

Design of railway project (Matroh – Gargob port Railway line) .

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Abstract- The development of the port city and the upgrade/expansion of local and regional transportation networks are considered as two mutually beneficial endeavors and could be developed in tandem . Gargoob Sea Port will not only benefit from this strategic location, but it could also become a catalyst for the expansion and development of those transportation networks

- The country is interested of construction a new projects like construction a railway line from Gargoob port to Matrouh that for more reasons :-

1. Decrease the crowding problem in Alexandria port ; That the new port will the Alternative choice To the old port by the new line that will be constructed .
2. The line will be a good transporter for the trading budget and for the people at the line .

I. INTRODUCTION

Transportation plays a major role in the daily life of human beings. It is necessary for things to be moved around and as transportation systems have developed over time, the speed and efficiency of these systems have improved drastically.

- The importance of transportation is showcased in how individuals, businesses, and governments rely on it to access resources. A society cannot function optimally if it does not have measures in place to facilitate transport. From movement to work to

travel around the world, being able to arrive at various places or deliver different items on time is vital for overall productivity and sustainable development. People, resources, jobs, and economies all need seamless movement to keep the entire world moving forward. Transport has helped to enhance life over the years and the current world would not be able to thrive without the ability to transfer things from one place to another. In general, different parts of the world would not have been able to achieve a fraction of what they have if there was no transport .

- One of the most important ways of transportation is the railway. WHY??

If someone said, ‘It is the economy’, then definitely, railway is one of the factors underpinning the robust economy of a country. Railway is the most efficient, the quickest and cheapest method of transporting people and goods in the world. All the industrialized nations have well developed railway networks spread to all the corners of their countries.

? Railways are also considered a factor in industrial settlement, as its importance is evident in the production and distribution stages, where there are opportunities for transporting raw materials, labour and intermediate goods, as well as transferring production to storage and consumption areas.

? Most of the countries of the world consider the railways among the national projects of national profitability, meaning that their returns are indirect, and therefore they are not subject to commercial profitability measures, but are measured by the social and economic benefits and gains they achieve.

? The expected social and economic returns can be determined, for example, but not limited to the following :-

- Urban expansions and civilized population gatherings.

- Providing social and economic services and establishing commercial activity.

- Establishing associated transformative industries and services that lead to job creation .

- Saving energy and preserving the environment.

- Reducing the volume of investments required to construct new service roads and reducing the annual and periodic maintenance costs to maintain damaged roads due to traffic volume.

- Reducing traffic congestion, reducing the risks of accidents, reducing deaths,

providing safe transportation, being punctual, and the social and material gains that result from that.

- In the following research, we discussed the problems that the Arabian Republic of Egypt faces from increasing the population and how Egypt managed to find a solution to this crisis by establishing new cities that lighten the burden a little. Then the research reviewed the advantages, characteristics and enumeration of new cities, and the most important cities and their characteristics were mentioned, and the research was concluded with some of the technical characteristics of the railways in Egypt and around the world and the project to be planned and designed. each other regarding power consumption and tracking performance. Finally, some conclusions are contained in Section VI.

II. SURVEYING AND DEFINE ALIGNMENT

We choose the alignment from many approaches:-

First for length:-

- Prefer to be parallel to the contour lines

- Prefer to be short as possible

- Prefer to be parallel to highways roads

- Use of Bridges, Tunnels & Slipways

- Intersections with highways use bridge

Second For use tunnels if necessary, because of high cost:-

- Intersections with local roads >> Use slipways

- Respect major highways if possible

- other considerations

- Prefer to limit use of horizontal curves

- Respect military areas

- Build stations near of central areas assumptions

- Re-map the population and its geographical distribution in Egypt, while creating a new urban environment that is more organized and attractive to absorb part of the overpopulation in the existing cities.

- Solving some of the existing problems of cities, such as overcrowding, deteriorating facilities, and narrow spaces available for urban expansion and services.

- Create an incentive for the flow of capital and attract investors to the new areas by creating the appropriate conditions for projects in the field of industrial production and services. The target numbers for the population of all new urban community's ranges between half a million to six million, while the target numbers are relatively lower in the newer urban communities in other regions. The state has continued to increase the number of new urban communities over the years, and it has also increased the geographical area of some new urban communities. Below we will talk about some examples of the new cities that helped the government solving the crisis of the overpopulation problem.

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T 31.352128776 27.231879234 9.0
T 31.352129173 27.229355791 9.0
T 31.352141461 27.226834427 6.9
T 31.351067415 27.224306232 11.6
T 31.34999794 27.221795874 9.9
T 31.348376783 27.220478973 15.9
T 31.346215402 27.220463687 29.3
T 31.344895936 27.219179181 27.3
T 31.342446138 27.216629519 26.6
T 31.340289614 27.215345356 24.2
    
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Map this data: [Leaflet](#), [Google Maps](#), [Google Earth](#), [JPEG map](#), [SVG map](#), or [elevation profile](#) - or go to the [map form](#) to set options

[Return to the "convert" form](#)
[Go to the main GPSV map form](#)

Fig.1 the GPS visualizer surveying

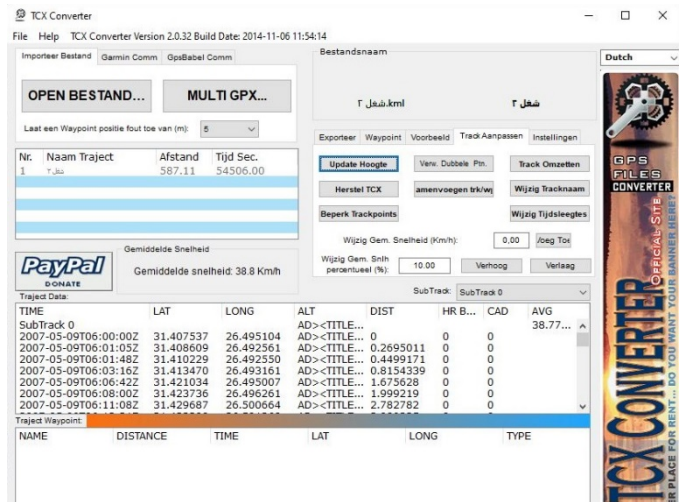


Fig.3 TCX Converter

- The GPS visualizer is the most popular Application to extract the points of the ground surface to begin in choose and design the railway alignment consider the approaches of cut and fill materials and consider the cost of the project.

type	latitude	longitude	altitude (m)	name	desc
T	31.487269006	26.476882077	44.6	maps	
T	31.478735190	26.472309822	47.2		
T	31.474920178	26.470961121	50.3		
T	31.468958687	26.467213218	52.6		
T	31.459970881	26.459133074	56.0		
T	31.454881592	26.457349832	58.8		
T	31.447644005	26.453178791	64.2		
T	31.441679463	26.449454100	73.0		
T	31.437382167	26.444678828	73.6		
T	31.429752647	26.442007775	85.3		
T	31.422036606	26.434403122	92.3		
T	31.412662433	26.427827578	95.2		
T	31.407582442	26.426034858	98.3		
T	31.401231656	26.423797541	100.7		
T	31.395669130	26.418571380	102.9		
T	31.389320483	26.416335155	104.2		
T	31.383365604	26.412605496	106.2		
T	31.375749496	26.409922361	108.1		
T	31.370673859	26.408128372	112.5		
T	31.362578285	26.401999943	111.9		
T	31.354966335	26.399310725	116.9		
T	31.346088169	26.396172577	116.1		
T	31.340139418	26.392434891	113.8		
T	31.335066712	26.390641149	114.0		
T	31.328725270	26.388408093	117.1		
T	31.323652289	26.386624565	121.6		
T	31.313507939	26.383058540	137.2		
T	31.305991507	26.385312884	141.3		
T	31.300921094	26.383530215	141.8		

Fig.2 the surface points.

*Solution which is as follows: -

- Economical study including the constructional and operational costs and passenger and freight tariff to realize feasible project. The following economic data will be used:-

- 1- Alignment and surveying costs = 12000 L.E./kilometre
- 2- Rail costs including its fastenings =1750000 L.E. / kilometre
- 3- Right of way (ROW) costs = 175 L.E. /m²
- 4- Cut and fill costs are 12, 14 L.E. /m³ respectively-
- 5- Earth transport costs= 0.89 L.E / m³/ km
- 6- Ballast cost 20 cm thickness = 45 L.E. / m³
- 7- Ballast life time = 55 years Sleeper cost = 450 L.E. / piece- sleeper life time= 40 tons
- 8- Level crossing costs = 160 L.E. / m³
- 9- Switch costs = 450 000L.E. & Diamond crossing costs = 310 000
- 10- L.E. Buffer stop cost = 10 000 L.E.
- 11- Bridge on River Nile cost = 430 000 000L.E

-Reference; (Institute of Developing Economies. 2020. Egyptian National Railways (ENR) - AGE (African Growing Enterprises) File - Institute Of Developing Economies) .

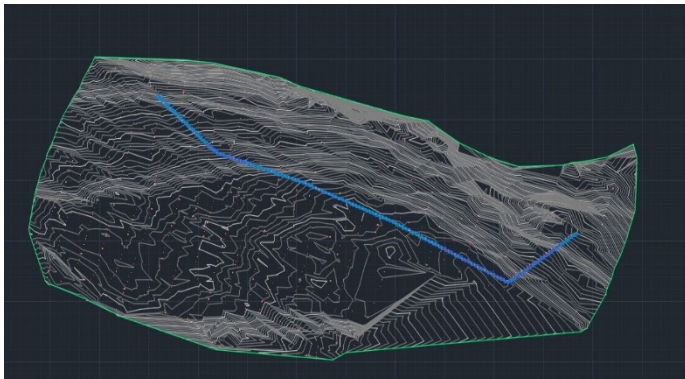


Fig.4 civil 3D Alignment drawing.

III. DESIGN OF RAILWAY LINE

- 1- According to Grades: -
 - Slope at blocks 0.25% or less
 - Slope at station 0-0.25%
 - Other paths don't exceed 1%
- 2- According Earthworks:-
 - Height of fill 12 m or less
 - Depth of cut 12 m or less
 - Volume of cut must be larger than volume of fill
 - Excavation is preferable than backfilling
 - The less earthworks the better

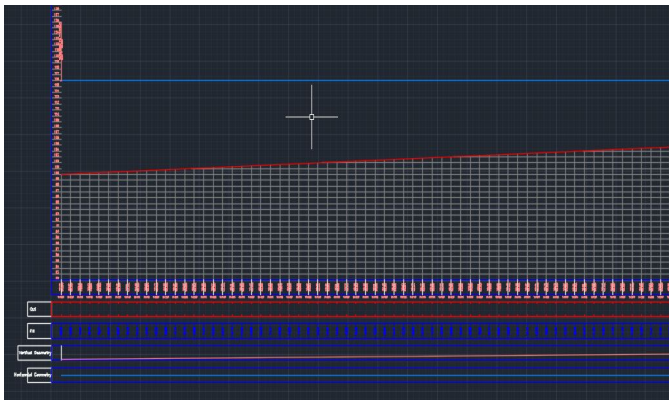


Fig.5 civil 3D profile .

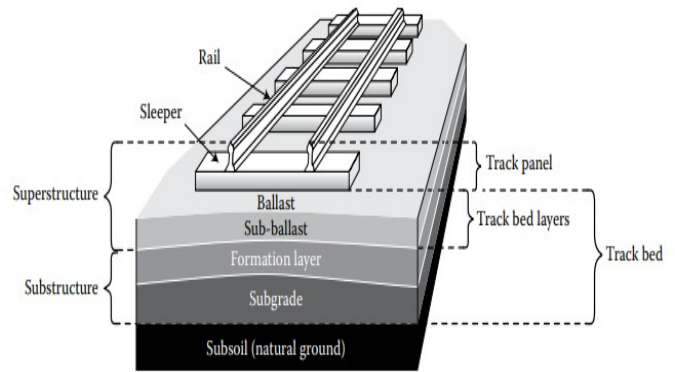


Fig.6 The base & subbase of the soil under rails .

- This is the best mode of transport for the public in the developing countries as they are very cheap. The comfort level offered by the current generation trains also cannot be compared with any other transportation facility. The governments are also trying to increase the number of trains and railway routes to help the people even in rural areas. Hence, railways are very important in the current world for both the developing and the developed countries Railroads are the most efficient transportation mode for moving goods on the earth's surface. Railroads are of particular importance for the movement of commodities that heavy and moved in bulk over long distances where the transportation spend represents a large portion of the total delivered cost .

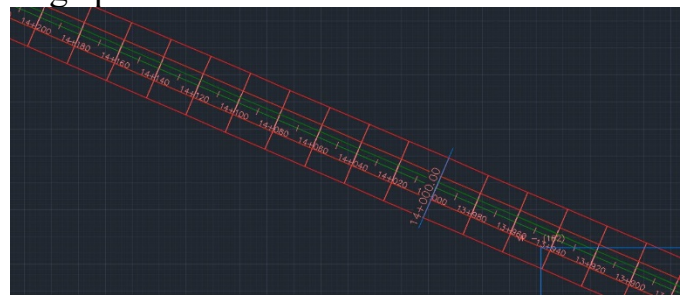


Fig.7 corridor view .

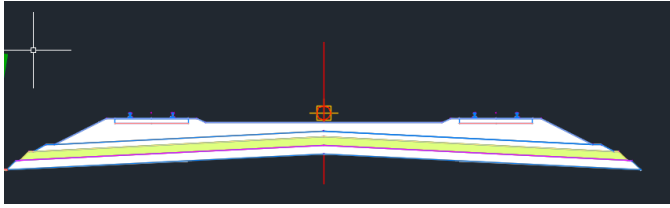


Fig.8 Assembly view .

IV. CALCULATION OF COST OPERATION

- C Operating = Operating cost for passenger
+ Operating cost for freight

- Operating Cost for Passenger=Cost (one
Pass.) x no. of pass. [Go & Back]
= 0.12 x
{(23x65x9x365x276.05)+(19x240x9x365x2
76.05)}x2
=1.31 milliard L.E

- Operating Cost for Freight = Cost (One
Ton) x no. of Tons [Go & Back]
= 0.38 x {(57)x54x32x365x276.05}x2
= 7.54 milliard L.E

VI. CONCLUSION

- In this paper, a The aim of the project is to connect gargob port with matroh city by constructing new railway line by the most economical way .

- more easily work together due to the decreased travel Time.

ACKNOWLEDGMENTS

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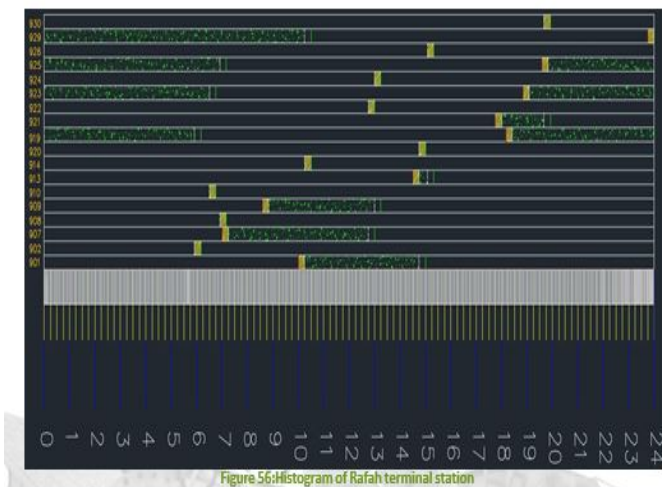


Fig.9 Histogram

REFERENCES

- Baseera.com.eg. (2020). Retrieved from <http://www.baseera.com.eg/>
- Egypt Population (2020) - World meter. Worldometers.info. (2020).
- Egypt plans to construct 50 four-generation cities by 2050: Cabinet Spox. Egypt Today. (2020). Retrieved from
- Map, E. (2020). مصر مشروعات | خريطة | Egypt's Projects Map. Egy-map.com. Retrieved from <https://www.egy-map.com/project/>
- Ltd, P. (2020). Home Page | The Railway Technical Website | PRC Rail Consulting Ltd. Railway- technical.com. Retrieved from <http://www.railway-technical.com/>.
- dallasriffle.com, D. (2020). Ship Smarter and Stay Competitive | Partnership. Partnership.com. Retrieved from <https://www.partnership.com/>.
- Business News Live, Share Market News - Read Latest Finance News, IPO, Mutual Funds News. The Economic Times. (2020). Retrieved from <https://economictimes.indiatimes.com/>.
- ThoughtCo.com is the World's Largest Education Resource. ThoughtCo. (2020).
- Institute of Developing Economies. 2020. Egyptian National Railways (ENR) - AGE (African Growing Enterprises) File - Institute Of Developing Economies. Available at: https://www.ide.go.jp/English/Data/Africa_file/Company/egypt03.html
- مصر حديد سكك. Enr.gov.eg. (2020). Retrieved from <https://enr.gov.eg/ticketing/public/login.jsf>.