

SUMMARY

The task of this master's thesis was to plan and develop a powder mixing production unit for Revala OÜ. The main objectives of the thesis were to plan and develop an efficient production unit, being convinced before that it is more profitable for the company in the long term than outsourcing a service.

Before starting production planning, the internal discussions and decisions were held on, information was gathered from other companies at similar production field as the manufacturing unit being developed and the gathered info was analyzed. Various options were deeply and repeatedly discussed in the company's management.

The planning of the production unit was started with brainstorming to understand what the company's own production unit gives to the development of the company and what threats it entails. A SWOT analysis was prepared for this purpose. After a thorough and large-scale analysis, which included the selection of the production building, production line and food safety management system, moved on to choose the suitable production building. The criterias that the production building must meet were carefully written down.

Food safety is extremely important and inevitable in food industry, in the production that deals with food handling. In order to ensure confidence for the customers as well as for the company, it was decided that the new production unit must be certified. This alone does not give confidence to the customers, but also gives the company's management a better overview of the dangers, ways and needs to avoid these.

The company had no previous experience as a manufacturer and did not have any of the necessary machines for the produce of powder mixes. The selection of production equipment was based on previous and expected sales volumes, which were based on the sales amounts of previous years. It was necessary to find out what the production capacity of the machines should be to meet the company's needs.

After a long and thorough planning of the production unit, the development of the unit began. For this, a building was chosen out for a rent, and a powder blending production line was ordered, both of which met the planned needs of the company. In addition, some reconstructions were made so that the building and production also meet food safety requirements.

Once the equipment arrived, the production line was installed and the necessary changes were made so that the line would work more efficiently. At the same time both the requirements accompanying the food safety certificate as well as the principles set by the company would be guaranteed. From the beginning of the start of the production, started to collect as much information as possible from the production process in order to understand if there are any and where the bottlenecks occur and what would need to be changed to solve them.

At the end of the thesis, the problems that arose during the production start-up, the changes that were made and the observations that should be observed in the future when developing a new line or production were highlighted.

In the penultimate chapter, the return on investment was calculated to make sure that the creation of this production facility was profitable for the company.

As a result of the development of the production department, a production unit with a production capacity of 4 tons of product in one eight-hour shift was completed. Analyzing the key indicators revealed that the length of the production cycle and the transition time are two basic factors, the reduction of which would improve production efficiency. If the improvements are implemented, it would be possible to increase the daily production volume by 0.8 tons. According to calculations, the company's investment is worth it in the first year.

As a result of this master's thesis, a complete solution for the development of production was prepared, which considered both the criteria given by the company and the possibilities that orders will increase in the coming years. Solving the rising problems, various options have been thought through and the optimal solution has been found among them.

The author of this work considers that this production unit meets the company's and food safety criteria. It is a production unit that can be made even more efficient. In the future, the company should think about the automation of the line, which would reduce the workload of the workers. Also there should be an additional inspection of the package for the food safety, which would be a metal detector.

In conclusion, there can be admitted that planning and developing a simple production process was more complicated and time-consuming than initially expected. The author of the thesis believes that the topics discussed in depth in this work is very closely related to the profession, providing engineering solutions, the need for planning skills, as well as

leadership qualities - the guidance and training of workers. The author of the work believes that the master's thesis provides a good and comprehensive overview of planning and creating of production facility according to the needs and possibilities.

However, the author considers the most important fact for himself and the company is that the master's thesis is not just a hypothetical theoretical work in written, but the result of it is a real production company that has been operating successfully for 5 months already and produced more than 100 tons of powder blends.

KOKKUVÕTE

Käesoleva magistritöö ülesandeks oli planeerida ja arendada pulbrisegamise tootmisüksus ettevõttele Revala OÜ. Lõputöö peamiseks eesmärkideks oli efektiivse tootmisüksuse planeerimine ja selle arendamine olles veendunud, et see on ettevõttele pikas perspektiivis kasumlikum, kui teenuse sisse ostmine.

Enne tootmise planeerimise alustamist viidi läbi ettevõttesisesed arutelud ja tehti vastavasisulisi otsuseid, koguti infot teistelt arendatava tootmisüksusega sarnase tootmisvaldkonna ettevõtelt ning analüüsiti kogutud infot. Ettevõtte juhtkonnas arutati süvitsi ja korduvalt erinevaid variante edasiseks.

Tootmisüksuse planeerimist alustati ajurünnakuga, et saada aru, mida annab ettevõtte enda tootmisüksus ettevõtte arengule ja milliseid ohte see endaga kaasa toob. Selleks koostati põhjalik SWOT-analüüs. Pärast põhjalikku ja suuremahulist analüüsi, mis hõlmas tootmishoone, tootmisliini ja toiduohutuse juhtimissüsteemi valikut, liiguti edasi sobiva tootmishoone valikuni. Hoolikalt pandi kirja kriteeriumid, millele tootmishoone peab vastama.

Tootmises, mis tegeleb toiduainete käitlemisega, on äärmiselt tähtis toiduohutus. Tagamaks nii klientidele, kui ka ettevõttele kindlustunnet, otsustati, et uus tootmisüksus peab olema sertifitseeritud. See ainuüksi ei anna klientidele kindlustunnet, vaid annab ka ettevõtte juhtkonnale parema ülevaate tekkivatest ohtudest ning vajadustest ja võimalustest neid vältida.

Ettevõttel ei olnud varasemat kogemust tootjana ega omanud seni ühtegi vajalikku masinat pulbersegude tootmiseks. Tootmiseseadmete valikul lähtuti eelnevatest ja eeldatavast müügiimahtudest, mille aluseks võeti eelnevate aastate realistasiooni käive. See oli vajalik, et teada saada kui suure võimsuse ja tootlikkusega tootmiseseadmeid ettevõttele vaja on.

Peale pikka ja põhjalikku tootmisüksuse planeerimist alustati üksuse rajamisega. Selleks renditi sobiv hoone ja telliti pulbersegamise tootmisliin, mis mõlemad vastasid ettevõtte planeeritavatele vajadustele. Lisaks tehti mõningad ümberehitused, et hoone ja tootmine vastaks ka toiduohutusenõuetele.

Seadmete saabumisel paigaldati tootmisliin ja tehti vajalikud muudatused, et liin töötaks efektiivsemalt ning samal ajal oleksid tagatud nõuded, mis kaasnevad toiduohutuse

sertifikaadiga tulenevatest nõuetest, kui ka ettevõtte poolt seatud põhimõtetest. Tootmise käivitamise algusest hakati koguma tootmisprotsesside käigus võimalikult palju infot, et aru saada kas ja kus tekivad kitsaskohad ning kas ja mida oleks vajalik muuta, et neid lahendada ning tulevikus ennetada.

Lõputöö lõpus toodi välja tootmise käivitamisel esile kerkinud probleemid, tehtud muudatused ning tähelepanekud, mida edaspidi uue liini või tootmise arendamisel jälgida.

Eelviimases peatükis arutati investeringu tasuvus, veendumaks, et selle tootmisüksuse loomine oli ettevõttele kasumlik.

Tootmisosakonna arendamise tulemusena valmis tootmisüksus tootmisvõimsusega 4 tonni toodet ühes kaheksatunnises vahetuses. Põhinäitajaid analüüsid selgus, et tootmistsükli pikkus ja üleminekuaeg on kaks põhitegurit, mille vähendamine parandaks tootmise efektiivsust. Parenduste elluviimisel oleks võimalik päevast tootmismahtu suurendada 0,8 tonni võrra.

Arvutuste kohaselt tasub ettevõtte investering tootmisüksuse loomisse esimesel aastal end ära.

Käesoleva magistritöö tulemusena valmis terviklik lahendus tootmise loomiseks ja vajadusel ning võimalusel ka edasi arendamiseks, mis arvestas nii ettevõtte poolt antud kriteeriume kui ka eeldust, et tellimuste arv ning maht lähiaastatel suurenevad. Tekkivate probleemide osas on läbi mõeldud erinevad varuvariandid ja nende hulgast leitud optimaalne lahendus.

Käesoleva töö autor leiab, et antud tootmisüksus vastab ettevõtte vajadustele ning ootustele ja samuti on kooskõlas toiduohutuse kriteeriumitega. Tegemist on tootmisüksusega, mida saab edaspidi vajadusel veelgi efektiivsemaks muuta. Tulevikus, tootmismahdade kasvades, peaks ettevõtte mõtlema liini automatiseerimisele, mis vähendaks tööliste koormust ja tõstaks tootmise efektiivsust. Samuti tuleks toiduohutuse seisukohalt täiendavalt lisada valmis pakendite automaatne kontroll, milleks oleks metallidetektor.

Kokkuvõtteks võib tõdeda, et lihtsa tootmisprotsessi planeerimine ja väljatöötamine oli keerulisem ja aeganõudvam, kui esialgselt planeerituna arvestatud oli. Lõputöö autor leiab, et käesolevas töös süvendatult käsitlust leidnud teemad on väga tihedalt seotud

omandatud erialaga, pakkudes insenerilahendusi, viidates planeerimisoskuste vajadusele, aga ka juhiomadusi proovile panev – rakendades töötajate juhendamist ja koolitamist.

Töö autor usub, et magistritöö annab hea ja tervikliku ülevaate tootmishoone planeerimisest ja tootmisüksuse loomisest vastavalt vajadustele ning võimalustele. Kõige tähtsamaks ja oluliseks enda ning ettevõtte jaoks peab autor aga seda, et magistritöö puhul pole tegemist pelgalt kirja pandud hüpoteetilise teooriatööga, vaid tänaseks juba 5 kuud edukalt toimunud tootmisettevõttega, mis on tootnud rohkem kui 100 tonni pulbersegusid.