Safety Breaker

Safety Concept Device for Tie-ins

SAFETY BREAKER

Safer Tie-ins

Gustavo Guaytima
PipeSak

Objectives

- Present a CONCEPT safety device
- Analyze current procedures and techniques for tie-ins
- Debate about safety during tie-ins
- Open discussion to prevent future incidents
- Induce/create new trends in the industry which aim for zero accidents in tie-ins.

Agenda

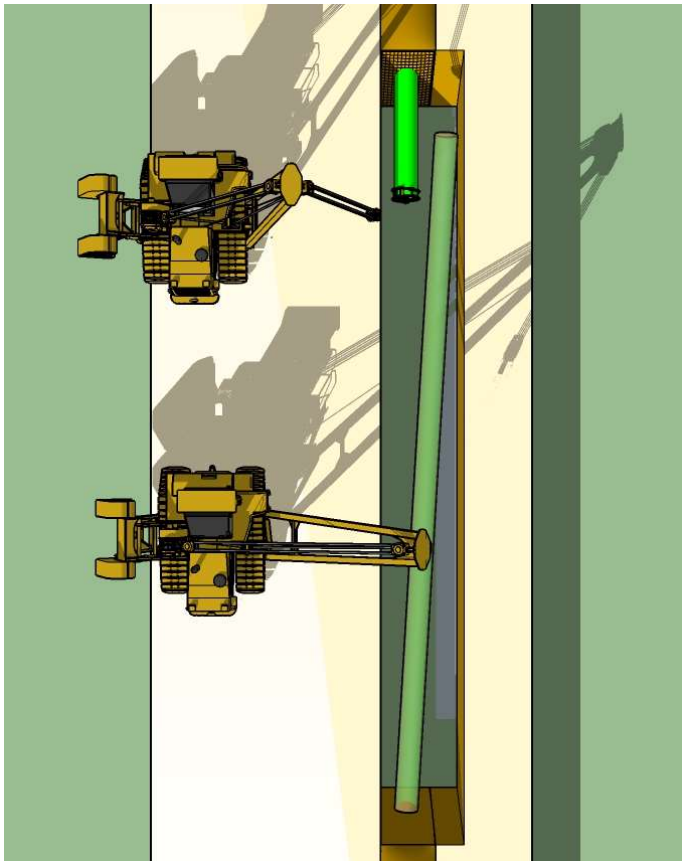
- Introduction
- Current Techniques and Procedures
- Risks associated to tie-ins
- Introducing Safety Breaker
- Discussions
- Conclusions

Tie-in in Pipeline Construction - Intro

- Tie-in joins two pipeline sections
- It takes place usually in the trench with both sections almost full back-filled.
- This joint type is unique and different from regular joints (from all point of view such as pipe fitting, welding, etc.)
- It is welded manually (new trends push for automation though)
- Pipe fitting is done by using external clamp (mech. or hydraulic)

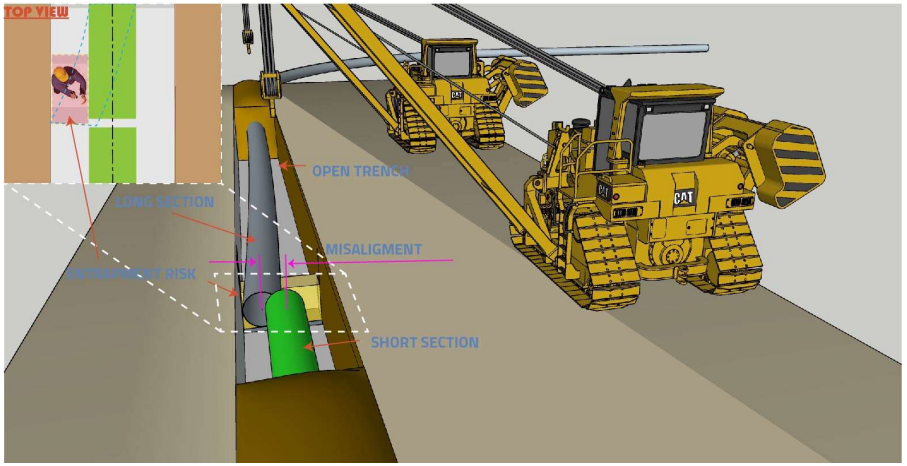
Current techniques

- One section is usually almost full covered. Then, it is quite fixed. The other section presents longer uncover section (typically 2-3 pipes long)
- Sections overlap is about 1-2 meter long.
- Sidebooms rice the longer section, put it by the short one (as parallel as possible), it is marked and cut to eliminate overlap.
- External clamp is set to joint both sections. Pipe fit-up take place to ensure welding joint geometry (joint gap and parallelism).
- Manual welding is performed.



Associated Risks

- Misalignment between sections might require enforce section to proper alignment.
- Elastic Energy is stored in the pipe sections
- Either external clamp or welding might fail
- Elastic Energy could be suddenly released
- Entrapment risk between pipe and trench's wall



Current Risk Mitigation Techniques

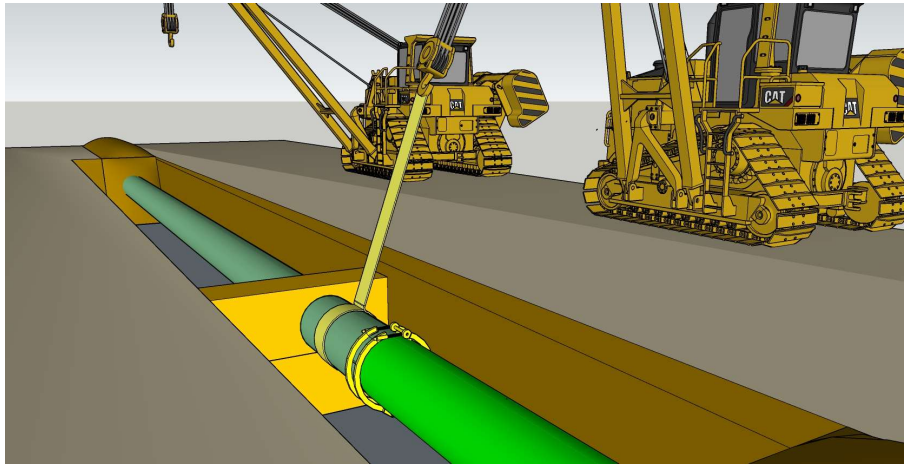
- EXCESIVE external force to align sections is NOT allowed
- If misaligment is too high, new bended pipe shall be put in place
- Counter force if applied to compensate any elastic force that might remain in the sections
- Temporary spacers are install to lock pipe sections

Current Situation

- Even though, typical risk assessments are extensively written in procedures, standards and best practices, accidents keep occurring
- Need for changing standards and procedure to ensure incidents are avoided.
- Need for increasing training and conscientization along whole industry.

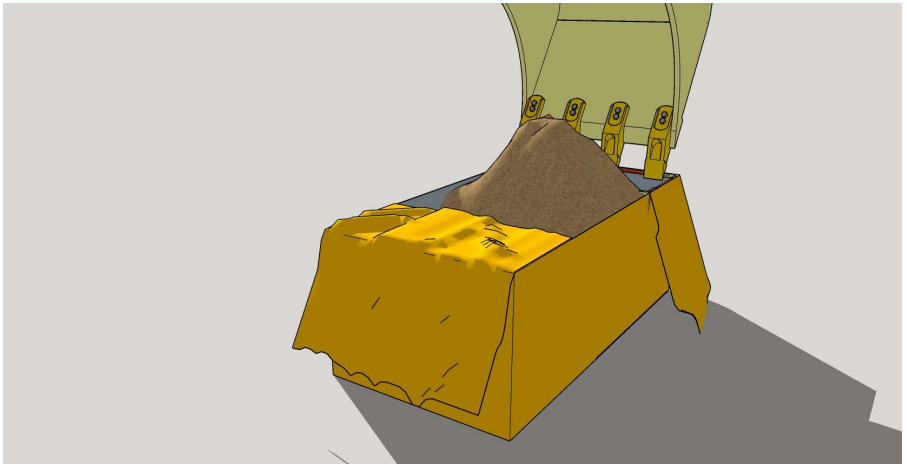
Featuring Safety Breaker

- In-trench installed device design to help tie-in activities and to ensure safety
- It is installed before staring tie-in maneuvers.
- During the first steps during tie-in activity it supports the section. No need for other supports.
- It brings safety since the first moment when pipe is loaded with elastic energy



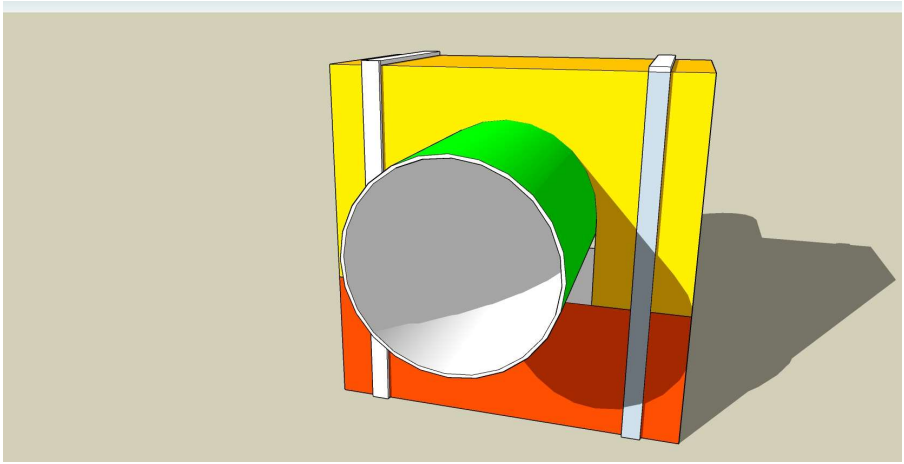
Main features

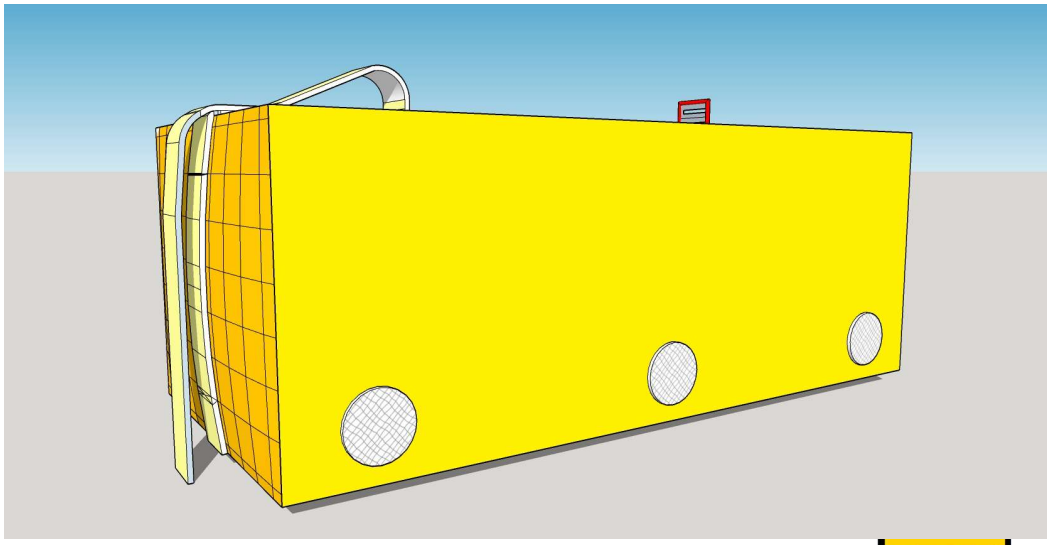
- Light, it can be handle by hand before installation
- Quick installation
- Filled with local material by excavator (or manually)
- Flexible to accommodate trench's shape
- It is flat to bring support at any position of the pipe section



Main Features (cont.)

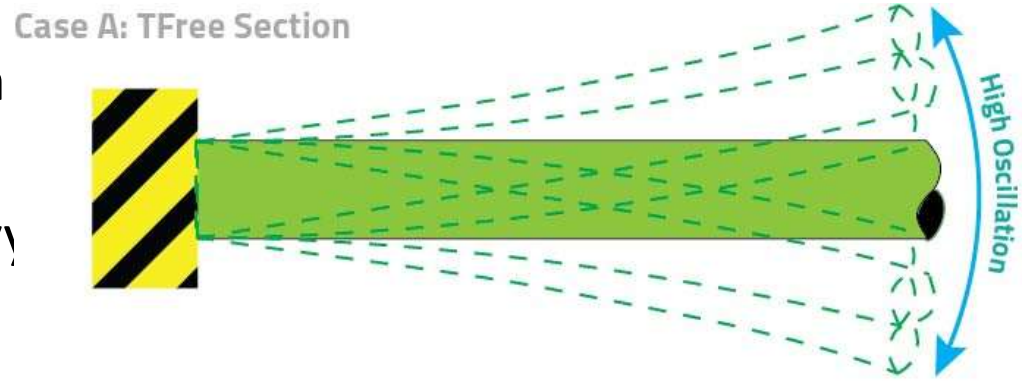
- After cutting pipe section and alignment, extra counterweight is installed on top
- Same principle, filled with local material
- Both counterweights are finally linked and become an unit
- After tie-in is done, device acts as trench plug or breaker
- No need for dismounting

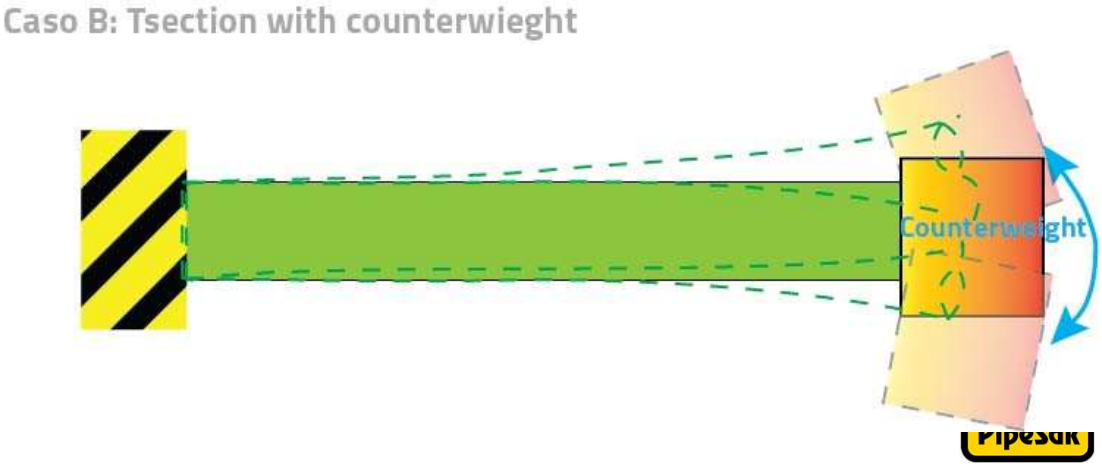




Device Principles

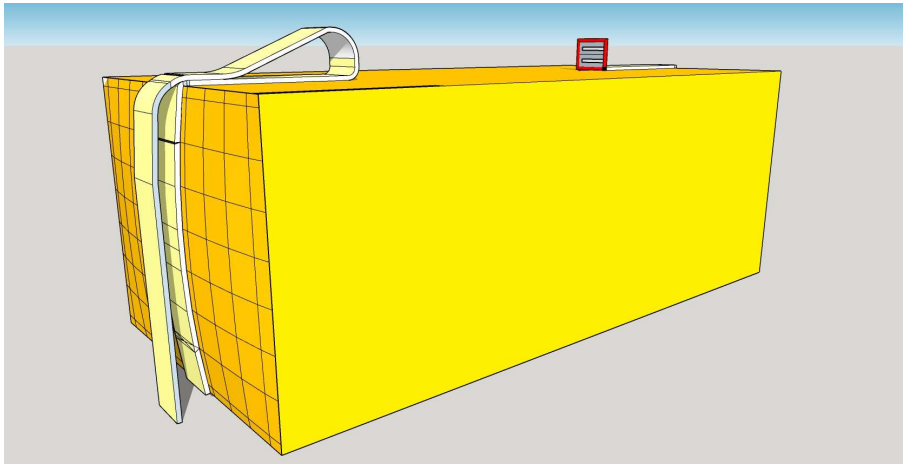
- Add large mass on pipe section
- If by accident elastic energy is released, it has to move a heavy counter weight
- Pipe section sudden motion is reduce/eliminated





Safety Mechanism

- Based on auto-adjustable belt around section
- Once pipe section is moved toward alignment position, the belt adjusts around section
- Mechanism is already activated during external clamp setting and pipe fit-up maneuvers
- After clamp is released, and in case welding fails while welding, this device offers full protection



Open Discussions

Current techniques

- Temporary spacing devices might or might not be installed. Chance to forget?? Avoid??
- They tend to be unstable and no standard technique is used.
- Right installation might depend on WHO perform the job
- Forgetting?? Dismounting tend to cause other issues: dents

Safety Breaker

- Permanent installation. Necessary to perform tie-in job. No chance to do not install
- Standard device and installation
- Universal and standard installation. Adapts to all type of situation
- Design to be in trench permanently. Large contact area. No chance to produce dents.

Conclusions

- Robust and susceptible to be standardized technique is presented
- It covers key factors that might lead to incident:
  - Optional use
  - No full needed for performing tie-in activities
  - Time for Dismounting
  - Full and correct function depends on WHO do it
- It does not intend to replace any other standard technique/procedures, but to bring extra assurance in case they failed or are not fully fulfilled.
- Since this a CONCEPT device there is room for improvements
- Effort on personnel conscientization and training is needed along whole industry.

Questions/Comments?

Thank YOU for the attention!

SAFETY BREAKER

Safer Tie-ins