

**DRONES, DRIVERLESS TRUCKS, AND THE REST OF THE FUTURE
WHAT COULD GO WRONG?**

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THANK YOU FOR THE KIND INTRODUCTION. AS THE TITLE TO MY PRESENTATION SAYS, I AM HERE TODAY TO TALK WITH YOU ABOUT THE FUTURE OF FREIGHT TRANSPORTATION IN THE U.S. AS I SEE IT. SINCE YOU ARE ALL INVOLVED IN THE CONFECTIONARY BUSINESS IN ONE WAY OR ANOTHER, I THOUGHT YOU WOULD WANT TO HEAR AN IMPORTANT FACT: "DO YOU KNOW THAT THERE ARE TWO TYPES OF PEOPLE IN THIS WORLD: PEOPLE WHO LOVE CHOCOLATE AND LIARS. "

AN ANONYMOUS AUTHOR ONCE SAID, "A GOOD FORECASTER IS NOT SMARTER THAN EVERYONE ELSE, HE MERELY HAS HIS IGNORANCE BETTER ORGANIZED." I HOPE TODAY THAT MY FORECASTING IS SLIGHTLY MORE THAN IGNORANCE AND, AS WINSTON CHURCHILL SAID, "I ALWAYS AVOID PROPHECYING BEFOREHAND BECAUSE IT IS MUCH BETTER TO PROPHECY AFTER THE EVENT HAS ALREADY TAKEN PLACE."

BEFORE I LAUNCH INTO MY REMARKS, ALLOW ME TO EXPOUND BRIEFLY ABOUT SOME ADDITIONAL BACKGROUND REGARDING MY HISTORY IN THE TRUCKING INDUSTRY.

- MY INITIAL JOB IN THE INDUSTRY WAS ACTUALLY AT A FORERUNNER OF A TRANSLOAD OPERATION – WHERE FREIGHT WAS BROUGHT TO THE WAREHOUSE BY RAIL, MOVED INTO A WAREHOUSE, AND THEN TRUCKED

OUT. ON THE VERY FIRST DAY ON THE JOB, MY BOSS INSTRUCTED ME ON HOW TO DRIVE A FORKLIFT. I PROMPTLY MANAGED TO DRIVE THE FORKS THROUGH THE FIRST LEVEL OF CIGARETTE CASES ON A PALLET.

- A FEW YEARS LATER, I WAS HIRED TO BE THE GENERAL COUNSEL OF TWO TRUCK LINES. IMAGINE MY CONFUSION WHEN FIRST HEARING THE TERM "DOUBLE BOTTOMS." AND THEN I WAS CONFRONTED WITH THE TERM "TWIN SCREWS", WHICH REALLY THREW ME FOR A LOOP. I SOON CAUGHT ON TO THE LINGO AND FROM THAT POINT ON, I HAVE BEEN ENGAGED IN ONE FORM OR ANOTHER OF FREIGHT TRANSPORTATION IN THE U.S. AND CANADA.

TODAY MY TALK WILL FOCUS PRIMARILY ON WHAT I SEE UPCOMING REGARDING THE TRANSPORTATION OF GOODS BY TRUCKS, DRONES, AND BLIMPS (YES, BLIMPS). I WILL ALSO ADDRESS OTHER MODES SUCH AS RAIL, INTERMODAL OPERATIONS, AND PORTS AND WHAT I FORESEE COMING IN THE NEXT COUPLE OF DECADES IN THOSE FIELDS.

FIRST, AS A PREDICATE, THERE ARE A NUMBER OF INDICATORS THAT THE DOMESTIC FREIGHT MARKETS WILL GROW BY A SUBSTANTIAL AMOUNT IN THE NEAR TERM. THE ATA HAS PREDICTED MAJOR GROWTH IN THE TRUCKING INDUSTRY BY 2022. FOR EXAMPLE, ITS STUDIES SHOW THAT IN 2010, THE TRUCK SECTOR ACCOUNTED FOR 81 PERCENT OF THE TOTAL REVENUE AND 67 PERCENT OF TONNAGE FOR TRANSPORTATION COMPANIES BUT THAT OVERALL REVENUE FOR THE INDUSTRY WILL RISE BY ABOUT 66 PERCENT AND TONNAGE BY 24

PERCENT BY 2022. THESE DATA CAN BE USED FOR SUPPLY CHAINS TO DEVELOP LOGISTIC STRATEGIES, ENABLING SHIPPERS TO IMPROVE THEIR REVENUE AND FIND WAYS TO IMPROVE THEIR SHIPPING CAPABILITIES AND EFFICIENCIES.

HOWEVER, THE TRUCKING INDUSTRY FACES SIGNIFICANT CHALLENGES TO ACHIEVE THIS GROWTH FORECAST. THOSE CHALLENGES INCLUDE:

- OUR CRUMBLING INFRASTRUCTURE. THE TRADE PUBLICATIONS ARE RIFE WITH STORIES ABOUT THOUSANDS OF OBSOLETE AND UNSAFE BRIDGES, HIGHWAYS LONG BEYOND THEIR EXPECTED LIFE SPANS, AND OTHER MAJOR CONNECTIVITY PROBLEMS – ALL OF WHICH HAVE LARGELY BEEN IGNORED AND FUNDING FOR IMPROVEMENTS IS PROBLEMATIC, ALTHOUGH THE FAST ACT IS A GOOD START;
- A CHRONIC SHORTAGE OF DRIVERS COUPLED WITH AN AGING WORKFORCE. TRUCK LINES FACE COMPETITION FROM OTHER INDUSTRIES OFFERING LESS DIFFICULT WORK AND SOMETIMES HIGHER PAY. AND AS WE BABY BOOMERS NEAR RETIREMENT OR ACTUALLY RETIRE, THE AVERAGE AGE OF TRUCK DRIVERS MOVES UPWARD. FORBES REPORTS THAT THE NUMBER OF AMERICANS AGED 55 OR OLDER WILL INCREASE BY 29.7% AND BECOME THE LARGEST SEGMENT OF THE GENERAL POPULATION AND ANY GAINS MADE IN YOUNGER AGE GROUPS WILL NOT BE ENOUGH TO REPLACE RETIRING DRIVERS;

- INCREASING REGULATION – FROM FHWA, EPA, OSHA, DEPARTMENT OF LABOR AND A HOST OF OTHER REGULATORY ACTIVITIES, PLUS STATE ACTIVITIES;
- CONGESTION – ONE ONLY HAS TO TRY TO TRAVEL ON THE BELTWAY AROUND DC OR TRY TO TRAVERSE CHICAGO TO WITNESS THIS. IF YOU THINK RUSH HOUR IS BAD NOW, CONSIDER THIS – THE FHWA ESTIMATES THAT IN THE NEXT 30 YEARS THERE WILL BE 60 PERCENT MORE TRUCKS ON THE NATION’S HIGHWAYS, MEANING A DRAMATIC SLOWING ON 28,000 MILES ON THE NATIONAL HIGHWAY SYSTEM DURING PEAK HOURS AND STOP-AND-GO CONDITIONS ON AN ADDITIONAL 46,000 MILES;
- CHANGES IN DEMOGRAPHICS AND A SHIFT IN CONSUMER BUYING HABITS – NOT ONLY IS THE AMERICAN POPULATION AGING, THE BUYING HABITS TODAY ARE DRAMATICALLY CHANGING WITH ON-LINE SHOPPING AND DEMANDS FOR QUICK DELIVERY OF PRODUCTS; AND
- COMPETITION FROM UNLOOKED FOR QUARTERS SUCH AS DRONES AND OTHER ALTERNATIVE DELIVERY METHODS.

IN RESPONSE TO THESE DYNAMICS, SOME INNOVATIONS AS WELL AS LEGISLATIVE CHANGES THAT HAVE ALREADY BEEN PUT IN PLACE AND SOME ON THE HORIZON.

INNOVATIONS

DRIVERLESS TRUCKS

ONE OF THE BIGGEST INNOVATIVE IDEAS IS THE DRIVERLESS TRUCK. WHAT! - YOU SAY?

A RECENT HEADLINE STATED, "SELF-DRIVING TRUCKS ARE GOING TO HIT US LIKE A HUMAN DRIVING TRUCK." FOR THOSE WHO SCOFF AT THIS IDEA AS A PIPE-DREAM AND ALTHOUGH THE APPEARANCE OF SUCH TRUCKS THROUGHOUT THE COUNTRY IS PROBABLY YEARS AWAY, THERE ALREADY ARE SUCH TRUCKS OUT THERE IN EXPERIMENTAL PHASES.

IN FACT, ON MAY 6, 2015, THE FIRST SELF-DRIVING TRUCK HIT THE ROAD (SO TO SPEAK) IN NEVADA. DAIMLER IS THE DEVELOPER OF THIS VEHICLE AND, ALTHOUGH IT SAYS THERE WILL BE A DECADE LONG TESTING PERIOD BEFORE THE TRUCK IS DEEMED SAFE FOR WIDESPREAD DEPLOYMENT, THE CHANGE IS COMING. AND DAIMLER IS NOT ALONE IN THIS FIELD – A COMPANY BY THE NAME OF OTTO, FOUNDED BY THREE FORMER GOOGLE EXECS, IS ALSO DEVELOPING A PROTOTYPE.

THESE DEVELOPMENTS REALLY DO NOT NECESSARILY DEPEND ON NEW TECHNOLOGY – MUCH OF THAT TECHNOLOGY ALREADY EXISTS – IN THE FORM OF SOFTWARE, RADAR, SENSORS, LASERS, AND CAMERAS.

OTTO HAS ALREADY EQUIPPED THREE BIG RIGS AND IT JUST COMPLETED OVER THE HIGHWAY TESTS IN NEVADA IN MAY. WHY NEVADA – BECAUSE IT IS ONE OF THE VERY FEW STATES WHOSE REGULATIONS ALLOW DRIVERLESS TRUCKS ON THE HIGHWAY. OTTO REPORTS THOSE PRELIMINARY TESTS WERE SUCCESSFUL WITH NO ACCIDENTS OR MECHANICAL PROBLEMS. OTTO IS NOW

RECRUITING 1,000 TRUCKERS TO VOLUNTEER AT NO COST TO THEM TO HAVE THEIR TRUCKS EQUIPPED WITH THE AUTOMATED TECHNOLOGY TO EXPAND THE TESTING.

WHAT HURDLES ARE THERE TO DRIVERLESS TRUCKS?

- LEGAL/REGULATORY – MOST STATES STILL PROHIBIT DRIVERLESS TRUCKS ON THEIR HIGHWAYS (ANYTHING OVER 10,000 POUNDS);
- UNIONS AFRAID OF LOSING JOBS FOR THEIR MEMBERS (POTENTIALLY A REAL THREAT);
- ACCEPTANCE BY THE MOTORING PUBLIC OF SEEING A TRUCK CARRYING 80,000 POUNDS OF FREIGHT WITHOUT A DRIVER. THE STATISTICS CONCERNING DRIVERLESS CARS SHOW THAT THEY ARE ACTUALLY SAFER THAN HUMAN DRIVEN CARS AND, WITH THE EXCEPTION OF TAKE-OFFS AND LANDINGS, COMMERCIAL JETS ARE FLOWN USING AUTOMATION; AND
- THE POTENTIAL EFFECTS ON THE ECONOMY – FEWER DRIVERS, TRUCK STOPS, MOTELS, RESTAURANTS, ETC. LOOK WHAT HAPPENED TO TOWNS ALONG ROUTE 66 WHEN THE INTERSTATES WERE BUILT.

PLATOONING

IN ADDITION TO THE DEVELOPMENT OF SELF-DRIVING TRUCKS IS THE DEVELOPMENT OF A CONCEPT CALLED “PLATOONING.” THIS IS AN ARRANGEMENT OF WIRELESSLY CONNECTING TRACTOR-TRAILORS AS A CONVOY ALLOWING OPERATIONAL COORDINATION AND CONTROL AS THEY MOVE OVER THE HIGHWAY. THIS IS VIEWED AS THE FIRST STEP IN TRUCK

AUTOMATION. THE CONCEPT AND DEVELOPMENT HAS BEEN LED BY A COMPANY NAMED PELOTON. IT IS A BILLED AS AN INTEGRATED SAFETY, AND ANALYTICS PLATFORM BUILT ON ADVANCED SAFETY TECHNOLOGIES SUCH AS COLLISION MITIGATION AND ADAPTIVE CRUISE CONTROL SYSTEMS. THE SYSTEM ELECTRONICALLY COUPLES TRUCKS BY A COMBINATION OF VEHICLE-TO-VEHICLE COMMUNICATIONS, RADAR-BASED BRAKING SYSTEMS, AND VEHICLE CONTROL ALGORITMS.

IN ADDITION TO THE SAFETY BENEFITS DERIVED FROM PLATOONING, OVER THE ROAD TESTS HAVE SHOWN THAT SIGNIFICANT FUEL EFFICIECIES ARE ALSO ACHIEVED. FUEL IS A LARGE PART OF THE OPERATING COSTS OF TRUCK LINES. CR ENGLAND TESTED A VERSION OF THIS SYSTEM AND THE TESTS SHOWED 10% SAVINGS ON THE REAR TRUCK AND 4.5% ON THE FRONT TRUCK. GIVEN THAT A TYPICAL TRUCKING COMPANY SPENDS ABOUT \$80 TO \$100,000 A YEAR ON DIESEL FUEL ON EACH LONG-HAUL TRUCK.

UNLIKE THE SITUATION WITH SELF-DRIVING TRUCKS, THERE ARE NO LEGAL OR REGULATORY OBSTACLES AT THE FEDERAL LEVEL INHIBITING PLATOONING. THERE ARE, HOWEVER, SOME HURDLES AT THE STATE LEVEL IN THE FORM OF FOLLOWING DISTANCE (TAILGATING) LAWS. IT IS ANTICIPATED THAT AS THIS CONCEPT BECOMES MORE WIDE-SPREAD, STATES WILL REACT POSITIVELY, ESPECIALLY IN VIEW OF THE IMPORTANCE OF TRUCKING TO THEIR ECONOMIES.

DRONES

PEOPLE INVOLVED IN THE DRONE INDUSTRY PREDICT THAT WITHIN THE NEXT 10 YEARS THERE WILL BE WIDESPREAD USE OF DRONES FOR THE MOVEMENT OF FREIGHT. YOU ARE ALL FACING MORE CHOICES ON HOW TO GET PRODUCTS TO CUSTOMERS, INCLUDING THE USE OF DRONES ACROSS ALL MODES OF TRANSPORTATION.

ONE COMPANY SPENDING A LOT OF TIME DEVELOPING THE USE OF DRONES AS PART OF ITS DELIVERY SYSTEM IS AMAZON. AMAZON PRIME AIR IS BILLED AS A FUTURE SERVICE THAT WILL DELIVER PACKAGES UP TO FIVE POUNDS IN 30 MINUTES OR LESS FLYING SMALL DRONES. THESE DRONES WOULD FLY UNDER 400 FEET AND WOULD TAKE ADVANTAGE OF “SENSE AND AVOID” TECHNOLOGY AND AUTOMATION TO SAFELY OPERATE DISTANCES OF 10 MILES OR MORE. IT PLANS TO FURTHER DEVELOP THIS CONCEPT TO ALLOW THE TRANSPORT OF LARGER PAYLOADS LONGER DISTANCES.

WHILE THERE HAVE NOT BEEN MANY ANALYSES OF DRONE AIR FREIGHT COSTS, THE FEW THAT HAVE BEEN DONE SUGGEST DRONES HAVE THE POTENTIAL OF BEING FASTER AND CHEAPER THAN OTHER MODES OF DELIVERY. PRIME AIR ESTIMATES IT COULD COST ONLY 88 CENTS PER DELIVERY FOR THE SMALL PACKAGES.

DRONES ARE IN THE SAME SITUATION AS SELF-DRIVING TRUCKS. DEVELOPERS HAVE TESTED THE CONCEPT BUT BOTH LEGAL AND REGULATORY HURDLES REMAIN – IN THIS CASE, PRIMARILY THE FAA.

THE USE OF DRONES TO DELIVER E-COMMERCE PACKAGES IN DENSELY-POPULATED AREAS IS PROBABLY A WAYS OFF. THE COMPANIES THAT WANT TO

USE THIS TECHNOLOGY IN THAT FASHION FACE A NUMBER OF HURDLES – PUBLIC ACCEPTANCE OF DRONES OVER-FLYING THEIR PROPERTY – WITNESS THE PSYCHOLOGIST WHO RECENTLY SHOT DOWN A DRONE FOR “VIOLATING HIS PATIENTS PRIVACY” – FAA REGULATIONS LIMITING DRONE FLIGHTS, AIRLINE COMPANY CONCERNS, AND INSURANCE COSTS. USE OF THEM TO REMOTE AREAS WITH LIMITED CONNECTIVITY COULD BE A BOON TO BOTH CUSTOMERS, MANUFACTURERS, AND LOGISTIC COMPANIES.

BLIMPS

I AM NOT TALKING ABOUT YOUR GRANDFATHER’S HINDENBURG HERE NOR THE GOODYEAR BLIMP THAT FLOATS LAZILY OVER SPORTING EVENTS. AND WHILE THE USE OF BLIMPS (MORE FORMALLY KNOWN AS AIRSHIPS) TO CARRY FREIGHT HAS BEEN TALKED ABOUT FOR DECADES, RECENTLY SOME REALLY BIG PLAYERS HAVE BECOME INVOLVED IN THIS TRANSPORTATION ARENA.

FOR EXAMPLE, LOCKHEED-MARTIN RIGHT NOW IS DEVELOPING A PROTOTYPE AIRSHIP, DUBBED THE LMH-1.

LOCKHEED IS TOUTING THIS AS A WAY TO DELIVER BOTH HEAVY CARGO AND PERSONNEL TO REMOTE LOCATIONS. THE COMPANY SAYS THAT WHEN IT IS FULLY OPERATIONAL, THE LMH-1 WILL BE A 21 METRIC TON, 300 FOOT- LONG, AND 78 FOOT - TALL AIRSHIP, INTENDED TO CARRY TRUCK SIZE CARGO LOADS, PARTICULARLY TO AREAS THAT ARE INACCESSIBLE TO MORETRADITIONAL MODES OF TRANSPORTATION. LOCKHEED ESTIMATES THAT THE LMH-1 COULD HAVE ITS FIRST FLIGHT BY LATE 2017 AND BE IN COMMERCIAL SERVICE IN 2018.

IT IS DESIGNED TO CARRY UP TO 47,000 POUNDS OF FREIGHT, 19 PASSENGERS, AND BURN LESS FUEL THAN CONVENTIONAL AIRCRAFT.

THERE ARE PLANS TO BUILD A MEDIUM-SIZE 90-TON HYBRID AIRSHIP IN ABOUT THREE YEARS, CAPABLE OF COMPETING WITH TRUCKING AND RAIL IN REMOTE AREAS. EVENTUALLY, LOCKHEED SAY IT WILL BUILD AN 800-FOOT AIRSHIP WEIGHING 500 TONS.

SOME OF THE HURDLES? COST – ABOUT \$40 MILLION PER AIRSHIP. ALSO, ACCEPTANCE BY SHIPPERS OF THIS MODE.

URBAN DELIVERY VEHICLES

ANOTHER CHANGE ON THE VERGE OF HAPPENING IS THE MOVE TOWARDS SMALL URBAN DELIVERY VEHICLES. ALTHOUGH WE ARE ALL USED TO THE UPS TYPE DELIVERY TRUCKS, THE FORECASTERS ARE SAYING THAT THE URBAN DELIVERY TRUCKS WILL BECOME SMALLER AND EITHER HYBRID OR FULLY ELECTRIC. THESE SMALLER VEHICLES HAVE THE ADVANTAGES OF REGENERATIVE BRAKING AND ENERGY EFFICIENCIES AT LOW SPEEDS. THEY WILL ALSO MEET NEW LOW EMISSION ZONES IN CITIES, RESULTING IN CLEANER DELIVERY METHODS. THEY WILL ALSO HELP REDUCE CONGESTION, WHICH MAY WELL BE THE GOAL OF SOME CITIES WHEN THEY ESTABLISH “NO TRUCK” BANS.

OTHER MODES

RAIL

THE US DOT ESTIMATES THERE WILL BE AN 88 PERCENT INCREASE IN RAIL FREIGHT DEMAND BY 2035. FORBES STATES RAIL WILL BECOME THE MOST IMPORTANT LOGISTICS SYSTEM OF THE 21ST CENTURY. FROM THE RAILROAD INDUSTRY'S PERSPECTIVE, RAIL IS ALREADY CAPTURING MARKET SHARE FROM TRUCKS BECAUSE OF ITS INCREASED RELIABILITY AND EFFICIENCIES.

HOWEVER, IN ORDER TO MEET THIS DEMAND, THE RAIL INDUSTRY WILL HAVE TO ENGAGE IN HUGE INVESTMENTS. THE AMERICAN SOCIETY OF CIVIL ENGINEERS, WHICH GRADED US RAIL INFRASTRUCTURE AS C-, SAYS THAT THE RAIL INDUSTRY REQUIRES \$200 BILLION IN INVESTMENT BY 2035 TO MEET THE PROJECTED FUTURE DEMAND.

IN THE PAST, RAILROADS WERE NOT TYPICALLY INTERESTED IN 500 OR LESS MILE SHIPMENTS BUT THAT HAS CHANGED FOR TWO REASONS:

- (1) THE DOWNTURN IN THE MOVEMENT OF COAL AND OTHER ENERGY PRODUCTS, PRINCIPALLY BY THE CLASS I CARRIERS, FORCING THEM TO RETHINK THE IMPORTANCE OF MANIFEST TRAFFIC; AND
- (2) MORE IMPORTANTLY, THE SHORT LINE INDUSTRY – KNOWN AS THE PROVIDERS OF THE FIRST AND LAST MILE OF RAIL FREIGHT. SHORT HAUL MANIFEST TRAFFIC IS THE LIFE BLOOD OF SHORT LINES AND THEY CAN PROVIDE A VALUABLE SERVICE TO SHIPPERS AND RECEIVERS.

WHAT INNOVATIONS DO I SEE COMING IN THE NEAR AND LONG TERM FOR RAILROADS?

- ONE PERSON AND/OR CREWLESS TRAINS

- EXTENSION OF INFORMATION TECHNOLOGY TO AREAS LIKE YIELD MANAGEMENT AND ASSET OPTIMIZATION
- MORE USE OF REMOTE CONTROL
- SHARING OF REAL TIME TRAFFIC AND SCHEDULING INFORMATION

AND THE CHALLENGES?

IN ADDITION TO THE CAPITAL NEEDS, THE HEAVY HAND OF REGULATION ON THE INDUSTRY IS CREATING SIGNIFICANT PROBLEMS, THE REQUIREMENT TO EQUIP TRAINS WITH PTC, EPC, AND OTHER (SOMETIMES) UNPROVEN TECHNOLOGY) AT A HUGE COST WITHOUT RESULTANT IMPROVEMENTS TO SERVICE AND ALSO DIVERTING FUNDS FROM NEEDED CAPITAL IMPROVEMENTS.

INTERMODAL

AS YOU ARE ALL AWARE, INTERMODAL FREIGHT TRANSPORTATION INVOLVES THE TRANSPORTATION OF FREIGHT IN CONTAINERS OR TRAILERS, USING MULTIPLE MODES OF TRANSPORTATION WITHOUT ANY HANDLING OF THE FREIGHT ITSELF. DURING THE SIGNIFICANT DOWNTURN EXPERIENCED BY THE CLASS I RAILROADS, INTERMODAL TRAFFIC HAS BEEN THEIR SAVIOR.

THERE ARE A NUMBER OF THINGS TAKING PLACE IN THE INTERMODAL WORLD THAT WILL MAKE THIS SEGMENT OF TRANSPORTATION EVEN LARGER AND MORE IMPORTANT. FOR EXAMPLE, THE SIZE OF CONTAINERS IS GOING THROUGH A TRANSFORMATION. THE STANDARD HAS BEEN 40 FOOT CONTAINERS AND THAT IS NOW MOVING TOWARDS 53 FOOTERS. THE SIZE OF THE CONTAINER SHIPS IS INCREASING ALMOST EXPONENTIALLY – AT ONE TIME A 12,000 TEU SHIP WAS CONSIDERED LARGE. NOW SHIPS ARE 14,000 AND 18,000 PLUS ARE NEXT.

INLAND TERMINALS HAVE BEEN BUILT ALL THROUGH THE MIDWEST AND EAST BY EACH OF THE CLASS I RAILROADS AND OTHERS. DREDGING IS GOING ON AT PORTS IN THE EAST AND WEST. THE PANAMA CANAL UPGRADES ARE ALMOST COMPLETE. ALL OF THESE AND MORE MEAN INTERMODAL WILL, ABSENT SOME WORLD RECESSION OR OTHER CATASTROPHY, CONTINUE TO GROW APACE.

HOW ARE PORTS DEALING WITH THESE CHANGES? ONE EXAMPLE CONCERNS THE PORT OF OAKLAND. IT HAS BEEN A LONG TERM INTERMODAL TERMINAL BUT IT IS NOW BUILDING WHAT IT CALLS THE GLOBAL TRADE AND LOGISTICS CENTER. THE PORT IS BUILDING A NEW RAILYARD AND RAIL ACCESS LINE, UNDERGROUND POWER, AND WATER CONDUITS AS WELL AS UNDERTAKING A GRADE SEPARATION PROJECT. WHEN COMPLETED IN 10 YEARS, TRANSLOADING, CROSS-DOCK, AND COLD STORAGE CAN ALL HAPPEN RIGHT IN THE MIDDLE OF THE TERMINAL. RAILROADS WILL BE ABLE TO MOVE UNIT TRAINS OF UP TO 200 CARS RIGHT INTO THE LOGISTICS COMPLEX. THIS DEVELOPMENT WILL COMPLEMENT THE MARINE TERMINAL AND OAKLAND ESTIMATES THIS NEW WAY OF BUSINESS WILL REDUCE COSTS BY \$100 A CONTAINER.

PREDICTIONS FROM SOME EXPERTS

- EXPECT MORE DIMENSIONAL AND DENSITY PRICING IN THE LTL SECTOR
- EXPECT MORE ACCESSORIAL CHARGES IN THE TRUCKLOAD SECTOR
- SHIPPERS WILL RELY ON ADVANCED TRANSPORATION MANAGEMENT SYSTEMS TO FIND MORE COST-EFFECTIVE WAYS TO OPERATE THEIR BUSINESS

- THERE WILL CONTINUE TO BE A PEOPLE AND TALENT SHORTAGE IN EVERY TRANSPORTATION SECTOR
- TECHNOLOGY WILL CONTINUE TO EXPAND WITH INCREASED WITH ROBOTICS IN DISTRIBUTION CENTERS AND DRONES IN WAREHOUSES (SEE ALSO, WALMART)

I HAVE ONLY SCRACHED THE SERVICE OF WHAT THE FUTURE MAY HOLD IN THE TRANSPORTATION ARENA. I LEAVE YOU WITH THIS THOUGHT FROM NOBLE LAUREATE IN PHYSICS NILS BOHR: PREDICTION IS VERY DIFFICULT, ESPECIALLY IF IT IS ABOUT THE FUTURE.”