

# Torsional Analysis



**Torsional Analysis**  
**Design solutions**  
**Field service**



[www.cstfirenze.com](http://www.cstfirenze.com)



# Design solutions

Compression trains are assembled by combining compressor, driver and relevant auxiliaries such as coupling, flywheel and gearbox. They usually operate in variable conditions of suction / discharge pressure, capacity handled, speed, etc.

Specially in case of reciprocating and other volumetric compressors, all these conditions generate different alternate torques whose harmonics could produce resonance phenomena and cause the amplification of the torsional stresses to dangerous levels.

CST offers proper design solutions through state of art calculation methodologies and component selection.

**Lumped parameter model calculation** for crank-mechanism using dedicated FEM analysis

**Exciting torque harmonics calculation** (i.e. reciprocating compressors torque calculation by CST proprietary software Reciperf)

**Optimum flywheel and coupling selection**

**Electric motor air-gap effect** in steady-state and transient conditions

## Torsional analysis by CSTors

CST proprietary software **CSTors** allows to perform API 618 compliant studies in a short time, allowing **quick response time**, in terms of a few days.

## Modal analysis

to determine the presence of possible resonance between exciting harmonics and compression train natural frequencies, in order to identify the parts of compression train more sensitive to the exciting harmonics.

## Steady-state forced response analysis

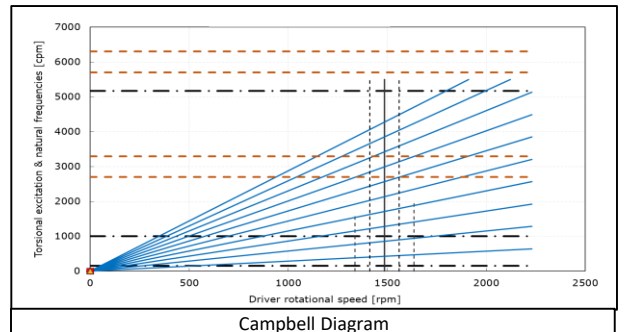
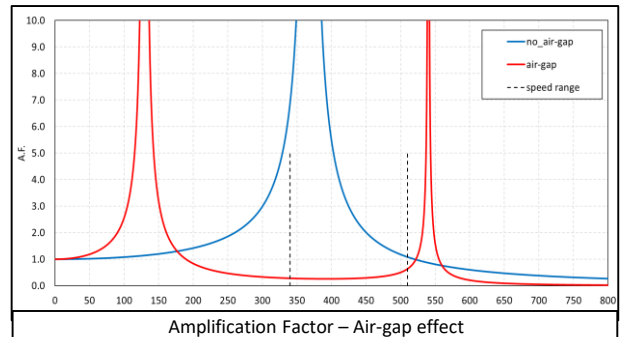
to determine alternate torque for each shaft interval and angular displacement of each node of the train (both in frequency and in time domain).

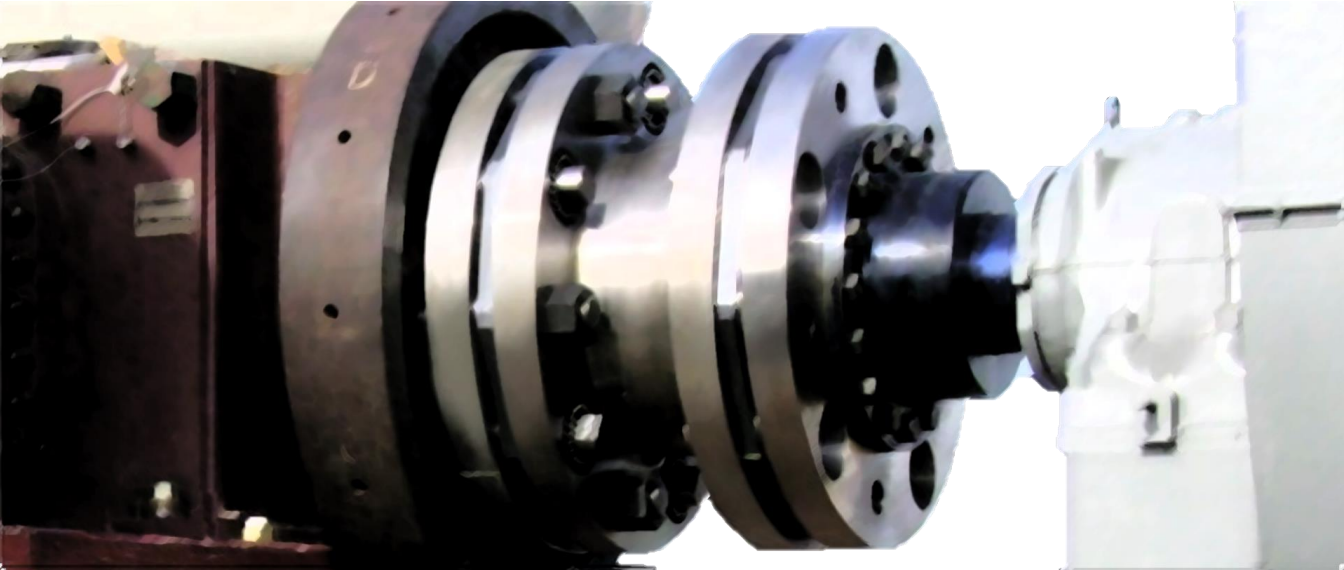
## Transient analysis

to evaluate torsional problems of the compression train during the start-up or other special situations (emergency shut-down, short-circuit).

## Post process evaluation of the reliability of the unit

torsional shaft stresses must be compared to the endurance limit, calculated taking into account all applicable fatigue factors for each part of the compression train.





# CST PLUS

Thanks to its multi-decade experience in compression system design and service, CST can provide to its customer, not only torque and stress calculation analysis but the best customized design solution for the specific application, as well as necessary field assistance to proactively solve any problem.

So, what's our plus?



### Long experience

Technology senior leaders whose knowledge is indisputably recognized worldwide.



### High tech tools

We are always at the cutting edge of technology.



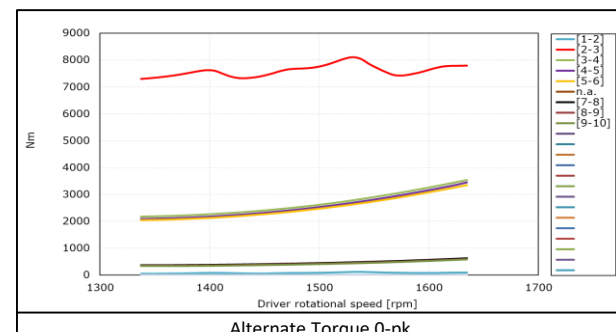
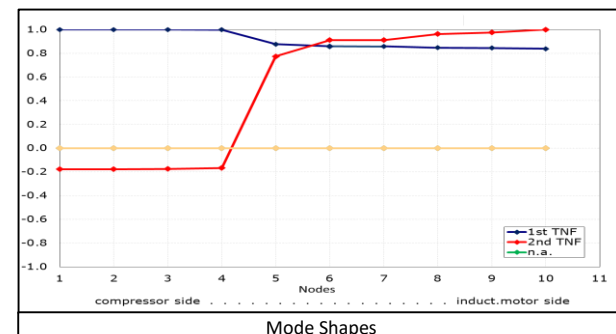
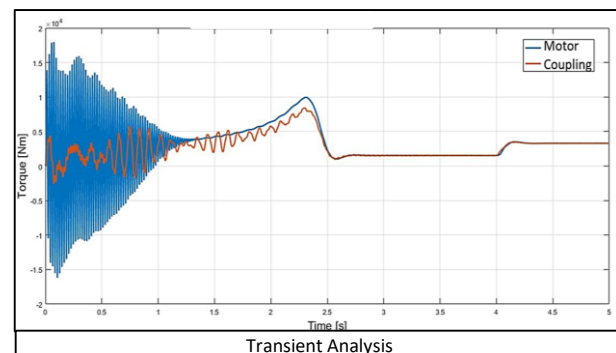
### Quick reaction time

On the contrary of large, heavy organizations, CST can mobilize its specialists to the farthest place in the world with a very short advance.



### Fields interconnections

CST Service experts are compression system and machinery specialists too: this is the key for providing effective and preventive suggestions and recommendations.



## CST SERVICE PORTFOLIO

- Pulsation and Vibration Analysis
- Rotor-dynamic Analysis
- Torsional Analysis
- Field measurements
- Machinery upgrades
- Lubrication system
- Training
- Troubleshooting

C.S.T is a high technology design and maintenance engineering company, established  
By a group of experienced engineers to support OEMs, Packagers, Main Contractors  
And End Users in designing, assembling and servicing compression equipment.



#### **Compression Service Technology**

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C.S.T Proprietary information

The images contained in this document are only intended to illustrate the service:

The actual supply is defined in the proposal, which will be customized for each application.