



Group Project Assignment B

GROUP PROJECT M5X00400

Owen Bayliss 1708437 | Mechanical and Manufacturing Engineering | 14th May 2020
Word Count - 2750

Context

1. Introduction.....
2. Planning.....
3. Time Scale
4. Implementation of Design.....
5. Belbin's Theory of Team Roles
6. Selection and Elucidation of Leadership Role ...
7. Management Ideologies.....
8. Conclusion.....
9. References.....

1. Introduction

Our primary function as a company (Johnson Controls) in Swansea is to provide many sectors of industry compliant fire suppression system designed and installed to the highest standard which comply with all standards, such as the LPCB, FM, NFPA 13 and other governing bodies. As such, in the beginning of July 2019 our company more specifically my colleagues in sales secured the order for the extension of a current project, this project was to provide a deluge sprinkler system to the ferrous sorting building and storage bunkers situated beyond fed off an existing system i.e. previously installed pump and water storage facility. Due to severe deterioration of the previous system via lack of management and maintenance from the previous installation team and parent company it was clear to me and my colleagues that a full overhaul of the previous existing system was needed to ensure that the final result would meet the standards of our company, the insurer and the governing bodies, in this case the insurer had chosen to select the Factory Mutual standards for fire suppression.

2. Planning

Once the contract was secured we began the planning stages of the project. In the initial stages of our project to ensure that our project would run in an orderly and smooth manner the sales team created a Tender document. The tender document outlined basic requirements that our system would have to meet and a basic time scale on when these tasks would need to be met by. Also in our tender doc we outline the basis of our proposal and the design standards that our systems (see Figure 1.) Will need to meet in order to pass the crucial and necessary jurisdictions of the insurers. Also in this crucial part of the planning doc, we outline major deviations from our usual duties, in we outline that “From site discussions the hydrant requirements will not be included within the sprinkler supply requirements,” This is to ensure that when an audit is performed upon completion of the project, and this will not be raised as a concern. The next section outlined in the Tender document is primarily for me as the designer (see Figure 2), it gives me the basic information on each sprinkler installation such as, Risk analysis (as outlined by Factory Mutual), system type, design density, area of operation, Maximum area per sprinkler, Number of control valves and then finally head type. As a designer these criteria are crucial as they show what our drawings need to include. The design density and area of operation won’t directly affect my design but this information is important for me to carry out a hydraulic calculation once my design is complete. If you continue through this document we go on to outline the Full program of works, in this my colleagues in sales have worked with my colleagues based on site to prepare an installation strategy, in this we outline basic information such as, normal working hours, how many times our installation teams will visit the site and also where and how our systems will be fixture to the structure (see Figure 3).

/ SECTION 1 – BASIS OF PROPOSAL /

1.1: Basis of proposal

This tender proposal has been based upon the information provided to us as part of the enquiry package:

Sims Metal management Fire prevention plan Avonmouth Shredder EPR/PP3009FM (EAWML 27202)
FM Global requirements as outlined within their report dated 20th April 2017
Site meeting with FM Global

The sprinkler system outlined below has been designed generally in accordance with the above

1.2: Design Standards

This sprinkler system as outlined herein in has been designed generally in accordance with the following design standards:

FM Global: DS 2-0 Installation Guidelines for Automatic Sprinklers

FM Global DS 7-11 Conveyors

Similarly, as with all fire protection systems, any specifications/scope of works contained herein should be confirmed as acceptable to the authority with jurisdiction (i.e. leading insurers/building control etc.) and we would be pleased to assist you in attaining these approvals as required.

From site discussions the hydrant requirement will not be included within the sprinkler supply requirement as this is provided as separate firefighting water supply by port authorities and fire and rescue service as required.

Figure 1

“From site discussions the hydrant requirements will not be included within the sprinkler supply requirements,” This is to ensure that when an audit is performed upon completion of the project, and this will not be raised as a concern. The next section outlined in the Tender document is primarily for me as the designer (see Figure 2), it gives me the basic information on each

2.1: Bunker sprinkler protection

Sprinkler Protection within the two separate bunkers will consist of individual deluge systems in that the sprinklers within the bunkers will be open sprinkler heads controlled by separate deluge valves which will hold back the water from the pipework feeding the open sprinkler heads and will be activated by a double knock FM Approved flame detectors, which after the second activation of the detectors will allow water to flow into the pipework and discharge on the floor and conveyors in the bunkers from all the sprinkler heads within the bunker.

The design for the bunkers is for the floor area of the buildings to be, hydraulically calculated to meet the design criteria outlined below;

/ Designation /	/ Description /
Hazard/Risk Analysis	High Hazard
System Type	Open deluge
Design Density	12.0mm/min
Assumed Maximum Area of Operation (AMAO)	Complete floor area
Maximum Area/Sprinkler	9.0m ²
Number of Installation Control Valves	1 per bunker
Sprinkler Head Type - Roof	20mm K115 – Pendant – 68°C – Standard Response – Brass

Figure 2

/ SECTION 3 – PROGRAMME OF WORKS /

3.1: Provisional Programme

The programme of works to be agreed

3.2: Installation Strategy

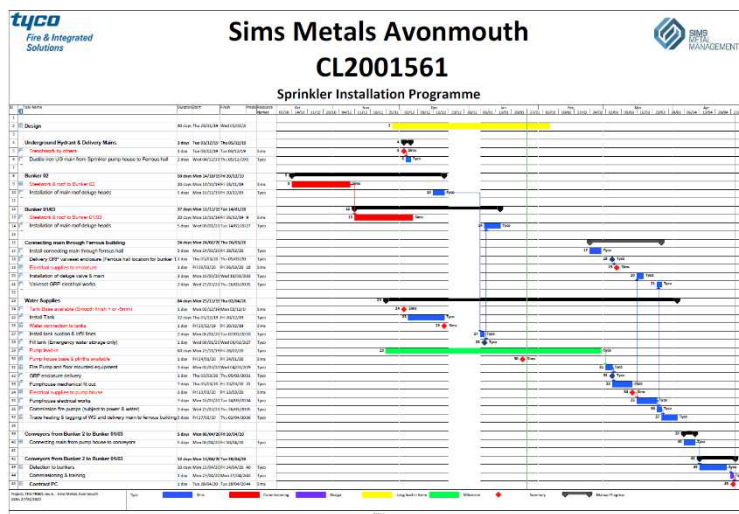
This proposal is based upon certain site conditions being met, these include:

- Site works to be undertaken during normal working hours, i.e. 8am to 6pm Monday to Friday
- Site Installation works completed in one continuous visit to site, with clear and uninterrupted access to work areas as required
- Our offer includes for the provision of standard MEWP's to install the works in accordance with our corporate QEHSS policies, our offer excludes the provision of any specialist access equipment, such as fixed scaffolding.
- Pipes will be fixed directly to the steel structure utilising standard bracketry, no allowance has been made for drilling of structural steelwork.

Figure 3

3. Time Scale

In the initial stages of our project to ensure that our project would run in an orderly and smooth manner the sales team created the tender document which I have mentioned previously. Once their tender document is fully complete and all my colleagues as well as myself are in agreements that we have met all standards and all issues have been raised and dealt with then we move onto the next phase of preparing and executing a Gantt Chart. Gantt Charts were first produced by the American mechanical engineer, Henry Gantt in around 1910. Gantt's visual work flow chart was based off a concept by polish engineer, Karol Adamiecki. Gantt's chart was revolutionary as it allowed

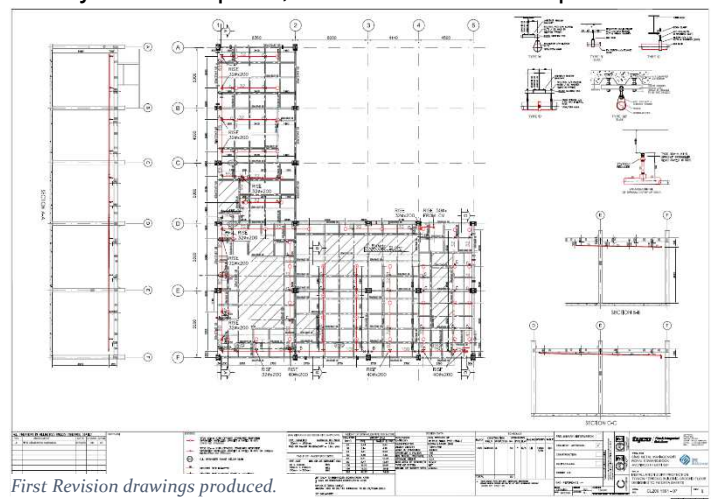
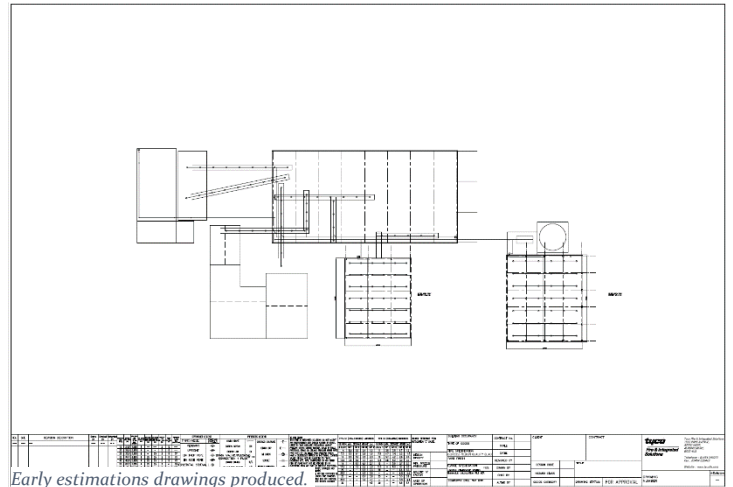


Gantt chart produced by Sales Team during planning process.

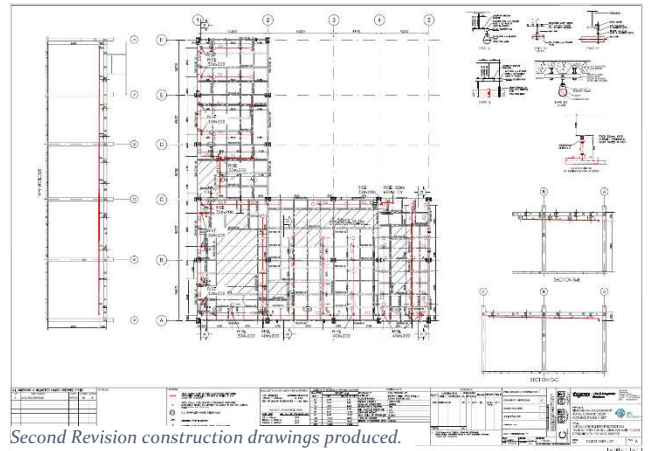
supervisors to see if their work “was on, ahead, or behind schedule,” Gantt charts have been used throughout the industry and in some of the largest projects in last few century’s since its fabrication. Gantt charts were first famously used during the hoover dam production from 1931-1936. Renowned American consulting engineer, Henry Wallace Clark described the necessity of the use of Gantt charts in large projects in his book “The Gantt Chart, a working tool of management”, He outlines the advantages of Gantt Charts saying, “Recording that plan on a chart where it can be seen by others has a tendency to make it definite and accurate and to promote the assignment of clear-cut tasks to individuals. The plan is presented clearly on these charts it can be understood in detail and as a whole not only by the executive himself but also by those above him and by his subordinates.”

4. Implementation of Design

After all planning and timescale had been decided, I and my other colleague were brought in by our sales and coordinating teams to begin the preliminary design stage. At this point only basic theoretical design had been conducted by our sales team in order to secure the order. These designs are only evaluations for number of sprinkler heads and pipe routes so we can estimate a final product cost to put to our clients before we secure the contract, this is so they can compare our costs and estimations against our rivals. As with any projects, change is inevitable, so by the time the project had moved onto the design phase, most of these earlier estimation design have become superseded and major alterations and redesigns are necessary. I as a designer then had to visit the site to conduct my first site survey on the job. Here, I and my other colleague A took measurements and photographs of the site to confirm that the drawings we had received from the architects and steel structure designers were the most recent revision and were a true reflection of what we were seeing. As the site was still a working progress some if the nonferrous building was still in construction, this was expected and we would return to complete our survey at a later date. Please find the images that were taken alongside their corresponding dates at the back of this report. Once the initial site survey was complete, I was able to draw up a first revision drawing to be sent for comment and approval to both the insurer and our clients, this took approximately 2 weeks as it had to be fully hydraulically calculated and also reviewed and checked by an internal reviewer, this internal reviewer was a more senior design colleague. As you can see the comparison between the early estimation drawings and the first revision drawings is drastically different, as earlier stated there has been major layout changes to the site and also in early estimations the extensions of protection to the nonferrous building was never taken into consideration. After this drawing was received by our clients a few issues were raised due to clashes with our pipework and the electrical trays that already fixed into position by our clients. A second revision was then made by myself taking into consideration these changes and a second



hydraulic calculation was completed. After receiving positive feedback from our clients and they had agreed to all amendments my drawings were signed off and sent for fabrication by our partners in MP&F (Mechanical Pipe and Fabrication). The design of the nonferrous building had to be placed on pause however due to the ongoing COVID-19 situation as the Sites were closed no pipework of materials could be delivered so the fabrication was placed on hold.



5. Belbin's Team Roles

Meredith Belbin produced a theory on team roles and attributes over a ten year period, eventually arriving at what we recognize as Belbin's theory on team roles in 1981. He first began studying teams at Henley Management College in 1960. Belbin is quoted as saying a team role is, "a tendency to behave, contribute and interrelate with others in a particular way." That quote can be misconstrued or interpreted however when you delve further into Belbin's research and his final theory, Team roles can be subdivide into 3 Divisions each containing 3 subdivisions, There are 3 'Action orientated roles', 3 'People orientated Roles' and finally 3 'Cerebral Roles'. The 3 'Action orientated role' can be applied to the colleagues on my project that would be completing the projects on the course such as designers, sales teams and project supervisors, they are as followed, Shaper, Implementers and complete finishers. The 3 people orientated roles are more suited to my colleagues such as site supervisors and senior designers. Finally the 3 cerebral roles, Plant, Monitor Evaluator and Specialist can be associated with those such as, insurers, fabricators and our installation teams.

Colleague	Project Occupation	Belbin Team Role most identifiable	Reason
Myself	Junior Designer	Implementer	As an implementer I am key to putting ideas on paper whilst also being disciplined and reliable.
A	Senior Designer	Shaper	The shaper needs to be the driving force behind the team to allow them overcome problems encountered whilst also not being afraid to upset others, colleague B perfectly embodies these aspects.
B	Sales	Resource Investigator	The resource investigator team role is for someone who explores opportunities, communicative and promotes decision making all of which is completed by this significant member of our sales teams.
C	Sales	Team worker	A Team Worker needs to be co-operative, diplomatic and a problem solver, as this particular colleague mostly deals with client issues and requests, they mostly associate with this role.
D	Project Supervisor	Coordinator	As the name suggests the coordinator is someone who leads, they're most likely the manager and key influencer in a team the delegate, promote

			decision making and clarifies goals, all key attributes of our project supervisor.
E	Site Supervisor	Monitor Evaluator	Unlike the project supervisor the site supervisor has a much smaller cooperative group to oversee, limited only to what goes on, on site, however colleague shares many aspects of a monitor evaluator, such as an even temperance, strategic decision making skills and judges accurately.
F	Insurer	Specialist	The insurers are only concerned about one thing within this project and that is that the overall design of the system complies with FM standards and legislation, they have no concern with timescale or planning, they are single minded and provide specialist knowledge all key factors of a specialist.
G	Fabricator	Plant	Both fabricator and installation teams are key problem solvers but lack communicative skills and are too immersed. Both fabricators and installation teams mainly deal with problems as soon as they arise but rarely feel the need to tell supervisors and designers until much further on down the line.
H	Installation Teams	Plant	
I	Design Manager	Complete Finisher	The design manager sees over our final designs and makes crucial decisions on what to submit and when they are submitted he is anxious to get the job done and has an extreme eye for detail spotting the smallest mistakes in our drawing and is the final stage before all drawings are submitted to our clients. These are all key personality traits of a complete finisher.

6. Selection and Elucidation of Leadership Role

As stated previously I identified my Project supervisor as the coordinator in Belbin's theory of team roles, not only is he the project supervisor but also the project leader, whilst researching leadership ideologies and theories such as, transformational leadership, leader-member exchange theory, servant leadership and strength-based leadership, I found he mostly related to the theory of adaptive leadership.

Adaptive leadership

The Adaptive leadership model was introduced by Ronald Heifetz and Marty Linsky, after 30 years of research at Harvard University. All of their findings was published in a paper titled, "The Practice of Adaptive Leadership: Tools and Tactics for Changing Your Organization and the World". The Basic definition for this leadership model "is the activity of mobilizing people to tackle tough Challenges and thrive". Adaptive leadership is different to the more traditional ideas of leadership, "where an individual single-handedly generates results by enforcing his or her will." These views can be deemed as outdated in many areas of both industry and society as a whole. The Adaptive Leadership model is based on an idea that, "Leadership is now a team sport".

The Main Principles of Adaptive Leadership

- Emotional Intelligence -

The ability to recognise your own emotions and the emotions of those on your team. This is crucial to build trust within your team.

- Organizational Justice –

Adaptive Leaders know what strategy's need to be brought in and implemented for the good of the organization/team whilst also upholding a "culture of honesty". They are willing to be flexible in regards to people's views and values.

- Development-

The growth and development of the team is the main goal for an adaptive leader through learning new things. An adaptive leader is willing to try many different techniques to achieve their desired results.

- Character –

An adaptive leader needs strong character and will, they may not always be right, but they will always earn respect.

Challenges with implementing an Adaptive Leadership Style

If they are to be truly adaptive some leaders may need to reassess and change their own personal values and behaviour, this can be very difficult for strong willed leaders, as they may see this as them being disloyal to themselves. As Adaptive leaders are willing to change their techniques and strategies, some workers are used to a more structured team environment, these changes can cause fractures in a team dynamic so work rates drop and in some cases rules are broken. When organisations implementing a more traditional leadership style become tired and no longer can see progressive results, an adaptive leadership style be brought in to "shake things up" it is not always seen as a permanent solution but can revive productivity and progression within an organisation.

7. Management Ideologies

Theories on management can differ from large scale industry where the management theories are aimed at tackling larger groups and the management of huge teams and sectors. However, in our company rather than working as one large corporate group, we are subdivided into both target sectors of fire suppression and integrated solutions. In the Swansea office we are delegated to the Major projects group and intern are Managed by a single figure. Colleague D our project supervisor. When researching management ideologies and theories 3 Management theories were easily relatable to how we as company work and are managed by those colleagues in a higher responsibility position, these management theories were, The Scientific Management Theory, the Classical Management Theory and the Bureaucratic Management Theory. One thing all 3 of these management theories have in common is the hierarchical chain of command and also the “hiring and promotion based on qualifications and performance, not personal relationship”, but out of all three The classical management theory is most relatable to how we function as team, with a single figure head, with streamlined operations and with a key goal of profit maximization at the end of each project, only entering into an agreement when this final goals is achievable and profitable.

The Classical management theory was created at the end of the 19th century to ensure that each job or task was streamlined and efficient. The main concepts for the classical theory is a hierarchical structure, where a single figurehead or board is at the top of the workplace and oversee the production and progression and subdivide responsibility down through managers and specialists. Expanding more on these specialists, the classical theory uses specialists who understand their role and understand that they work together to form a large driving specialist workforce in a subdivided group or job, this helps to increase productivity. These concepts are seen throughout our company and office.

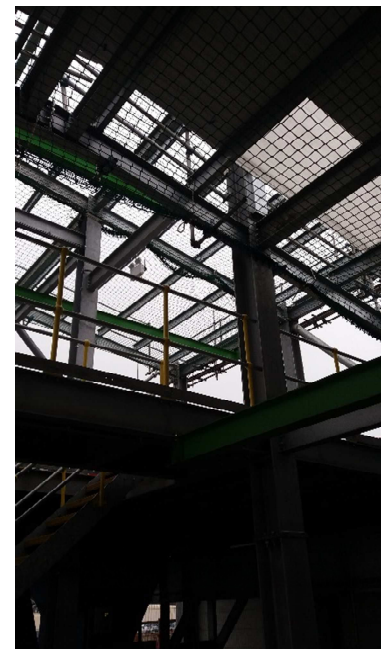
8. Conclusion

To conclude in this report I have outlined our main function as a business and sub-organization in the Swansea office and major projects group of Johnsons Control, showing how we plan, prepare, design and implement all parts of this project. Showing examples of our time scale and planning process via Gantt charts, tender documents and order information. Also divulging into how we conduct our site surveys and early stages of design right through to the production of pipework and installation. Delving deeper into how we work as a team, using Belbin's ideology on team roles assigning each member of our team and project and showing how they contribute through these roles. Through the evidence and examples brought forward from a firsthand experience I am able to analyse the management theories shown throughout our business and the types of leaders I work with.

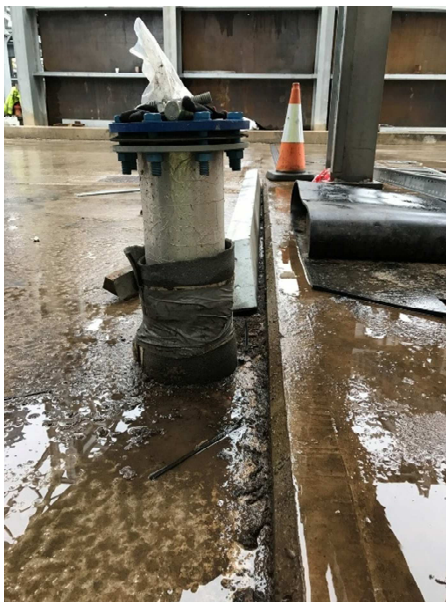
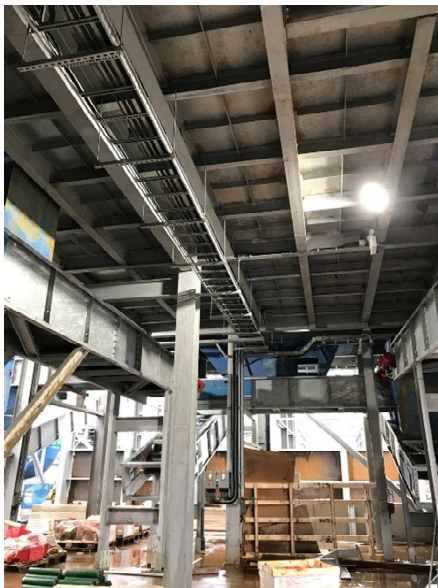
Images Taken 13/01/2020



Images Taken 02/02/2020 by Colleague



Images Taken 02/02/2020 by Myself



9. References

- Dowding, M., Mugridge, T., Swift, C., Jackson, K., Hancock, J., Bell, S., Dunne, K., Bishop, L., Hughes, M., Robinson, R. and Gledhill, A., 2020. *Gantt Charts: Planning And Scheduling Team Projects*. [online] Mindtools.com. Available at: <https://www.mindtools.com/pages/article/newPPM_03.htm>
- Kashyap, S., 2018. *How To Use Gantt Chart To Kickstart A Project Like A Boss*. [online] Proofhub.com. Available at: <<https://www.proofhub.com/articles/uses-of-gantt-chart>>
- Clark, W., 1922. *The Gantt Chart, A Working Tool Of Management*. 1st ed. New York: The Ronald press company, p.3.
- Teams, L. and Belbin, T., 2020. *Meredith Belbin's Team Roles – Businessballs.Com*. [online] Businessballs.com. Available at: <<https://www.businessballs.com/leading-teams/team-roles-meredith-belbin/>> [Accessed 8 May 2020].
- Moultrie, J., 2020. *Belbin's Team Roles*. [online] Ifm.eng.cam.ac.uk. Available at: <<https://www.ifm.eng.cam.ac.uk/research/dmg/tools-and-techniques/belbins-team-roles/>> [Accessed 8 May 2020].
- Heifetz, R. and Linsky, M. (2020). *Becoming an Adaptive Leader*. [online] Lifelongfaith.com. Available at: https://www.lifelongfaith.com/uploads/5/1/6/4/5164069/becoming_an_adaptive_leader.pdf [Accessed 13 Feb. 2020].
- Corporate Finance Institute. (2020). *Adaptive Leadership - Know the Traits of Adaptive Leaders*. [online] Available at: <https://corporatefinanceinstitute.com/resources/careers/soft-skills/adaptive-leadership/> [Accessed 13 Feb. 2020].
- Hks.harvard.edu. (2020). *Ronald Heifetz*. [online] Available at: <https://www.hks.harvard.edu/faculty/ronald-heifetz> [Accessed 13 Feb. 2020].
- Cambridge Leadership Associates. (2020). *Adaptive Leadership*. [online] Available at: <https://cambridge-leadership.com/adaptive-leadership/> [Accessed 13 Feb. 2020].
- Regoli, N. (2020). *11 Advantages and Disadvantages of Adaptive Leadership Styles*. [online] FutureofWorking.com. Available at: <https://futureofworking.com/11-advantages-and-disadvantages-of-adaptive-leadership-styles/> [Accessed 13 Feb. 2020].
- Heifetz, Ronald A., Marty Linsky, and Alexander Grashow. *The Practice of Adaptive Leadership: Tools and Tactics for Changing Your Organization and the World*. Harvard Business Press, 2009
- Mackechnie, P., 2020. *What Are The Belbin 'Team Roles'?*. [online] Businesscoaching.co.uk. Available at: <https://www.businesscoaching.co.uk/files/belbin_team_role_theories.pdf> [Accessed 12 May 2020].
- Moga, B., 2017. *Belbin Team Roles: Theory And Practice · Activecollab Blog*. [online] ActiveCollab. Available at: <<https://activecollab.com/blog/collaboration/belbin-team-roles-theory-practice>> [Accessed 13 May 2020].

Prichard, J. and Stanton, N., 2020. *Testing Belbin'S Team Role Theory Of Effective Groups / Emerald Insight*. [online] Emerald.com. Available at: <<https://www.emerald.com/insight/content/doi/10.1108/02621719910371164/full/html>> [Accessed 13 May 2020].

Teambuilding.co.uk. 2020. *Belbin Team Role Theory*. [online] Available at: <<https://www.teambuilding.co.uk/theory/belbin-team-role.html>> [Accessed 13 May 2020].

Smartsheet. 2020. *How To Use Teamwork Roles To Build Winning Teams*. [online] Available at: <<https://www.smartsheet.com/how-to-use-team-roles-to-boost-performance>> [Accessed 13 May 2020].

Villanovau.com. 2019. *The Classical Management Theory*. [online] Available at: <<https://www.villanovau.com/resources/leadership/classical-management-theory/>> [Accessed 14 May 2020].

Team, S., n.d. *The 11 Most Important Management Theories For Small Business / Sling*. [online] Sling. Available at: <<https://getsling.com/blog/management-theories/>> [Accessed 14 May 2020].

Caramela, S., n.d. *The Management Theory Of Frederick Taylor - Business.Com*. [online] business.com. Available at: <<https://www.business.com/articles/management-theory-of-frederick-taylor/>> [Accessed 14 May 2020].

Enyart, S. and Womack, W., n.d. *Frederick Taylor'S Scientific Management / Organization And Administration In Recreation, Sport And Leisure Management*. [online] Oer.missouriwestern.edu. Available at: <<https://oer.missouriwestern.edu/rsm424/chapter/frederick-taylors-scientific-management/>> [Accessed 14 May 2020].

Business Jargons. n.d. *What Is Scientific Management Theory? Definition And Meaning - Business Jargons*. [online] Available at: <<https://businessjargons.com/scientific-management-theory.html>> [Accessed 14 May 2020].

Expert Program Management. 2018. *Expert Program Management*. [online] Available at: <<https://expertprogrammanagement.com/2018/05/taylors-scientific-management/>> [Accessed 14 May 2020].

Mulder, P., 2017. *What Is Max Weber Bureaucracy Theory? Definition & Examples / Toolshero*. [online] toolshero. Available at: <<https://www.toolshero.com/management/bureaucratic-theory-weber/>> [Accessed 14 May 2020].

iEduNote.com. n.d. *Bureaucratic Management Theory By Max Weber*. [online] Available at: <<https://www.iedunote.com/bureaucratic-management-theory-max-weber>> [Accessed 14 May 2020].

Lucas, S., 2020. *How To Use The Principles Of Adaptive Leadership In The Workplace*. [online] The Balance Careers. Available at: <<https://www.thebalancecareers.com/using-principles-of-adaptive-leadership-in-the-workplace-4161276>> [Accessed 14 May 2020].

Mcfarland, R., 2019. *What Is Adaptive Leadership?*. [online] Opensource.com. Available at: <<https://opensource.com/open-organization/19/3/adaptive-leadership-review>> [Accessed 14 May 2020].