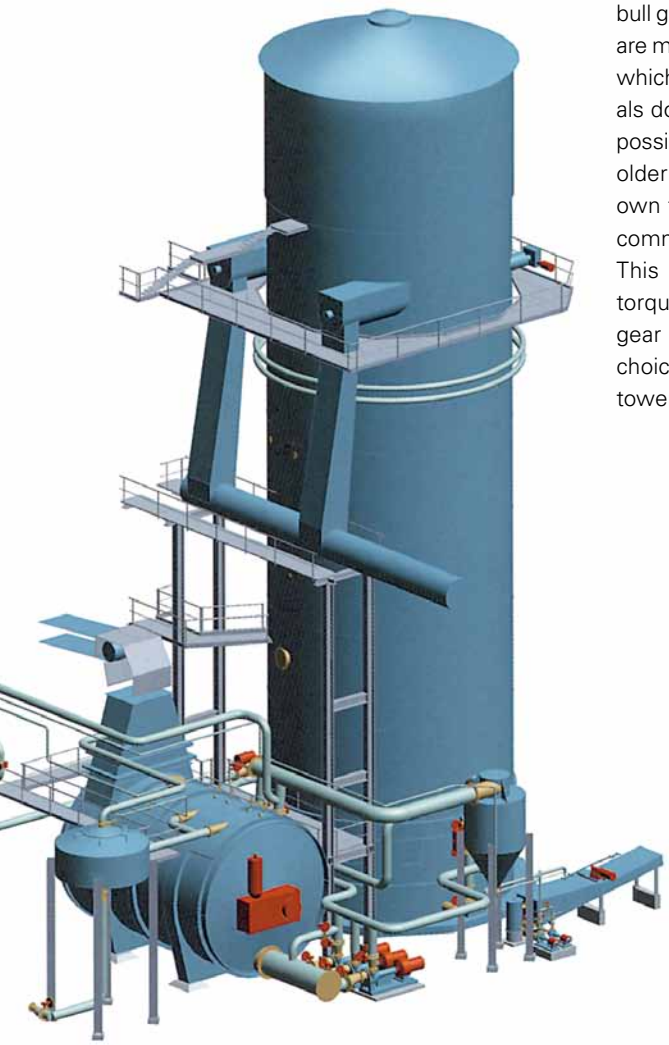
Sugar beet extraction systems in the USA

The last few years have seen an increased interest of the US sugar beet industry into the modernization of their aging extraction systems. There are different reasons why an extraction system might need a modernization and of course different steps or in other words degrees of change to reach this goal.

One way to improve the performance of an existing system is the addition of a counter-current cossette mixer CCCM or the replacement of a co-current mixer with a counter-current one. A CCCM is basically a giant heat exchanger which improves the heat economy of the extraction system and reduces the steam consumption for the factory. It uses the hot raw juice from the extractor to pre-heat the cold cossettes. The cold raw juice leaving the CCCM also helps to prevent infections.

Another option to modernize a system is to extend the extraction length of the extraction tower. This is of course only possible if the tower does not already have the maximum length. The top of the tower with the drive is separated and set down, the new sections (shell and tube shaft) are welded in, and the top is welded back onto the extension. Most of the time the tower will need one or two additional drives on the bull gear. The benefit of this option is an increased slice rate, a reduced draft, reduced pulp losses or a combination. A lower draft does help to improve the energy efficiency.

The addition of drives might not be possible because all drive spaces are already occupied or the bull gear already shows signs of considerable wear and tear. These circumstances typically lead to the replacement of the entire one piece bull gear drive system with a modern segmented bull gear and planetary gearboxes. The segments are made from the natural hard Kymenite material which does not tend to crack as hardened materials do. The use of planetary gearboxes makes it possible to transfer higher torque compared to the older parallel shaft gearboxes. Each drive has its own frequency converter, and these converters communicate directly in a master-follower array. This ensures a fast communication and equal torque distribution. A segmented modern bull gear and planetary gearboxes are an excellent choice if the original drive is worn even without tower extension.



Top part of the extraction tower shaft

with segmented bull gear during

fabrication

Last but not least there is the option to replace the entire extraction system with a modern BMA Tower-2000 system. This could be the replacement of an old slope diffuser or an old RT drum. But even the replacement of older style tower diffusers does make sense. The BMA Tower 2000 combined with a CCCM is a low draft, low pulp loss design which offers energy efficiency improvements for the factory. The raw juice is exclusively drawn through side screens which are integrated into and flush with the outer shell. The juice collection channels are designed to always be 100 % rinsed by the juice flow. This reduces the risk of infection. The bottom screens used in older design have been eliminated. This avoids the damage by foreign objects and consequential regular maintenance. The infection risk is further reduced because there is no need any more for juice channels under the bottom screens.

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- Energy savings owing to low draft
- Minimised infection risk
- Reduced maintenance needs