit of hydrostatic mud pressure slowly creeps up to fill the void of the 'breathing pipe' (i.e. the space between the OD of the pipe and ID of the mud filter cake) and eventually works its way up through the filter cake to release the pipe.

RESULTS:

Differentially Stuck Jobs 2018

Client	Date	Location	Pipe Specs	KOP	TVD	Hook Load, Lbs	Free Point, Ft	VT Unit Used	Results
Operator #1	1/30/2018	Gaines Co., TX	5-1/2" 20 ppf Casing	10,243'	10,967'	120,000	7,185'	180k	Successful
Operator #2	2/14/2018	La Salle Co., TX	5" 19.5 Drill Pipe	N/A	16,861'	140,000	4781'	360K	Successful
Operator #3	3/4/2018	Gonzales Co., TX	6" 24 ppf Casing	10,528'	10,729'	143,315	4,398'	500k	Successful
Operator #3	3/26/2018	Gonzales Co., TX	5" 19.5 ppf Drill Pipe	N/A	8,053'	215,000	8,053'	360k	Successful
Operator #3	6/3/2018	Reeves Co., TX	7-5/8" 23 ppf Casing	8,510'	9,520'	213,000	6,548'	500k	Successful
Operator #3	6/6/2018	Gonzales Co., TX	5-1/2" 24.2 ppf Casing	N/A	N/A	125,000	5,400'	360k	Unsuccessful
Operator #4	6/27/2018	Jackson Parish, LA	5-1/2" 24.2 ppf Casing	13,100'	13,307'	265,000		360k	Successful
Operator #3	7/20/2018	Gonzales Co., TX	9-5/8" 32 ppf Casing	11,128'	11,070'	252,000	6,000'	360k	Successful
Operator #5	8/12/2018	DeSoto Parish, LA	5-1/2" 22.6 ppf Casing	11,035'	11,632'	210,000	9,300'	500K	Successful

MOST SUCCESS ON "FIRST CALL" JOBS:

Vibration Technology's surface generated acoustic energy services is most effective when it is the first retrieval option used to free stuck pipe, before complications caused by conventional methods. On a 1st call out basis, vibration services are 63% successful.