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Investigation of Corrosion Metal in Oil Industry in Iran

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ABSTRACT: Erosion is one of the important unlikely problems in oil refining industry that produces many damages and values to refining parts. In other part stop of refining operation for repairing is very expensive. Many erosions are happened in refining operations when equipments are placed to atmosphere, Powerful acids, eruption gases, hydrocarbon vampires and high temperature make very complex situation in oil refining industry, Monotonous erosion, cavity erosion rubbing erosion, stress split are more common erosions in oil refining systems that will be search in this survey.

KEYWORDS: Erosion, Oil Refining Industry, Erosion Control, Gas.

1 INTRODUCTION

Crosio is always one of the important unlikely problems in oil refining industry and increases operation and maintenance expense also prediction stops in production line and repairing of pipes and equipments are very expensive. Production line stop makes a situation that produces powerful. Erosion for repairing, equipment is placed to atmosphere, when metal covers are in air and moist cavity erosion and stress split are produces. When equipments in production lines are washed by water, remaining of water produces moist and increases erosion. Among different metals, just some of them can be used in equipments and pipes in refining. These metals include carbon steels stain less steels, and in less scale. Aluminum, Nickel, titanium all of these metals according to different situations experience different kinds of erosion. Erosion is happened in direct reaction between metal and environment. Generally erosion in oil refining are divided into two groups low temperature and high temperature low temperature erosion happens in water situation with 260^0C. For example carbon steels are used to maintain hydrocarbon vapors in this temperature. Hydrogen colored or hydrogen solphid needs more powerful material in this search erosion connects to oil refining industry are analyzed and prevention ways are mentioned.

2 EROSION IN LOW TEMPERATURE

Many of erosions are not happened by hydrocarbons but they are produced by water, hydrogen solphid, hydrochloric acid, hydrofluoric acid. Two basic sources are food pollution and chemical pollution. Important factor in low temperature in refining is pollution include oil. Much pollution removed in first materials but many of them remain in refining tanks and some of the pollutions are related to pipe lines or stores. In many times erosion materials are produced in first part of refining. For example hydrogen chloride is produced by warming manyezim and calcium in crude oil some others are produced by stopping production line in air. In this section the most important pollution introduced.

3 EROSION BY AIR AND WATER

When production line stops, equipments are placed in air. Air also can enter through pumps and other loose parts. Generally air pollutions are important factor in increasing erosion in refining crude oil in vacuum situations. There is water in all kinds of crude oil and complete remove is very difficult waste is work as a electro lit and with hydrolyze in chloride

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materials produces hydrogen coloride. Water is responsible for much erosion in distillation tower systems. Water and air combine can be dangerous. Moist and air are produced in taking air in pumps and temperature changing in tanks tank activity and erosions are closely related to each other. Because crude oil and heavy oil produce oil supportive layer in tank walls, Erosion is limited to upper and bottom parts bottom erosion in oil tanks are produced by air and salt. Also sour crude oil and salt are factors for erosion. Erosion layer likes to increase erosion. Spilt in erosion parts has Anode roles and other parts become cathode. Erosion is tank walls cavity erosion is very dangerous become because it isn't monotonous. Erosion is related to water and air amount in system.

4 EROSION WITH HYDROGEN SOLPHID

Hydrogen solphid is very important erosion in refining. Salt crude oil and hydrogen solphid gases are used as food in refining. In other hands in high temperature hydrogen solphid is produced by analyzing solphid materials. Steed erosion with hydrogen solphid produces solphid black film and it is seen in all of the refining equipments hydrogen solphid is one of the important parts in refining salt water and can increase erosion in upper parts of distillation tower systems for example steam and soulphuor recycling parts are seen very serious problems. Generally carbon steels have high resistance against solphid erosion one of the reason is solphid film is a supportive part in steel level. To prevent hydrogen stress split (solphid split) should prevent boiling samples with high degrees (upper them 200 Bril) we can solve this problems with temperature activity and with putting 400 Ali yazh in stores that can prevent cavity in high level. In must pay at tension that Ali yazh in solphid situation and in 150^0C temperature has low resistance. If coloride amount is not very much putting ali yazh 405 or stainless steel 304 will be suitable. Recently 2 gride titanium is wed instead of carbon steels in solphid erosion situations in heating transformers.

5 EROSION WITH HYDROGEN CHLORIDE

Hydrogen chloride erosion in oil crude distillation is happened and with low level we can find in Reformer parts. Hydrogen pollution is seen in special footsore it is produced by hydrolyzed catalyst aluminum coloride. Also in mange of crude oils we can seen solved or solid coloride salts. Generally crude oil includes 75 percent of sodiyom coloride, 15 percent of many exam coloride 10 percent of calcium coloride. When crude oil goes to distillation part and warm until 120^0C manyezium and calcium coloride are produced. Sodiy omcoloride has resistance until 760^0C. Also soft coloride acid is produced in upper tower and upper parts of distillation system. Carbon steels parts in coloride solution in temperature under dew temperature can produce erosion. With decreasing, erosion is increasing upper distillation systems are made of carbon steels. In coolers and water sets, sea steels are wed to decrease erosion. For places that we can see hard coloride erosion, gride titanium is wed. To decrease coloride in crude towers the best method is to decrease crude oil salt. This operation is done by removing salt from Tighes tankand twice salt removing.

6 EROSION WITH CO_2

In many times of oil refining hard erosion happened in pipes, taps and transformation lines basic reason is oil and gas have many different amounts of water that can sediment in different materials. Water has CO_2 and sometimes H_2S and some kinds of salt. Also, in many of hard erosion, CO_2 has important roles. In this action CO_2 combines with steel and $FeCO_3$ is produced on steel level. This sediment according to basic metal is cathode and with a small problem cavity erosion developed. This situation increase in production section, Erosion amount in bad production situation reaches to 10mm /year important factors in oil and chemical in dustiest are:

1. Water that can be wed as a separate part.
2. Salt in water, similar to sea water, less or more that is related to situations.
3. High pressure.
4. High CO_2 levels in gas. If we have high pressure, CO_2 Limit pressure will increase. Usually gas and oil have erosion characters when CO_2 pressure becomes twice. According to situation limit pressure more than %2 can make erosion.
5. High temperature that increase action's speed.
6. High flow that can be active with removing $FeCO_3$ studies are shown rubbing erosion in North Sea happens when flow speed is between 7 to 10 meters in second.

7 CONCLUSION

High temperature erosion: This erosion in refining is very important equipments usually high temperature analyze. In high pressure some of equipments near to hydrocarbon steam may be catch fire. High temperature erosion generally is related to solphid combines with crude oil erosion with different solphid combines in temperature between 260 to 540 is one of the common problem in oil refining. Play solphid, hydrogen solphid and hydrogen solphid. Solphid erosion in high in temperature increases. According to the situation, monotone us erosion, cavity erosion, rubbing erosion will happen. Erosion control depends to solphid supportive film that is grown as Para bulk. Generally, Nickel and Nickel Ali yazh, Attack very quickly with solphid combines but Corom steels in these situations has more resistance (such as aluminum) hydrogen solphid and hydrogen combines are more active and generally stain less steels are more suitable in these situations. For prediction of crude oil erosion we use Economies. These graphs are according to soulphuor Economies on process's changes in erosion.

Fig. 1. Hydrogen Blistering

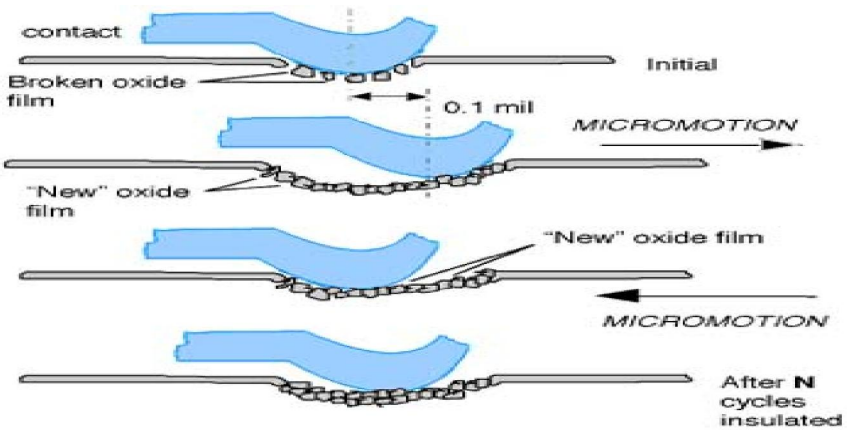

Fig. 2. Fretting Corrosion

Fig. 3. Crevice Corrosion in a Flange

Is shown one Makconomi graph. This graph shows useful effects of Corom steels that stain less steels that have 12% Corom show no erosion. Erosion in more than 455 temperatures will decrease and this is related to soulphuor combines and production of protective Coca layers.

Stress split: Stress split is one of the sudden problems. This problem usually happens without any reason and it is very expensive. For example split will happen in fire place after one hour that is placed in air tower connections and heating Tran's formers encounter with this problem. Hydrogen attacks in high temperature will suddenly split stores in high pressure. Generally stress split in different situations. Such as coloride, Amnions, Amines, acid, Will happen, coloride are one of the important factors in stress split in stain less steels and Nickel Ali yazh. In theory with one color deyou in water, efficient oxygen and remaining stress will produce split. At work all situations are prepared and coloride yon amounts are more.

Common stress split in stain less steels is middle piece. Sometimes border piece erosion happens with middle piece erosion but it isn't very common studies show stain less steels and Nickel Ali yazh that contains more than 30% Nickel are safe against stress erosion. Important factors in split include coloride, Oxygen, temperature, stress, PH levels in solution. With increasing Oxygen split will decrease. Graph 4 shows effect of Oxygen and coloride you levels on erosion. For example when transformer tube handle stops in air split will happen. Parts that are placed in direct sun have more dangers. Necessary stress for split is always can find. Stress for producing shapes, bending and connection are important factors for splitting so removing stress is very important. Faritistain less steels are more resistance against solphid erosion than Stnity stain less steels but still they can't resist against erosion. We must pay attention that stress split happens when equipments are placed in air and moist in repairing times.

7.1 EROSION CONTROL

These factors are important for erosion control:

1. Material selection
2. Suitable plan
3. Operation situation
4. Using anti- erosion materials
5. Covens

Important changing process for decreasing erosion:

1. Temperature decrease
2. Erosion levels
3. Decreasing flow for decreasing erosion
4. Removing oxygen
5. Water level control

Plan changing for preventing erosion:

1. Changing connection parts with Feeling connection for decreasing split erosion
2. Equipment plans for cleaning
3. Decreasing of mechanical
4. And moving stress
5. Heating transformers must work in low temperature
6. Conclusion
1. Erosion is one important unlikely problem in refining
2. Monotonous, cavity, stress split, erosion are more important erosions in refining
3. CO_2, H_2S are very important factors
4. High temperature is one of the important factors in erosion.

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