

# CASE STUDY

Fixed Casing Centralizer Solution Provides Substantial Hookload Recovery while Rotating in ERD Wells, Enabling Successful Landing to TD

## The Challenge

- An Operator on Alaska's North Slope was anticipating extremely high open hole friction factors (~0.7) when running its 13-5/8" 12,430 ft. liner string, which would present challenges with drag and maintaining hookload during the run that could prevent it from reaching TD. The Operator planned to use liner floatation and expected the need for rotation to overcome axial drag challenges during liner installation to successfully land the string to TD.

## The Objective

- Deliver a fixed centralizer solution for the Operator's application that realizes the full benefit of string rotation to reduce axial friction and improve efficiency and effectiveness of the string installation process.
- Ensure the centralizer attachment method prevented slippage during axial, torsional and combined loading states and did not compromise the structural integrity of the liner.
- Enable hookload recovery upon commencement of rotation while managing challenging wellbore issues to successfully reach TD and improve out-of-slip running efficiency.
- Balance the benefits of casing stand-off for cementing purposes and differential sticking mitigation with the increase in rotational torque expected by introducing fixed centralizers to the liner.

## The Delivery

- Volant's Product Engineering team and consulting subsidiary, Noetic Engineering, employed its inhouse applications engineering capabilities to recommend a centralizer placement strategy in combination with Volant's HydroFORM® crimped centralizers.
- Crimp retention calculations and physical testing were done to meet the operator's demands for centralizer retention loads for this section of the well. Stress state of the pipe body was also evaluated to ensure integrity would not be compromised based on the crimping method being used to fix the centralizer to the pipe.
- A new triple crimp 13-5/8" HydroFORM centralizer was designed that satisfied the retention load requirements expected during rotation and at the same time provided the durability required to withstand the rigors of extended rotation while running in the open hole section of the well.
- The centralizer attachment process required use of Volant's RTF-13.38 Radial Tubular Forming tool. Volant custom designed components to retrofit the RTF-13.38 tool to accommodate the crimping of 13-5/8" centralizers and the substantially higher crimping forces required.
- Centralizer installation took place at a designated pipe yard in Alaska. Operations were optimized with a reliable computer-aided crimping system, resulting in efficient, accurate and consistent crimps. Digital measurements were produced to confirm the effectiveness of each crimp and QA/QC records were provided to the operator.
- The string was successfully rotated to TD with a Volant CRTi2-8.63 casing running tool.

## WELL HIGHLIGHTS

- North Slope Alaska
- 12,430 ft. of 13-5/8" 88.20 ppf L80 liner

## TECHNOLOGY & SERVICES

- 13-5/8" X 15" O.D. Triple Crimp HydroFORM® centralizer
- RTF™ Radial Tubular Forming tool with computer-aided system
- CRTi2-8.63 casing running tool
- Consulting Engineering



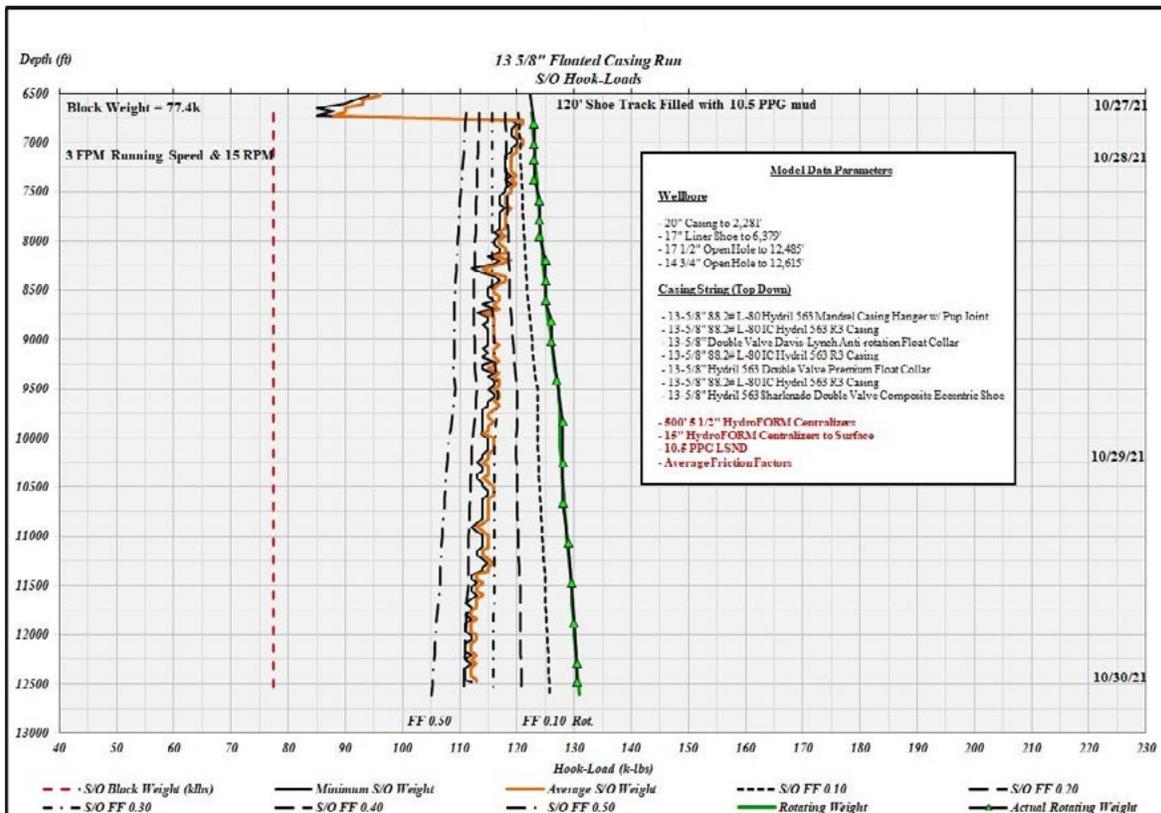
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## The Value

- Volant’s computer-aided RTF™ tool accurately controlled every crimp, improving the overall efficiency and consistency of the crimping process. Installation occurred at a convenient time and location to the operator, allowing them to effectively manage the expense and logistics of the centralizer installation and pipe handling process to support a multi-well project that required more than 2,400 13-5/8” HydroFORM® centralizers installed one per joint.
- With a high open hole friction factor of ~0.7, the customer knew the casing string would not reach bottom without rotation. The crimped HydroFORM centralizers functioned as predicted during rotation and helped the liner reach TD successfully.
- Hookload recovery was observed immediately upon rotation of the string as a direct result of Volant’s HydroFORM crimped centralizers rotating with the casing and breaking the static friction between the formation and the centralizers, which provided a significant advantage over floating centralizers. Hookload jumped from 85 kips to 120 kips when they began to rotate the string at a depth of 6,700 ft. and was adequately maintained all the way to TD.

“Having the centralizers crimped helps to break the static friction when starting to rotate... It helped the floated rotating liner reach bottom.” - ERD Drilling Engineer



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